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## **75<sup>th</sup> Annual Scientific Meeting**

# *Mobilizing Technology to Advance Biobehavioral Science and Health*

**March 15-18, 2017**

**Sevilla, Spain**

# **Abstracts**

*Abstracts are listed by presentation type:  
first posters, then paper and symposia presentations. Citation posters are  
presented first and represent the highest rated posters.*

## CITATION POSTERS

### 1) Abstract 1170

#### IMPACT OF BRIEF COGNITIVE BEHAVIORAL AND RELAXATION TRAINING INTERVENTIONS ON CANCER-RELATED DISTRESS IN BREAST CANCER PATIENTS OVER 12-MONTHS

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**INTRODUCTION.** We have demonstrated that a 10-week cognitive behavioral stress management (CBSM) program mitigates distress in breast cancer patients undergoing primary treatment. These prior investigations, however, did not identify the active components of CBSM. We recently completed a randomized controlled dismantling study that partitioned CBSM into two separate group-based 5-week interventions, cognitive behavioral training (CBT: cognitive restructuring, coping and interpersonal skills training) and relaxation training (RT: muscle relaxation, deep breathing, imagery), and compared these interventions to a 5-week attention-time matched health education (HE) control group. **METHODS.** We recruited 183 women (age  $M = 54.28$ ) in the weeks after surgery and before initiating adjuvant therapies, randomized them to CBT, RT or HE, and assessed intrusion of cancer-related thoughts at four time points (baseline, post-intervention, 6-month follow-up, 12-month follow-up) using the Intrusions subscale of the Impact of Event Scale – Revised (IES-I). Treatment groups did not differ on age, education, marital status, race/ethnicity, disease stage, time since surgery, surgical procedure type, or type of adjuvant treatment received but HE reported higher income. Prior analyses revealed that women assigned to CBT showed greater IES-I reductions vs RT and HE controls at 2-month (post-intervention) follow-up. We hypothesized that IES-I effects would also be more likely to persist in the CBT condition over a longer period. Here we tested whether there would be a significant group  $\times$  time interaction over a 12 month follow-up period, such that women in the CBT group show the greatest reductions over time. **RESULTS.** A 3 (condition) by 4 (Time: baseline, 2 months, 6 months, 12 months) general linear model repeated measures analysis revealed that compared to both the HE and RT groups, women in the CBT group had the greatest decreases in cancer-related intrusive thoughts over the 12-month period,  $F(6, 200) = 2.5$ ,  $p = .02$ . **CONCLUSION.** These findings suggest that a brief group-based program teaching cognitive behavioral methods in the post-surgical period shows the greatest reductions in cancer-related stress for breast cancer patients over the initial one-year period of primary treatment. The brevity of this intervention increases the likelihood of uptake in clinical oncology settings.

### 2) Abstract 1185

#### IS YOUR SMARTPHONE A DIGITAL SECURITY BLANKET? HOW PHONE USE AND AVAILABILITY INFLUENCES SALIVARY ALPHA AMYLASE AND EXCLUSION REPORTS DURING SOCIAL STRESS

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**Objectives:** Cell phones are increasingly becoming a part of the social environment and play a significant role in the nature of social interactions. In this modern age, when an individual feels rejected or isolated during a socially stressful situation, they may retreat to the comfort of their phone to feel better. This study examined whether smartphones alter psychological and physiological responses to social stress by exposing individuals to rejection and experimentally manipulating smartphone use and availability. **Method:** Participants ( $N=147$ ) completed questionnaires and were subjected to a modified

version of the Yale Interpersonal Stressor, where two confederates ignored the participant during a brief interaction. Prior to exclusion, participants were randomized to one of three conditions: (1) phone present with use encouraged, (2) phone present with use restricted/not permitted or (3) no phone access. Saliva samples were collected at five points across the study to assess salivary alpha amylase, a marker of sympathetic activity. Self-reported exclusion was also reported following the stressor. **Results:** Participants in the phone-present conditions reported lower feelings of exclusion as compared to individuals who had no access to their phone,  $p=.004$ . Reported exclusion was not significantly different across phone-present groups. Multi-level modeling of salivary alpha amylase responses revealed that the individuals in the restricted phone condition had a significantly different trajectory following the stressor in comparison to individuals in the phone use condition ( $p=.014$ ) and no phone condition ( $p=.009$ ). Those in the no phone and phone use conditions show a gradual increase over the course of the study, whereas those in the restricted phone condition show a decrease following the stressor. **Conclusions:** Taken together, these results suggest that the presence of a phone (not necessarily phone use) may reduce feelings of exclusion and buffer the negative physiological stress response associated with social exclusion. In this way, a phone may symbolically serve as a “digital security blanket” in stressful social environments. These findings also lay a foundation for future studies to explore the intricacies of how phones may influence our psychological, physiological, and social well-being.

### 3) Abstract 1194

#### PREGNANCY ANXIETY AND LENGTH OF GESTATION: HOW DO RACE AND ETHNICITY FIT IN?

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**Pregnancy anxiety** (also called pregnancy-specific anxiety) is a distinct form of anxiety related to fears and worries reported about a current pregnancy, and may include anxiety about being pregnant, about one's own health and that of the developing child, fear about labor and childbirth, and worries about parenting ability (Dunkel Schetter, 2011). Pregnancy-specific anxiety is a risk factor for early delivery, infant complications, and less than optimal development after birth. In fact, pregnancy anxiety is a more powerful predictor of early delivery than general anxiety, depression, or various forms of stress. Despite the well-documented disparities in birth outcomes, few studies have examined whether levels of pregnancy anxiety differs by race/ethnicity or if prediction of birth outcomes is modified by a woman's ethnicity or race. To address this gap, the current study examined levels of pregnancy anxiety in a sample of 180 predominantly low-income African American, Latina, and Non-Latina White pregnant women. Analyses aimed to: (1) test differences between the three groups, (2) replicate the finding that pregnancy anxiety is related to shorter length of gestation and (3) test whether or not the relationship between pregnancy anxiety and length of gestation differed by race/ethnicity. Pregnant women participated in structured interviews that were conducted at two intervals during pregnancy (14-27 weeks, 28-37 weeks) in this prospective study about preconception and prenatal stress.

We found statistically significant differences in mean levels of pregnancy anxiety across groups at both time points ( $p$ 's  $< .001$ ). Post-hoc analyses revealed statistically significant differences in mean levels of pregnancy anxiety at 14-27 and 28-37 weeks between African American and White women ( $p < .01$ ) and African American and Latina women ( $p < .01$ ). In the full sample, pregnancy anxiety at 28-37 weeks predicted length of gestation ( $\beta = -.22$ ,  $p < .05$ ). Although length of gestation did not differ between ethnic groups, separate analyses by ethnic group revealed that pregnancy anxiety at 28-37

weeks predicted length of gestation for African American women ( $\beta = -.33, p < .05$ ) only. These findings add to growing evidence that associations of pregnancy anxiety with birth outcomes may differ depending on race/ethnicity.

#### 4) Abstract 1201

##### CHILDHOOD BEREAVEMENT AND REDUCED STRESS RESILIENCE IN LATE ADOLESCENCE

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**Methods:** In this national register-based study, we identified 492 152 Swedish young men born 1973-1983, who underwent compulsory military enlistment examinations including measures of psychological stress resilience. We further identified biological first-degree relatives of conscripts as well as of their mothers through the Multi-Generation Register, and ascertained antenatal, childhood and adolescence familial deaths in the Cause of Death Register. Relative risk ratios (RRR) with 95% confidence intervals (CI) adjusted for parental socioeconomic circumstances and conscript's birth characteristics were calculated using multinomial logistic regression.

**Results:** Bereavement in childhood or adolescence conferred a 49 % increased risk of low stress resilience in late adolescence (RRR, 1.49, 95 % CI, 1.41-1.57). The association was present regardless of the familial relationship to the deceased, age at loss or cause of the relative's death. Strong associations were noted for loss of father (RRR, 1.71; 95% CI, 1.57-1.85), loss after the age of 12 (RRR: 1.60, 95 % CI: 1.50-1.72) and for deaths not due to illness (RRR, 1.68; 95 % CI, 1.52-1.86). The seemingly highest risk was observed for suicide (RRR, 1.75; 95 % CI, 1.49-2.05). In contrast, exposure to antenatal maternal bereavement was not associated with stress resilience in late adolescence.

**Conclusion:** These data suggest that childhood bereavement may be an important determinant of stress resilience in late adolescence. Interventions aimed at relieving long-term emotional and social consequences of bereavement may thus help reduce the risk of stress-related health outcomes later in life.

#### 5) Abstract 1309

##### INTERACTIVE RELATIONS OF BLOOD PRESSURE AND SOCIODEMOGRAPHIC FACTORS ON GLOBAL BRAIN VOLUMES IN URBAN DWELLING AFRICAN-AMERICAN AND WHITE ADULTS

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**Objective:** Examine interactive relations of systolic and diastolic blood pressure (SBP, DBP) with age, sex, race, and/or SES on global brain volumes.

**Participants and Methods:** Participants were 193 African-American (AA) and White, urban dwelling adults (mean age = 51.79, 53% female, 36% AA, 48% below the poverty line) from the Healthy Aging in Neighborhoods of Diversity across the Life Span (HANDLS) SCAN study. Seated SBP ( $M = 118.59, SD = 15.91$ ) and DBP ( $M = 72.75, SD = 9.47$ ) were measured by standard brachial artery auscultation following a 5 min rest. Approximately five years later, cranial magnetic resonance imaging determined total brain, gray matter (GM), white matter (WM), and white matter lesion (WML) volumes. Education and poverty status were used to compute a dichotomous composite of SES. Exclusion criteria were history of stroke, dementia, neurological disease, HIV+ status, and known cardiovascular disease. Multiple linear regression was used to examine up to three-way interactive relations of SBP (and DBP) with sex, age, SES, and/or race and their main effects with global brain outcomes. Body mass index (BMI) and the use of antihypertensive medications were covariates.

**Results:** A significant three-way interaction of SBP, sex, and SES was found for total brain ( $\beta = 1.86, p = .006$ ), WM ( $\beta = 2.00, p = .005$ ), and GM ( $\beta = 1.62, p = .014$ ) volumes. For high-SES men only, greater SBP was inversely associated with total brain ( $\beta = -3030.99, p < .001$ ), WM ( $\beta = -1623.21, p < .001$ ), and GM ( $\beta = -1407.78, p = .002$ ) volumes. A significant three-way interaction of SBP, race, and SES with WML volume ( $\beta = 3.06, p = .002$ ) was also noted. Greater SBP was associated with significantly greater WML volume, but only for high-SES Whites ( $\beta = 55.68, p = .005$ ) and low-SES African-Americans ( $\beta = 83.82, p < .001$ ). No significant associations were found with DBP.

**Conclusions:** This study suggests that men of high SES with greater SBP may be vulnerable to lower total brain, WM, and GM volumes; while high-SES Whites and low-SES African Americans with greater SBP may be vulnerable to WML. Future studies should identify relevant vulnerability and protective factors within these sociodemographic subgroups.

#### 6) Abstract 1311

##### KEEP CALM AND CARRY ON: LOW AROUSAL POSITIVE AFFECT IS ASSOCIATED WITH HIGHER PARASYMPATHETIC FUNCTION BUT NO SYMPATHETIC ACTIVATION DURING EXPERIMENTALLY INDUCED PAIN

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Experimental studies have shown positive affect impacts health by attenuating responses to stress. However, little has been done to understand the *type* of positive affect that is beneficial, what kind of stressful *context* positive affect is beneficial for, and *how* positive affect attenuates responses to stress. Thus, the current study explored the effect of different types of positive affect on both parasympathetic and sympathetic responses to two kinds of stressors: a passive-coping stressor (i.e., cold pressor task) and an active-coping stressor (i.e., star tracing task). Participants ( $N=279$ , 75.6% female,  $Age=20.6$ ) completed a resting baseline, then were randomized to one of three positive mood writing inductions (calm, happy, or excited) or a neutral morning routine writing period. This was followed by a manipulation check, a 2-minute painful, cold pressor task, a 5-minute recovery, a brief repeat of their initial writing manipulation, a 2-minute star tracing task, and a final 5-minute recovery. Root mean square of the successive differences (RMSSD; a time-domain measure of parasympathetic function) and pre-ejection period (PEP; a time-domain measure of sympathetic function) were recorded continuously throughout the study via BioLab 3.0.13. Results revealed that individuals who were induced to feel calm had greater rates of change in RMSSD from stress to

recovery during the cold pressor task compared to both the neutral control and excited conditions ( $p < .05$ ), but there were no differences between conditions during the star tracer task. Additionally, the calm condition had smaller rates of change in PEP compared to both the neutral control and happy conditions ( $p < .05$ ) but there were no differences between conditions during the star tracer task. These results suggest that feelings of calm promote greater autonomic flexibility (i.e. more adaptive functioning) during responses to passive stressors via parasympathetic nervous system activation (i.e., vagus nerve). These results support past research on the stress buffering effects of positive emotion and point to an underlying parasympathetic mechanism of these effects. Furthermore, these results suggest that low arousal positive affect (calm) may be physiologically adaptive during acute pain.

#### 7) Abstract 1325

##### **PREDICTORS OF INCIDENT DEPRESSIVE SYMPTOMS IN ADULTS WITH DIABETES: PROSPECTIVE RESULTS FROM A COMMUNITY COHORT STUDY IN MONTREAL**

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**Background:** Depression is more common in adults with diabetes than in adults without diabetes, and comorbid depression is associated with adverse diabetes health outcomes. Prospective studies examining risk factors for incident depressive symptoms in people with diabetes, however, are limited. This study examined associations between three classes of predictors (sociodemographic, lifestyle, and medical characteristics) and the risk of incident depressive symptoms over 5 years in a cohort of adults with diabetes.

**Methods:** Data were from a prospective community survey of adults with diabetes from Montreal ( $N = 1,261$ ) who reported no/low depressive symptoms at baseline. Sociodemographic (age, sex, education, marital status, ethnicity, material neighbourhood deprivation), lifestyle (smoking, body mass index, alcohol use, exercise), and medical (number of comorbid chronic conditions, insulin use, diabetes duration, self-reported diabetes control, disability) characteristics were assessed at baseline. Self-reported depressive symptoms were assessed annually for 5 years. Modified Poisson regression analyses estimated the relative risk of depressive symptoms during over 5 years. Models were first estimated for each class of predictors and a final model was estimated for all predictors entered together.

**Results:** Of the sociodemographic factors, non-white ethnicity (risk ratio [RR]=2.14, 95% confidence interval [CI]=1.45, 3.16) and being single (RR=1.34, CI=1.00, 1.80) predicted incident depressive symptoms. Of the lifestyle factors, only obesity vs. normal weight (RR=1.55, CI=1.02, 2.37) predicted incident depressive symptoms. Of the medical factors, more comorbid chronic conditions (RR=1.13, CI=1.02, 1.25), poor vs. excellent diabetes control (RR=1.64, CI=1.14, 2.37), and increased disability (RR=1.03, CI=1.02, 1.04) predicted incident depressive symptoms. When all predictors were simultaneously entered into one model, non-white ethnicity, comorbid chronic conditions, and increased disability remained significant predictors of incident depressive symptoms.

**Conclusions:** Results suggest that adults with diabetes who are of non-white ethnicity, have comorbid chronic conditions, or have disability have the greatest risk of developing depressive symptoms. Identifying who is at greatest risk of depression can help inform prevention strategies for people with diabetes.

#### 8) Abstract 1331

##### **INTRA-INDIVIDUAL VARIABILITY IN MOMENTARY CORTISOL IN A SAMPLE OF WORKING ADULTS: RELATIONSHIPS TO PERCEIVED STRESS AND AFFECTIVE VALENCE AND AROUSAL**

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**BACKGROUND:** Research employing ecological momentary assessment (EMA) methodology to assess cortisol levels during daily life is still sparse, as is careful testing of the dynamic within-person associations between stress, affect, and cortisol levels. Such analyses are essential to understanding potential processes linking stress and affect to health. In this study we examined the within-person covariation of momentary cortisol with momentary stress and affect.

**METHODS:** A community sample of 115 working adults (mean age=41.2; 75.7% women; 76.1% white) completed 3 days of EMA surveys (6 per day; 2 work days and 1 weekend day) to assess perceived stress and momentary affect (valence and arousal indicators, derived from a circumplex approach), and provided salivary cortisol samples. Multi-level models were used to examine the contemporaneous association between (person-mean centered) momentary stress or affect and (log-transformed) momentary cortisol, controlling for time of day.

**RESULTS:** Moments characterized by greater perceived stress were associated with higher cortisol ( $p=.036$ ). Similarly, momentary affective valence covaried with cortisol ( $p=.003$ ), wherein states of more positive affective valence were associated with lower cortisol and more negative valence with higher cortisol. Momentary affective arousal was not related to cortisol ( $p=.131$ ). The interaction between momentary affective arousal and valence did not predict cortisol ( $p=.085$ ). When momentary perceived stress, affective valence, and affective arousal were tested in the same model, only valence remained a significant predictor of cortisol ( $p=.047$ ).

**CONCLUSION:** The results conceptually replicate and extend previous research by demonstrating that momentary perceived stress and affective valence, but not arousal, predicted within-person fluctuations of cortisol in the natural environment. Also, although preliminary, the results suggest that within-person variability in cortisol may be more strongly influenced by affective valence than by perceived stress. These findings contribute to our understanding of how moments of stress and dynamic changes in the degree of positive or negative valence of mood states could 'get under the skin' in daily life. When repeated over time, these micro-processes may represent one mechanism underlying the long-term associations of stress and mood to health outcomes.

#### 9) Abstract 1332

##### **SEXUAL MINORITY IDENTITY DISCLOSURE PREDICTS PSYCHIATRIC SYMPTOMS AND DIURNAL CORTISOL IN SEXUAL MINORITY YOUNG ADULTS**

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Previous research indicates that the degree to which sexual minority young adults (SMYA) disclose their sexual identity (outness) predicts better mental and physical health outcomes (e.g., reduced depressive symptoms, anxiety, and total cortisol output). In order to further investigate these associations, the current study sought to extend previous findings by using a more nuanced degree of disclosure scale (assessing different dimensions of outness), and assessing diurnal cortisol more robustly. We expected more disclosed SMYA to report

less depressive symptoms and anxiety, and to have lower total cortisol output across the week. We also examined whether particular dimensions of disclosure (3 subscales: outness towards family members, outness towards the world, outness towards religious figures) underlie its relationship to diurnal cortisol.

One hundred and twenty-one SMYA (aged 18-35, 54.5% female, free of major psychiatric/endocrine disorders) completed an initial survey and daily evening questionnaires for one week. A randomly selected subset ( $n = 58$ ) also provided salivary cortisol samples at wake, 45 minute post-, 12 hours post-wake, and at bedtime over 7 days. Outness was measured using the Outness Inventory at baseline.

Overall outness was associated with less depressed mood (baseline) but was unrelated to trait anxiety. Mixed linear models revealed that overall outness predicted lower AUCg cortisol across the week,  $F(1,231) = 6.08, p = .01$ . The effect of outness on cortisol AUCg was driven by disclosure to family members,  $F(1,230) = 10.18, p = .001$  but not disclosure to world or religious groups,  $F(1,231) = 1.78, p = .18$  and  $F(1,81) = .91, p = .34$ , respectively. This effect was independent of sexual orientation, sex, or time since disclosure, and was not moderated by sex or orientation. Follow up analyses revealed that disclosure to family did not predict diurnal slopes,  $F(1,634) = .003, p = .95$ , but was associated with lower cortisol levels at wake, 45 minute post-wake, 12 hours post-wake, and at bedtime,  $F(1,634) = 11.37, p < .001$ ,  $F(1,634) = 12.66, p < .001$ ,  $F(1,633) = 7.44, p = .006$ , and  $F(1,634) = 4.56, p = .03$ , respectively.

These results extend previous work by suggesting that, for SMYA, regardless of sexual orientation, sex, or age of disclosure, disclosing one's sexual identity to family members may have the most benefit for health.

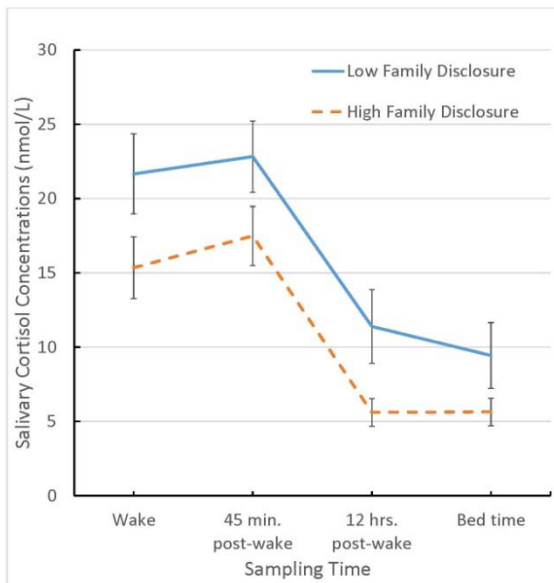


Fig.1 Outness to family members (median split) and diurnal cortisol in SMYA

#### 10) Abstract 1333

##### YEARNING PREDICTS SUBGENUAL ANTERIOR CINGULATEACTIVITY IN COMPLICATED GRIEF

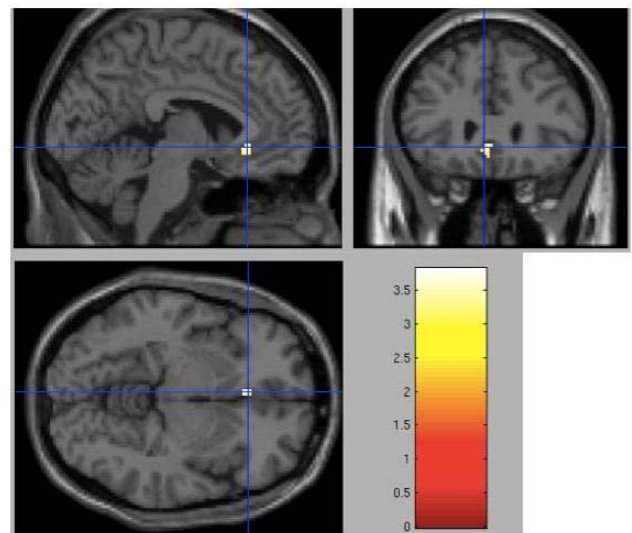
Mairead H. McConnell, B.A., Mary-Frances O'Connor, PhD, Psychology, University of Arizona, Tucson, Arizona

Research has demonstrated that experiencing the death of a loved one has medical repercussions in addition to the psychological burden of the loss. The widowhood effect refers to a person's increased risk of morbidity or mortality after the death of a long-time partner or spouse. Neural mechanisms may differentiate those who are adjusting well, compared to those with complicated grief. Individuals with complicated grief experience symptoms of debilitating, recurring emotions and yearning for the deceased for years after the death. The present study

included bereaved individuals with both complicated and non-complicated grief in order to better understand the neurobiological processes involved in different grief trajectories.

Sixteen widow(er)s (mean age = 71.94, SD = 4.06) completed the Inventory of Complicated Grief (ICG), a 19-item self-report questionnaire designed to assess grief severity. Of the sixteen participants, 9 met criteria for complicated grief. Because yearning is a "hallmark" symptom of complicated grief, and has prior evidence of neural correlates, the yearning item was extracted from the scale. This item asks participants to rate the extent to which they yearn for the deceased on a scale from 1 to 4. All participants completed a photo-viewing task in the fMRI scanner. This task consisted of an "anticipation" period in which participants were shown a countdown of the numbers 4 through 1 on the screen, followed by a photograph of either the deceased spouse or a stranger.

Results of a regression analysis in SPM12 revealed that greater self-reported yearning scores significantly predicted greater neural activation in the subgenual anterior cingulate cortex (sgACC,  $x = -4, y = -28, z = -6$ ) during the anticipation phase compared to viewing a photo of one's spouse ( $Z = 3.11, p < .005$ ). Activity in the sgACC has been previously linked to depressive symptoms and sadness and is generally related to emotion regulation. This finding may suggest that yearning for the deceased taxes the individual's emotion regulation system and prevents abatement of the grief experience. Future research should investigate potential interventions that reduce yearning as a mechanism for improving psychological as well as physical health outcomes associated with bereavement.



#### 11) Abstract 1344

##### GREATER EMERGENCY DEPARTMENT CROWDING IS ASSOCIATED WITH ELEVATED POSTTRAUMATIC STRESS SYMPTOMS IN THE ACUTE AFTERMATH OF EVALUATION FOR SUSPECTED ACUTE CORONARY SYNDROME

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Background: One in 8 patients evaluated for acute coronary syndrome (ACS) in the emergency department (ED) develops posttraumatic stress disorder (PTSD). In one study, high ED patient census during ACS evaluation was associated with PTSD symptoms 1 month later, but the sample was small and ED census is a crude crowding metric. No study has accounted for ED staffing, triage level of patients, or patient-to-bed ratio when considering the association of crowding with PTSD



symptoms, nor tested potential mechanisms. We examined the association between a standard ED crowding metric and early PTSD symptoms in patients evaluated for ACS, and assessed whether threat perceptions in the ED explained this association.

**Methods:** The REACH study is an observational study of patients recruited during ED evaluation for ACS. Perceived threat was assessed in the ED, and early PTSD symptoms were measured with the Acute Stress Disorder Scale (ASDS) upon inpatient transfer or discharge. ED crowding when patients first entered the ED was measured using the Emergency Department Work Index (EDWIN). The sample comprised 1000 participants (age  $61 \pm 13$  yrs; 46% female; 56% Hispanic; 21% Black). Multivariable linear regression was used to determine the association between EDWIN and ASDS score, and between EDWIN and threat perceptions. The indirect effect of EDWIN on ASDS score through threat perceptions was evaluated using the bootstrap resampling procedure for more robust confidence intervals. Covariates included the Charlson Comorbidity Index, GRACE index, race, gender, age, and ACS diagnosis.

**Results:** Higher EDWIN score was significantly associated with higher ASDS score in unadjusted;  $b=1.67$ ,  $p=0.01$ , and adjusted models;  $b=1.51$ ,  $p=0.03$ . EDWIN was not significantly associated with ED threat perceptions in the adjusted model,  $b=0.31$ ,  $p=0.26$ . When ED threat perceptions were entered in the model, the association of EDWIN with ASDS score was attenuated by 26% to  $b=1.10$ ,  $p=0.08$ , but the bootstrap test of the indirect effect (0.39) was not significant,  $p=0.16$ .

**Conclusions:** We found that an objective ED crowding measure was associated with the development of early PTSD symptoms after ACS evaluation. Crowding may influence early PTSD symptoms in part through elevated threat perceptions in the ED, although other mechanisms are also likely at play. Findings have implications for ED management.

## 12) Abstract 1353

### PATTERNS OF CIRCADIAN RHYTHMS OF VAGAL ACTIVITY VARY BY TRAIT MEASURES OF EUTHYMIA AND DYSTHYMIA

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**Introduction:** Vagal activity fluctuates in a pattern of diurnal variation, with a peak during nighttime. We previously demonstrated an association of circadian variation patterns (CVP) and depressive symptoms in predominantly healthy employees. The present analysis aimed to replicate and extend our previous finding by investigating associations between both positive and negative affective trait measures with CVP.

**Methods:** We analyzed root mean square of successive differences (RMSSD) as an indicator of vagally-mediated heart rate variability (HRV) from 24-h HR-recordings of 81 male subjects (mean age  $41 \pm 7$ ). Each participant had two measurements with one day in between. Positive and negative affect were measured by subscales of the state trait depression scale (STSD; Trait Euthymia, Trait Dysthymia).

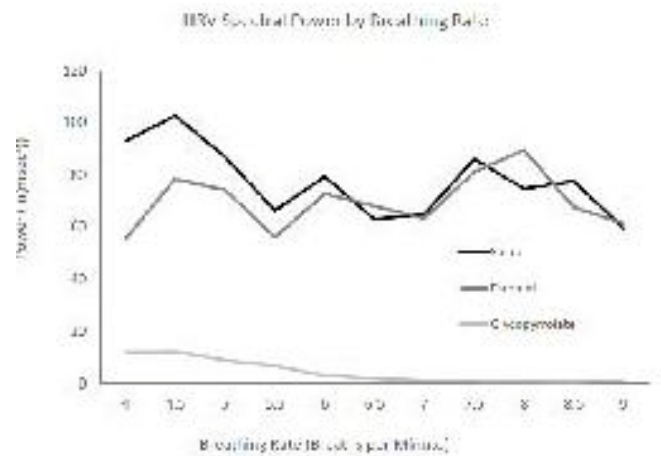
Three individual-level cosine function parameters were estimated to quantify the CVP: MESOR ( $M$ , the 24h mean), amplitude ( $A$ , the distance between  $M$  and the highest maximum value of the cosine curve, and acrophase ( $\theta$ , the phase shift of  $A$ ). The MESOR is thought to index overall vagal activity. Two multivariate linear regression models were estimated, assessing the association of affective traits

with  $M$ ,  $A$ , and  $\theta$  simultaneously using measures of positive and negative affect respectively. Covariates were age, habitual exercise, smoking and working hours.

**Results:** Figure 1 shows the predicted diurnal variation of RMSSD by a median split of the negative (upper panel) or positive (lower panel) affect scale respectively and their according MESOR lines and  $\theta$  around 1:30 a.m.. Dysthymia was a significant negative predictor of MESOR, but not of  $A$  or  $\theta$ . Euthymia was a significant positive predictor of MESOR, but not of  $A$  or  $\theta$ .

None of the other covariates were significantly associated. Explained variance in the euthymia models were 11% ( $M$ ), 7% ( $A$ ) and 1% ( $\theta$ ), and 11% ( $M$ ), 5% ( $A$ ) and 0% ( $\theta$ ) in the dysthymia models respectively. Zero influence of selected explanatory variables on  $\theta$ , mean that there is no systematic phase shift difference observed as a function of the respective variable.

**Conclusions:** This is the first study investigating circadian rhythm patterns by measures of euthymia and dysthymia in a healthy male sample. In the present study trait measures of positive and negative affect were associated with the rhythm adjusted 24h mean (MESOR).



HRV spectral power at the breathing frequency as a function of paced frequency and drug condition.

## 13) Abstract 1422

### THE EFFECTS OF A STRESS MANAGEMENT INTERVENTION ON REDUCING BIRTH COMPLICATIONS AND THE MEDIATING ROLE OF PRENATAL MATERNAL CORTISOL

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A growing body of evidence has associated elevated maternal stress levels with heightened risk for birth complications, particularly among low-income women. Recent studies have found cognitive behavioral stress management (CBSM) interventions to be effective in reducing stress among pregnant women, yet few studies have examined the impact of these interventions on reducing the risk of birth complications. The current study evaluated whether participation in a prenatal CBSM intervention was associated with reduced birth complications, and whether this association was due to lower maternal cortisol levels during the third trimester. Our sample consisted of 69 mothers and their infants (67% Latina, 80% with annual combined household incomes under \$20,000). During their first trimester of pregnancy (<17 weeks pregnant), participants were randomly assigned to either a CBSM intervention ( $n = 34$ ) or control group ( $n = 35$ ). Women in the CBSM intervention completed an eight-week, group-based course which covered topics such as thought modification and relaxation techniques. The control group received print-based prenatal

information throughout the eight-week period. Maternal salivary cortisol was assessed seven times on one collection day during the participant's third trimester to calculate Area Under the Curve (AUC). At postpartum, a medical record review was conducted to assess the prevalence of nine birth complication outcomes (e.g., premature birth, labor duration). A mediation analysis revealed that group assignment was a significant predictor of birth complication outcomes, with women in the CBSM intervention experiencing fewer birth complications compared to women in the control group,  $\beta = -.77$ ,  $t(66) = -2.68$ ,  $p < .01$ . However, these CBSM intervention effects on birth complications were not driven by maternal cortisol levels during the third trimester,  $\beta = .005$ . These results highlight the importance of stress management interventions for low-income pregnant women and support their implementation as an effective method for reducing the risk of birth complications in this population. Additional studies are needed to examine potential mediators of this relationship.

#### 14) Abstract 1451

##### **MONITORING AND MODELING FAMILY EATING DYNAMICS (M2FED): A SYSTEM THAT DETECTS FAMILY EATING BEHAVIORS AND MOODS IN THE HOME ENVIRONMENT**

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##### **BACKGROUND**

Diet monitoring historically relies on self-reporting tools, which have significant accuracy limitations that make dietary behavior modeling difficult. Furthermore, these tools fail to account for parenting style, home environment, interpersonal influence, and stress reactions, which play a significant role in obesogenic eating behaviors. Monitoring eating behaviors, mood, and social interactions in real-time can provide unique insights into obesity-related eating patterns. M2FED is an mHealth approach that uses sensors, and Ecological Momentary Assessment to understand and intervene on family eating dynamics (FED) contextually in real-time. One of the primary components of this system is detection of conversation, stress, and mood. Accurately assessing mood is challenging, but our project aims to refine and improve this process.

##### **METHODS**

Our group has developed a cyber-physical system controlled by computer algorithms that will detect and model eating events, mood, and interpersonal interactions in home environments. It includes sensors that capture acoustic signals and analyze the audio data for mood and stress. In order to develop accurate algorithms for detecting moods related to eating events, machine learning techniques were used on 535 short coded utterances (2-5 seconds each) from 5 male and 5 female participants. Six moods currently identified in the literature as related to eating behavior were chosen as a focus: anger, anxiety, boredom, annoyance, happiness, and sadness.

##### **RESULTS**

The accuracy of the algorithms for each mood, respectively, was: anger (94.5%), anxiety (95.7%), boredom (97.5%), annoyance (97.8%), happiness (88.7%), and sadness (88.9%).

##### **CONCLUSIONS**

M2FED will deploy new methods for in-home mood detection that will contribute to accurately monitoring and modeling FED. In addition to mood, M2FED will refine sensors that detect eating behavior, social interactions, participant co-location, and other signals. It will allow for

the generation of theory-based system models of family social dynamics and eating events that learn and react to personal, social, and environmental cues in real-time and in context to inform and refine behavior models. This will enable the identification of temporally-specific processes and events within the family system that can be targeted for personalized, context-specific, and real-time feedback.

#### 15) Abstract 1493

##### **EFFECTS OF A MINDFULNESS INTERVENTION FOR STUDENT TEACHERS ON DEPRESSIVE SYMPTOMS, AFFECT AND EMOTION REGULATION.**

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Educator stress and teacher burnout are not only the cause for negative health consequences, they also impact negatively on educational performance and diminish students' learning behavior. Therefore, it should be an important element in teacher education, to increase self-regulatory capacities to manage job-related stress. The present study investigated effects of a mindfulness intervention for student teachers on affect and emotion regulation. The intervention was based on the Mindfulness Based Stress Reduction approach by Kabat-Zinn (2005), which was adapted to fit the context of a university seminar, including e-learning elements. N= 96 student teachers received 8 group sessions, each 14 days apart and were instructed to practice essential exercises (sitting meditation, bodyscan) for 25 min daily. To identify effects specific to mindfulness training, the pre-post study design included a passive (N= 31) and an active control group (N= 42). The active control group received a phenomenologically oriented training of awareness, which consisted of a theoretical input during class and homework assignments collected from Blackmore (2010), during which participants reflected on their own consciousness by asking themselves questions such as "Am I conscious now?". Linear mixed-effect models were computed using R. Significant group x time interactions were found in the following domains: With respect to depressive symptomatology (Hospital Anxiety and Depression Scale) and negative affect (Positive and Negative Affect Schedule, PANAS), the mindfulness group showed decreased scores after the training whereas the passive control group showed increased scores ( $p < .01$  and  $p = .05$ ). Furthermore, the passive controls showed a significant decrease in positive mood (PANAS) compared to the mindfulness group at post measurement ( $p=0.05$ ). Finally, effects on emotion regulation (Emotion Regulation Questionnaire) were observed. Students trained in mindfulness increased the use of cognitive reappraisal after the intervention, whereas the active as well as the passive control group exhibited lower reappraisal scores at the end of the term ( $p$ 's .04). To conclude, positive effects of mindfulness training in the university context on affect and emotion regulation were observed, which might be beneficial during the transition into school placements.

#### 16) Abstract 1501

##### **INVESTIGATING SOCIAL EVALUATIVE THREAT (SET) USING A ROBOTIC STRESS TESTING PANEL**

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Objective: A variety of social stress testing paradigms manipulate the panel or participant environment focusing on the characteristic of social evaluative threat (SET) to elicit a response. This pilot study assessed whether a non-human (robot) panel could elicit a stress response in human participants.

**Methods:** Nineteen healthy adult participants (female=16) aged 21–57 years (mean=29.7) underwent a 90-minute experimental testing session based on the Trier Social Stress Test (TSST). A pre-recorded robotic panel was used, presented as a live on-screen simulation with mannerisms parallel to those typically used in TSST paradigms. Instructions for the stress task were delivered by a confederate who was not part of the panel. Following a 20-minute preparation stage, a 5-minute mock interview and 5-minute maths task were undertaken in front of the robot panel. Forty minutes after the stress task participants were interviewed about their experience. Cortisol was assessed via saliva at five points; baseline, anticipation and three points post-test. Underlying perceived stress and coping responses were assessed pre-test. Simple numerical coding of subjectively reported experiences was applied to the post-test interview data.

**Results:** The stress test induced a significant effect on cortisol response over time ( $p=.037$ ). Using the subjective stress experience from interview, participants reported either: a) not finding the test stressful; b) finding the performance stressful but not the presence of the robots; or c) finding the test and the robots stressful. Analysis of cortisol based on these three groupings revealed a borderline effect for the task only group ( $p=.044$ ) and a stronger significant effect for the task and robot group ( $p=.018$ ). Perceived stress and coping scores did not distinguish between these groupings.

**Conclusions:** Using a non-human (robot) panel within a social stress testing paradigm produced overall significant effects with cortisol responses distinguishable by subjective stress experience. In a proportion of the group for whom the robot panel elicited SET, cortisol responses were the strongest. This is the first time that a robotic panel has been utilised in testing responses to the TSST and offers an innovative application with potential for further in-depth study.

#### 17) Abstract 1515

##### **THE ASSOCIATION OF RESTING HEART RATE VARIABILITY AND FALSE MEMORY: A PRELIMINARY STUDY FOCUSED ON MEMORY VALENCE**

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Research suggests that higher resting high frequency heart rate variability (HF-HRV) is associated with both better health and cognitive control, including the domain of memory control. Previously we found greater resting HF-HRV was associated with fewer false memories. However, lower HF-HRV is associated with a greater negativity bias, and research has yet to understand how the valence of the memories (positive, negative, or neutral) may influence these results. The current preliminary analysis attempts to investigate this in a sample of 32 students at a large Midwestern university (14 women, mean age = 22.37, SD = 5.37). Baseline-resting HF-HRV was collected for 5 minutes using an electrocardiogram in accordance with Task Force (1996) guidelines. Participants then completed a false memory paradigm. During the task, participants first completed a presentation phase, in which participants were shown a total of 6 word lists with each list containing 12 words (2 word lists per valence). Immediately following the presentation phase, participants completed the recognition phase, in which they were to indicate if they previously saw a word. Outcome variables include: hits rates (defined as the proportion of true words correctly identified as true, with higher values reflecting better identification of true memories), and false alarm rates (defined as the proportion of lure or false words incorrectly identified as true words with lower proportions reflecting better rejection of false memories). Controlling for age, gender, and respiration, preliminary results showed

lower resting HF-HRV to be associated with a higher tendency to incorrectly identify both neutral ( $r = -.349$ ,  $p = .034$ ) and negative ( $r = -.362$ ,  $p = .029$ ) false memories; however a similar pattern was not observed for positive false memories ( $r = .152$ ,  $p = .220$ ). These results are in line with our lab's previous work, suggesting that those with lower resting HF-HRV have difficulties with correctly identifying false memory-words. Importantly, this pattern was found in negative and neutral, but not positive, memory-words. These preliminary data support the novel idea that individual differences in resting HF-HRV may not predict control over positive memories, and may best predict control over negative and neutral memories.

#### 18) Abstract 1523

##### **THE ASSOCIATIONS BETWEEN HEART RATE, PERCEIVED HEART RATE AND ANXIETY DURING ACUTE PSYCHOLOGICAL STRESS.**

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**Introduction:** Acute psychological stress typically induces feelings of anxiety and increases in heart rate (HR). However, some research suggests that the level of anxiety is not always associated with the amount an individual's HR increases. Instead, feelings of cognitive and somatic anxiety, and the interpretation of these symptoms may be more closely associated with an individual's perceived HR response (i.e., how much an individual feels their HR is changing in response to the task). However, research has yet to investigate whether actual or perceived HR changes in response to stress are more strongly associated with anxiety experienced during stress. **Aim:** Examine whether perceived or actual HR changes are more strongly associated with cognitive and somatic anxiety during two different stress tasks. **Method:** 71 healthy males (M (SD) age = 20.1 (1.1) years) completed baseline rest, mental arithmetic task (PASAT) and impossible puzzle task (order counterbalanced), during which HR was measured continuously. Immediately after the tasks, cognitive and somatic anxiety intensity and interpretation of these symptoms were measured with the Immediate Anxiety Measure Scale, and perceived change in heart rate was measured on a 7-point scale (0 = no change, 6 = large increase). **Results:** Compared to the puzzle task, the PASAT elicited a faster HR, greater perceived HR change, and higher and more debilitating anxiety ( $p$ 's  $<.05$ ). Regression models, entering both perceived and actual HR changes as independent variables, revealed that only perceived HR significantly predicted PASAT cognitive and somatic anxiety (positively for anxiety intensities and negatively for interpretation of symptoms;  $p$ 's  $<.05$ ). The findings were replicated for anxiety intensity during the puzzle task ( $p$ 's  $<.05$ ), but the overall models did not significantly predict perceptions of puzzle task anxiety symptoms ( $p$ 's  $>.05$ ). In all models, actual heart rate was unrelated to anxiety intensity or perceptions of symptoms ( $p$ 's  $>.26$ ). **Conclusion:** Individual ratings of anxiety intensity and interpretation of these symptoms appears to be closely associated with perceptions of HR change in response to stress rather than actual HR changes. Future research should investigate whether training individuals to lower their perceptions of HR can reduce the anxiety experienced during stress.

#### 19) Abstract 1531

##### **HIGHER TRAIT PERSEVERATIVE COGNITION IS ASSOCIATED WITH DECREASED HEART RATE VARIABILITY DURING A NEGATIVE EMOTION INDUCTION IN WOMEN**

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Perseverative Cognition (PC) is defined as excessive worry and rumination, and is associated with lower high frequency heart rate variability (HF-HRV). However, little work has demonstrated how trait PC relates to changes in HF-HRV from rest to a negative emotional state. Decreased HF-HRV when processing negative emotions suggests decreased inhibitory control and is conceptualized as a maladaptive psychophysiological response. As such, we expected that those with greater trait PC would show decreased HF-HRV in response to negative emotions. The current study investigated this relationship in 56 women (mean age of 20, standard deviation of 4). HF-HRV was collected using an electrocardiogram (ECG) as participants first completed a 5-minute resting-baseline period, followed by a 5-minute negative emotion induction (NEI). During this NEI, participants were instructed to think about someone with whom they were currently frustrated. Participants then completed a number of self-report questionnaires, including the 16-item Penn State Worry Questionnaire and the 22-item Ruminative Responses Scale as indices of trait perseveration. HF-HRV was analyzed in accordance with Task Force (1996) guidelines, and change scores were calculated as NEI HF-HRV minus baseline-resting HF-HRV, with higher scores reflecting an increase in HF-HRV from baseline to the NEI. Results showed greater trait PC, both worry ( $r = -.330, p = .006$ ) and rumination ( $r = -.230, p = .044$ ), to be significantly associated with decreases in HF-HRV from rest to the NEI. These results are consistent with prior research suggesting that state changes in HF-HRV from baseline to an emotion inducing task may reflect emotion regulation. Our data further support the idea that trait PC can lead to decreases in HF-HRV reactivity, which may be maladaptive for overall health and well-being. Directions for future research will be discussed.

## 20) Abstract 1534

### NEIGHBORHOODS AND HEALTH: DEVELOPMENT AND VALIDATION OF AN EXPERIMENTAL MANIPULATION OF NEIGHBORHOOD CHARACTERISTICS IN A VIRTUAL REALITY ENVIRONMENT

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**Background:** Neighborhood disadvantage is an environmental predictor of health that is thought to operate, in part, through acute impacts on emotion and stress reactivity. Nevertheless, no studies have measured the acute effect of neighborhood contexts on emotion and stress reactivity. To address these issues, we used virtual reality (VR) to develop an experimental model of neighborhood disadvantage and affluence. This study (1) assesses the validity of the VR neighborhoods by examining participant observations and (2) tests the hypothesis that neighborhood disadvantage elicits greater stress reactivity and emotion. **Methods:** In a preliminary analysis of an ongoing study, 26 participants were randomly assigned to complete a simple navigation task in the virtual affluent (VR-A) ( $n = 11$ ) or disadvantaged (VR-D) ( $n = 15$ ) neighborhood. Participants were young adults ( $M = 22.8$  years,  $SD = 3.1$ ), 53.8% female, and undergraduate or graduate (88.5%) students. Participants completed a systematic social observation of the virtual neighborhood, and ratings of emotion and arousal, after the task. Blood pressure (BP) was measured three times during a baseline condition and at 3-minute intervals during the task.

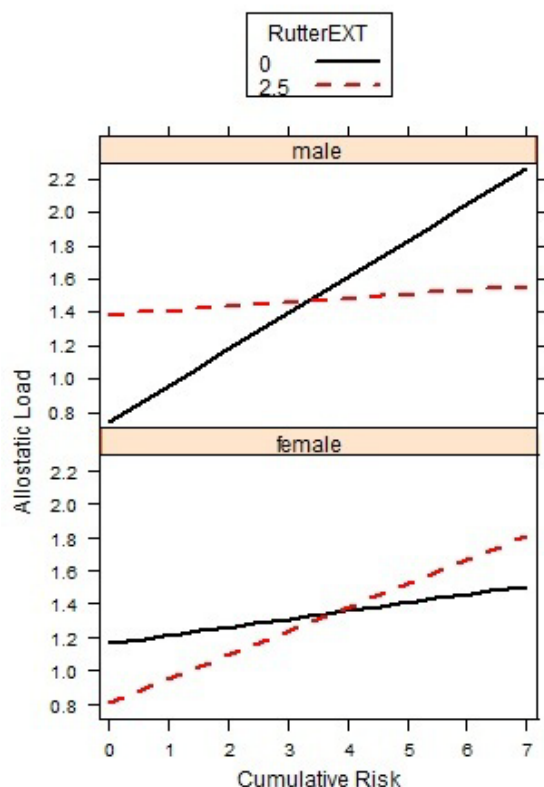
**Results:** The VR-D condition was rated as lower in a measure of overall socioeconomic position ( $t = 10.2, p < .001$ ). It was also rated as less safe to live in, less desirable, in worse condition, and having more garbage and fewer trees (all  $p < .001$ ). The VR-D condition also elicited more negative affect ( $t = 2.5, p = .02$ ) but not arousal ( $t = -.48, p = .64$ ), and higher ratings of anger, disgust, and sadness (all  $p \leq .02$ ). Systolic and diastolic BP were significantly higher than baseline across both VR conditions (all  $p < .001$ ). No significant differences in BP were found in preliminary analyses between VR-D and VR-A (all  $p > .55$ ). **Conclusions:** The validity of the VR-based models was supported by participants' differentiated perception of the neighborhood environments. In addition, the disadvantaged condition elicited more negative affect, consistent with hypotheses. Physiological and psychological responses to the virtual environments indicate the feasibility and utility of this approach for studying acute effects of neighborhood conditions on stress reactivity and other pathways to health. The final presentation will include complete data from this ongoing study.

## 21) Abstract 1541

### AGGRESSION AND CHRONIC PHYSIOLOGICAL STRESS: EXTERNALIZING BEHAVIORS BUFFERS THE EFFECT OF EARLY LIFE ADVERSITY ON ALLOSTATIC LOAD.

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Early life adversity is associated with increases in behavioral problems including the class of externalizing behaviors which include disruptiveness, aggression and bullying (Yoshikawa, Aber & Beardslee, 2012). Traditional developmental pathology models have operated under the assumption that early adversity lead to these maladaptive behaviors (Campbell, 1995; Hinshaw, 1992; Qi & Kaiser, 2003). Externalizing behaviors are associated with a variety of negative outcomes such as underachievement (Hinshaw, 1992), peer rejection (Ladd, 2006) and substance use (Krueger, Markon, Patrick, Benning and Kramer, 2007). However, recent theoretical perspectives have argued that the assumption that these behaviors are pathological is problematic and limit our understanding of effective interventions (Ellis et al., 2012). Instead, they posit the idea that externalizing behaviors are in fact adaptive responses to stressful/disadvantageous environments, and thus for interventions to be effective they must consider the possibility that these behaviors serve important functions. In the proposed study, we test the counterintuitive hypothesis that in the context of adversity, externalizing behaviors are adaptive for physical health. The sample for the study included 239 children (110 girls). Participants' ages were 9.2 ( $SD = 1.1$ ) at Wave 1, snf 13.4 ( $SD = 1.0$ ), 17.3 ( $SD = 1.0$ ) at Wave 2 and 3. Early life adversity was a measure of confluence of nine risk factors from three domains: demographic, psychosocial, and environmental, all of which have been previously shown relevant in the development of psychopathology. Externalizing behaviors were assessed via parent and child report. Allostatic load, a measure of chronic physiological stress consisted of six parameters capturing HPA axis (cortisol), SAM system (epinephrine and norepinephrine), cardiovascular (systolic and diastolic blood pressure), and metabolic (body mass index) activity. Linear mixed effect models were used to analyze the prospective associations between externalizing behaviors, cumulative risk and allostatic load. Results were consistent with our hypothesis - higher levels of externalizing behaviors moderated the effects of cumulative risk on allostatic load for males.



## 22) Abstract 1548

### SOCIAL INTEGRATION AMONG DISTRESSED MOTHERS OF CHILDREN DIAGNOSED WITH CANCER ASSOCIATES WITH ELEVATED INFLAMMATION ONE YEAR AFTER CHILDS INITIAL DIAGNOSIS

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Chronic distress associates with upregulation of innate inflammation known to predict risk for inflammatory diseases. Social network integration may buffer the effects of stress on health risk. Caring for a child newly diagnosed with cancer is a provocative psychological stressor. While most parents cope well, 25-30% of caregivers show prolonged distress that may contribute to elevated levels of inflammation over time. Here, we followed 120 mothers (age 18-56, 86% Caucasian) from just after their child's cancer diagnosis through one year. Assessments of stress (Perceived Stress Scale; PSS), social integration (Social Network Index), BMI, and circulating levels of interleukin (IL)-6 were conducted on 3 occasions: T1 (mean = 1 mo. post dx), T2 (mean = 6.8 mo. post dx), and T3 (mean = 12.7 mo. post dx). Hierarchical linear modeling showed that change in social network diversity positively associated with change in plasma IL-6 over time ( $B = .93, p = .03$ ), but change in PSS and social network size did not ( $B = 0.02, p = .30, B = 2.46, p = .36$ ). These findings were independent of mother's age, education, race, change in BMI over time, and the child's treatment intensity. Interestingly, the interaction between change in PSS and change in social network size over time positively associated with change in plasma IL-6 over the study period after adjusting for mother's age, education, race and child's treatment intensity ( $B = 1.38, p = .042$ ). When change in BMI was included in the model, a similar trend was observed ( $B = 1.19, p = .085$ ). This interaction reveals

greater increases in IL-6 over time among mothers endorsing increasing perceived stress and social integration when compared with those remaining low on both measures. This effect was more pronounced further in time from the child's initial diagnosis. These results are contrary to the stress-buffering hypothesis and suggest that in this population increasing social integration may not be health protective and may combine with increasing distress to predict systemic inflammation. Further research is warranted to understand the direction of these effects. It may be that mothers reporting prolonged distress increase social integration in an effort to cope. It is possible that reducing social network diversity may associate with better emotional and physical health in this population. American Cancer Society RSG118367

## 23) Abstract 1576

### SIX-MONTH STABILITY OF HEART RATE AND BLOOD PRESSURE RESPONSES TO MOMENTARY AFFECT

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Much of behavioral medicine is concerned with physiological responses to cognitive affective states. Those responses are often treated as though they are individual traits or features of a psychiatric disorder. Little is known, however, about how stable these responses are in the world and in specific populations. We estimated blood pressure (BP) and heart rate (HR) responses to a series of momentary affective states in the Masked Hypertension Study at two time points over the course of six months in 160 participants. Participants were recruited through workplace BP screenings at two universities and affiliated medical centers, and a financial investment firm. Participants were outfitted with a SpaceLabs 90207 Ambulatory Blood Pressure monitor, programmed to take BP and HR readings every 30 minutes, and were provided with a smartphone on which they were asked to answer questions about their thoughts, emotions, and activities immediately after each reading. To estimate the 6-month stability of BP and HR response to different cognitive affective states, we calculated the correlation between the mean within-person BP (HR) response to each cognitive affective state at Time 1 with the mean within-person BP (HR) 6-months later. Participants were 160 individuals (age  $52.1 \pm 9.9$ ; 38% male; 6% black race; 14% Hispanic). Six-month stabilities for the 9 cognitive affective states are listed in Table 1. For Systolic BP the most stable cognitive affective variable was excited ( $r=0.69; p<.0032$ ). For HR, angry/hostile ( $r=0.99; p=.005$ ) and frustrated ( $r=0.64; p=0.002$ ) were most stable. For Diastolic BP, no cognitive affective variables were more stable than anxious/tense ( $r=0.48; p=0.52$ ). In this study we found that the stability of physiological responses to cognitive affective states vary by the physiological parameter assessed. HR responses, overall, to cognitive affective variables are more stable that BP responses and physiological responses to emotions higher on the arousal dimension are more stable than those lower on the arousal dimension. These findings should inform future research on health consequences of physiological reactivity to cognitive affective states.

	Systolic Pressure (BP)	Blood Pressure (BP)	Diastolic Pressure (BP)	Blood Pressure (BP)	Heart Rate (HR)	
	r	p-value	r	p-value	r	p-value
Excited	0.69	0.0032	0.40	0.28	0.45	0.029
Tired	0.10	0.68	0.11	0.65	0.28	0.11
Frustrated	-0.30	0.40	--	--	0.64	0.002
Anxious/Tense	0.58	0.047	--	--	0.45	0.024
Angry/Hostile	0.02	0.96	-0.79	0.55	0.99	0.005
Relaxed	0.18	0.43	0.09	0.72	0.53	0.0009

#### 24) Abstract 1591

##### **NOCTURNAL BLOOD PRESSURE DIPPING AND CARDIOVASCULAR RESPONSES TO ACUTE STRESS IN YOUNG ADULTS: EVALUATING CONCORDANCE USING AMBULATORY AND LABORATORY-BASED METHODS**

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Despite a large literature on the topic, the utility of nocturnal blood pressure dipping as a predictor of cardiovascular disease (CVD) risk has recently been described as "far from practical" (Bloomfield & Park, 2015). For example, studies rarely facilitate comparisons between dipping and other CVD markers. This study combines laboratory and ambulatory methods to compare dipping profiles with cardiovascular reactivity to, and recovery from, acute stress. Given mixed literature on blunted/exaggerated stress reactivity, we had no a priori hypotheses regarding reactivity/ We hypothesized that blunted dipping would be associated with reduced cardiovascular recovery.

Participants were 120 young adults ( $M = 18.50$  years,  $SD = 1.08$ ) recruited as part of a larger study on stress and health. Participants underwent a laboratory-based stress-testing session during which cardiovascular reactivity to an acute stressor was monitored using a Finometer hemodynamic monitor. Participants also underwent a 24-hour ambulatory cardiovascular monitoring protocol with the Oscar 2 monitor. Measures were recorded once every 20 minutes over the daytime (plus or minus 5 minutes to ensure participants could not predict the next blood pressure measurement), and every 45 minutes during sleep time, with times determined based on a sleep diary completed for 7 days prior to ambulatory monitoring. Following screening for artefacts and outliers, nocturnal BP dipping values were calculated according to the standard formula as:  $(\text{average daytime BP} - \text{average night-time BP}) / \text{average daytime BP} \times 100$ .

The mean percentage dipping was 12.34 ( $SD = 8.51$ ) for SBP and 19.64 ( $SD = 7.67$ ) for DBP; scores were positively correlated ( $r = +.42$ ,  $p < .001$ ). Contrary to our hypotheses, regression models adjusted for age, sex, and BMI revealed that percentage SBP dipping predicted SBP recovery (i.e., an adaptive dipping profile was associated with poorer recovery,  $b = .24$ ,  $t = 2.66$ ,  $p = .009$ ,  $R^2$  change = .06), but not reactivity. No associations between DBP measures were observed.

These unexpected findings suggest that the relationship between dipping and other prognostic factors for CVD is far from straightforward. This presentation will discuss the methodological and analytical issues in evaluating dipping and cardiovascular recovery to enhance our understanding of the predictive value of these markers for CVD.

#### 25) Abstract 1612

##### **DIFFERENCES IN PAIN-RELATED SYMPTOMS AMONG ADULT OUTPATIENTS CONSIDERED FOR CHRONIC OPIOID MANAGEMENT AND SPINAL CORD STIMULATOR IMPLANTATION.**

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Chronic pain is a growing public health crisis worldwide that poses significant challenges for both providers and patients. The use of opioids to treat chronic pain has a controversial history given its known effectiveness and the risks of overdose, developing dependence and

addiction. Neuromodulation with the use of implantable devices such as spinal cord stimulator (SCS) and targeted drug delivery systems (TDDS) are alternatives to opioids in some cases. Patient selection is paramount in determining success in both interventions. Suitability for chronic opioid management (COM) and implantable devices may be further complicated by psychiatric co-morbidities which are common in patients with chronic pain. Psychological, biological and social factors have been shown to predict outcomes. IN the present study, we examined differences in pain-related symptoms in a cohort of chronic pain patients being considered for COM and/or SCS with co-morbid Axis I psychopathology. The sample consisted of  $N=246$  (191 females, 70% Caucasian) outpatients evaluated at a multidisciplinary comprehensive pain center in the southeast US. Diagnostic and pain-related symptom data were obtained from an archival database including information from clinical interview and psychological testing. A total of 176 patients met DSM-IV TR criteria for an Axis I diagnosis including 69% for depression (i.e. unipolar, bipolar and unspecified) and 14% for Anxiety (i.e. generalized, obsessive compulsive and post-traumatic stress disorder). Relative to patients with a primary Axis I diagnosis of Anxiety, patients with Depression reported significantly greater pain severity prior to treatment ( $p < .05$ ). In contrast, patients with Anxiety endorsed significantly less pain-related functional impairment ( $p < .05$ ), compared to patients with Depression. These results suggest that patients with chronic pain and with co-morbid Depression may present with greater pain-related distress and impairment compared to those with Anxiety. Such differences must be considered during evaluation and determination of treatment recommendations, especially in patients assessed for long-term opioid management and/or implantable devices.

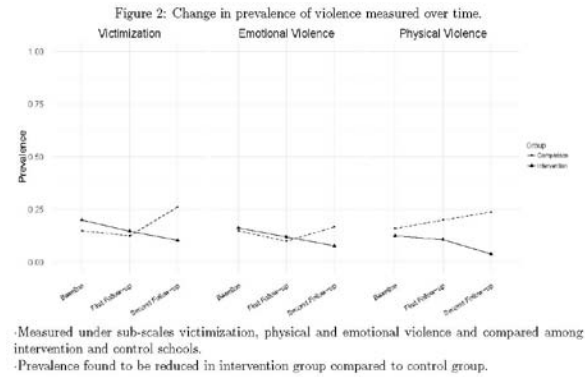
#### 26) Abstract 1634

##### **PILOT STUDY TO ASSESS THE EFFECT OF LIFE-SKILLS TRAINING ON PREVENTION OF INTERPERSONAL VIOLENCE AMONG SCHOOL ADOLESCENTS IN NEW DELHI, INDIA.**

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**Background:** Region bound cross-sectional studies suggest that acts of interpersonal violence are prevalent (from 10 to 66%) among adolescents across India. World over, there is strong evidence that universal school-based programs that provide information about violence and its prevention, or help children learn positive social skills, decrease rates of violence and aggressive behaviour. Information regarding the same is scarce in developing regions. **Methods:** Quasi-experimental study among middle school students (8th grade) of public schools, located in Central Delhi, was conducted. Two classes (95 participants) in intervention school and three classes (108 participants) in comparison school were selected. The intervention, comprising knowledge regarding violence and a culturally apt Life Skills Training, was administered weekly over one month (total 4 sessions). The comparison group, on the other hand, did not receive any intervention; standard school protocols were functional at both the schools. Self-reported violence behaviour (physical and emotional perpetration of violence and victimization) was measured at baseline and at one month and six months after intervention in both the schools. Intention to treat analysis was used. The difference in violent behaviour was compared using Chi-square test and Odds ratio was calculated. **Findings:** The differences observed in prevalence of violence parameters were: a fall of 15.8 percent points ( $OR=0.32$ ,  $p=0.008$ ) for victimization and a decrease of 19.9 percent points ( $OR=0.13$ ,  $p=0.0002$ ) for perpetration of physical violence in the intervention group compared to the comparison group. However, no significant difference was observed in the prevalence of emotional violence ( $OR=0.42$ ,  $p=0.099$ ). The effect

of intervention was uniform across gender. **Implications for Research:** Compared to the comparison group, the intervention group showed significant improvements in mean scores for physical perpetration of violence and victimization. The results of this study suggest that Life Skills Training is effective in reducing violence among adolescents even in the Indian setting. The intervention under study requires further testing on larger samples and for longer durations (>12 months) to determine its effectiveness.



## 27) Abstract 1023

### CYTOKINE PATTERNS IN OLDER U.S. ADULTS: MIXED-METHODS CLUSTERING OF INDIVIDUALS BASED ON 22 ANALYTES

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Cytokines are protein molecules with interactive and cascade effects that regulate immune processes underlying physical and mental health. The sheer number of cytokines and their multiple possible interactions makes studying their roles in health necessarily complex. Further, little is known about the distribution of individual cytokines or cytokine profiles among healthy older adults. The National Social Life, Health, and Aging Project (NSHAP, 2010-11) introduced an innovative protocol for obtaining plasma samples in the home and used them to measure 22 cytokines: IFN- $\gamma$ , IL-10, IL-1b, IL-6, MCP-1, TGF- $\alpha$ , TNF- $\alpha$ , GM-CSF, IL-12, IL-13, IL-1ra, IL-2, sIL-2ra, IL-3, IL-4, IL-5, TNF- $\beta$ , VEGF, NGAL, fibrinogen, adiponectin, and apo-B. Our goals were to 1) describe the univariate and joint distributions of cytokines among U.S. older adults, 2) develop multivariate methods for analyzing multiple analytes within individuals that address both challenging measurement issues and possibly non-linear and discrete relationships, and 3) use these methods to study the association between inflammatory profiles and health conditions related to immune function. Plasma from a representative U.S. sample of 2,745 home-dwelling older adults (62-91 yrs; 55% women) were assayed at the University of Chicago Flow Cytometry Core Facility, using a Bio-Plex system and Luminex xMAP technology. We used a hierarchical cluster analysis to identify groups of individuals with similar cytokine profiles. Analyte values were coded as high or not, using cutoffs based on the observed percentiles of each distribution. Similarity was then measured using the Jaccard coefficient, thereby emphasizing the co-occurrence of cytokines with high values. A K-means cluster analysis was then used to identify and visualize distinct cytokine profiles. While both gender and race/ethnicity were associated with specific cytokine profiles, age

was surprisingly not. Health outcomes that were strongly associated with specific cytokine profiles included body mass index (BMI), cognitive function, cardiovascular disease, and diabetes. Several distinct cytokine profiles are identifiable among the general population of U.S. older adults, and are associated with demographic characteristics and health outcomes. Cluster analysis is an effective method for analyzing data from multiplex cytokine panels in a population-based study.

## 28) Abstract 1054

### LOW SELF-RATED HEALTH AND BLOOD HYPERCOAGULABILITY IN PATIENTS WITH AN ACUTE CORONARY SYNDROME

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**Background:** Self-rated health (SRH) is associated with cardiovascular mortality in patients with coronary heart disease. The increased cardiovascular risk with low SRH shows a dose-response relationship and is poorly explained by demographic factors, comorbidities, health behaviors and patients' psychosocial status. We examined whether SRH relates to hemostatic factors of a hypercoagulable state in patients admitted with acute myocardial infarction (MI) to a university hospital. **Methods:** We assessed 190 patients (median age 59 yrs, range 18-88; 83% men) within 48 h of an acute coronary intervention in terms of demographic factors (age, sex, education), comorbidity (Charlson comorbidity index, history of hypertension, hypercholesterolemia, depression and anxiety disorders), health behaviors (body mass index, smoking status, drinking status, physical activity), cardiac-related variables (previous MI, number of diseased coronary vessels, the prognostic Global Registry of Acute Coronary Events (GRACE) Score at admission), and psychosocial characteristics (distress during MI, social support, depressive symptoms). Patients rated their health state before MI retrospectively with the EuroQol Visual Analogue Scale ranging from 0 ("worst imaginable health state") to 100 ("best imaginable health state"). Levels of fibrinogen, fibrin D-dimer and von Willebrand factor (VWF) antigen were measured in plasma on the morning after hospital referral. **Results:** The median score of SRH was 75 (range 20-100) and inversely associated with fibrinogen ( $r=-0.25$ ,  $p<0.001$ ) and D-dimer ( $r=-0.17$ ,  $p=0.020$ ) levels in the bivariate analysis. Similar associations emerged for fibrinogen ( $r=-0.32$ ,  $p<0.001$ ), D-dimer ( $r=-0.20$ ,  $p=0.010$ ), and also VWF ( $r=-0.17$ ,  $p=0.027$ ) levels in fully adjusted linear regression models. Regarding covariates, independent associations with hemostatic factors were strongest for the GRACE score (fibrinogen:  $r=0.29$ , D-dimer:  $r=0.28$ , VWF:  $r=0.33$ ; all  $p$ -values  $<0.001$ ). **Conclusions:** Lower SRH was associated with greater blood coagulability in patients with acute MI, independent of covariates. The strength of the association was comparable to the one observed for the prognostic GRACE score. The findings provide a novel psychobiological mechanism that may potentially link SRH with cardiovascular outcome in patients with an acute coronary syndrome.

## 29) Abstract 1071

### THE TRAJECTORY OF SCREEN TIME FROM ADOLESCENCE TO EMERGING ADULTHOOD

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**Objective:** US adolescents spend up to 8 hours daily in screen time. Efforts to reduce sedentary time have often focused on identifying its correlates. However, little is known about the trajectory of adolescents' screen time or factors that predict it. This study examined change in screen time from age 13 to 23 and its predictors in a representative US sample. **Method:** Adolescents (N=3,705; 46.3% boys) from the National Longitudinal Study of Adolescent to Adult Health's public-use data self-reported their screen time (hours/week watching TV and videos, and playing video/computer games) in 1994, 1996, 2001, and 2008. Piecewise latent growth models within a cohort-sequential design modelled screen time from ages 13-18 and 19-23 years. Predictors of change for each piece were gender, parental education and limits on screen time, household income, perception of neighborhood safety, race/ethnicity, body mass index, physical activity (PA), and employment status.

**Results:** Adolescents spent an average of 24.99 hours/week in screen time at age 13 and more than 14 hours/week until age 23. Screen time decreased 1.27 hours per week per year from age 13 to 18, then increased .39 hours per week per year from age 19 to 23 ( $p<.001$ ). From 13 to 18, decrease in screen time was associated with feeling safe in one's neighborhood ( $b=2.70, p=.01$ ), having parental limits on screen time ( $b=1.22, p=.02$ ), and being Asian American (vs. white;  $b=2.27, p=.02$ ). From 19 to 23, African Americans ( $b=-1.13, p<.001$ ) and Asian Americans ( $b=.67, p=.04$ ) had a lower increase compared to whites. More bouts of PA were also associated with lower increase in screen time ( $b=-.04, p=.03$ ) during emerging adulthood. Participants who were only in school ( $b=.43, p=.01$ ) or neither in school nor working ( $b=.91, p<.001$ ) had a greater increase in screen time than those who were only working.

**Conclusion:** Interestingly, screen time increased after the age of 18, a point when many transitions, such as the entry into college, often occur. However, given the high levels of screen time maintained from age 13 to 23, effective means of curbing screen time during these developmental periods are needed. Furthermore, since the factors associated with change in screen time from ages 13-18 and 19-23 differed, this may be important to consider when developing sedentary behavior interventions.

30) Abstract 1074

**RESILIENCE TRAINING FOR WORK-RELATED STRESS AMONG HEALTHCARE WORKERS: RESULTS OF A RANDOMIZED CLINICAL TRIAL COMPARING IN-PERSON AND SMARTPHONE DELIVERED INTERVENTIONS**

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Mindfulness interventions hold promise as a strategy to improve employee well-being and mitigate burnout, but most studies measure only distress-based outcomes and lack comparison against an active treatment condition. Despite growing interest in smartphone applications, there is little research on the use of smartphones to decrease work-related burnout. This study assessed the effectiveness of an in-person mindfulness-based resilience training (MBRT) program and a smartphone-delivered resiliency-based intervention against a control condition on distress and well-being in employees at a major tertiary healthcare institution.

Participants ( $n = 60$ , 86.7% female;  $M$  age = 46) were randomized to a MBRT program ( $n = 22$ ), a resiliency-based smartphone intervention in which participants selected well-being goals with exercises regarding selected topics ( $n = 23$ ), or a control group ( $n=15$ ) for six weeks. Measures of distress including the Depression, Anxiety, and Stress Scales (DASS-21), Visual Analog Scale-Fatigue, Maslach Burnout

Inventory (MBI), and well-being measures including the WHO5 Well-Being Index, Connor-Davidson Resilience Scale, Self-Compassion Scale, and Compassion for Others Scale were taken at baseline, 6 weeks, and 3-months post-intervention. All participants tracked their sleep via smartphone from baseline to six weeks.

Groups were similar on demographic and baseline outcome measures except that the control group had more meditation experience at baseline than the other groups ( $p = .028$ ). Compared to changes over time in controls, improvements on well-being as measured by the WHO5, and reductions in stress as measured by the DASS-21, were greater for the MBRT ( $p < .0001$  and  $.001$  respectively) and smartphone group ( $p = .001$  and  $.049$  respectively). The MBRT group also showed significant improvements in the Depersonalization subscale of the MBI ( $p < .0001$ ). In the MBRT and smartphone groups, number of sessions attended correlated with improvements in WHO5 ( $p < .001$ ) and Compassion for Others ( $p = .005$ ) scores at 3-month post-intervention. Results suggest that both a smartphone intervention and a MBRT program reduced stress and increased well-being in employees. However, the employees who did MBRT, an in-person intervention, were most likely to improve in measures of work-related burnout.

Table 1  
*Mindfulness-Based Resilience Training (MBRT) Course Outline*

Session	Topics
Session 1	Resilience – Core Concepts and Research Mindful Movement Attentional Training – Awareness of Breath Informal Practice
Session 2	Awareness of Breath – 10 minutes Mindfulness – Core Concepts and Research Mindful Movement Compassionate Body Scan
Session 3	Coping with Difficult Physical Sensations – Core Concepts Mindful Movement Awareness of Bodily Pain/Discomfort Compassion Meditation
Session 4	Coping with Difficult Emotions – Core Concepts ABC’s of MBRT Mindful Movement Naming Emotions Meditation
Session 5	Coping with Unwanted Thoughts/Narratives – Core Concepts Fusion and Diffusion Mindful Movement Practicing with Difficult Thoughts/Narratives Meditation
Session 6	Self-Criticism and Self-Compassion Personalized Resilience Plan Incorporating Intentions, Mindfulness Skills and Resilience Skills

### 31) Abstract 1075

#### **PREGNANCY INDUCED HYPERTENSION MODERATES THE ASSOCIATION BETWEEN PSYCHOSOCIAL STRESS IN EARLY PREGNANCY AND GESTATIONAL AGE AT BIRTH.**

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**Background:** Maternal prenatal psychosocial stress and pregnancy induced hypertension are risk factors for adverse birth outcomes. Research has shown that psychosocial stress and pregnancy induced hypertension are associated with younger gestational age at birth, but whether psychosocial stress influences gestational age differently among women with and without pregnancy induced hypertension has not been determined.

**Objective:** To investigate whether the association between prenatal maternal psychosocial stress and gestational age at birth is moderated by pregnancy induced hypertension.

**Methods:** A secondary data analysis was conducted using the All Our Babies prospective pregnancy cohort ( $N = 2858$ ). Sociodemographic information (e.g., maternal age, parity, pre-pregnancy body mass index) and measures of psychosocial stress (e.g., perceived stress, and symptoms of anxiety and depression) were obtained at <24 weeks' gestation using self-report questionnaires. Information regarding prenatal and birth record data that included pregnancy complications was retrieved from participants' electronic medical record.

**Results:** In line with previous research, three hierarchical multiple regression analyses revealed significant negative associations between depressive symptoms, anxious symptoms, and perceived stress and gestational age after adjusting for sociodemographic variables. Moderation analyses showed that depressive symptoms significantly predicted younger gestational age at birth among women with and without pregnancy induced hypertension, but among those with hypertension the association was stronger such that a one-unit increase in total score on the Edinburgh Postnatal Depression Scale was associated with a one-day decrease in gestational age ( $b = -.14$ ,  $SE = .03$ ,  $p < .001$ ). Anxious symptoms ( $b = -.05$ ,  $SE = .01$ ,  $p < .001$ ) and perceived stress ( $b = -.06$ ,  $SE = .02$ ,  $p < .05$ ) significantly predicted younger gestational age among women with pregnancy induced hypertension, but not among those without. These results remained significant after adjusting for sociodemographic variables.

**Conclusions:** The association between psychosocial stress and gestational age at birth is moderated by pregnancy induced hypertension. Future research should investigate psychophysiological mechanisms that may link psychosocial stress, pregnancy induced hypertension, and birth outcomes.

### 32) Abstract 1084

#### **HAIR CORTISOL AND THE METABOLIC SYNDROME IN A MULTIRACIAL SAMPLE**

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**Background:** Although hair cortisol is associated with metabolic syndrome prevalence in White adults, this relationship has not been examined in other racial groups. Racial differences in both long-term cortisol concentration and cardiometabolic risk may influence how hair cortisol levels vary with metabolic syndrome status and severity.

**Design:** We used the analysis of cortisol in hair (CORT) to examine associations of long-term cortisol levels with two different metabolic syndrome calculations - standard metabolic syndrome (SMetS) and race-specific metabolic syndrome severity score (MSSS) - and with cardiometabolic components, in a multiracial sample.

**Participants:** Participants included 232 community-dwelling adults (73 White, 89 Hispanic, 70 Black; mean age 45.4 years; 67% females).

**Main Outcome Measures:** The first 3 cm of scalp-near hair were analyzed for cortisol concentration using enzyme-linked immunoassay analysis (ELISA). Relevant cardiometabolic risk factors were assessed and a metabolic syndrome continuous score and diagnosis were determined using 1) standard 2009 international task force SMetS criteria and 2) 2014 MSSS calculations weighting individual metabolic syndrome components for their race-specific contribution to cardiometabolic risk.

**Results:** In bivariate analyses, CORT showed positive associations with systolic and diastolic blood pressure, glucose, glycated hemoglobin, body mass index, and waist-to-hip ratio, and a negative association with HDL cholesterol. These correlations were largely driven by associations among Whites. In fully-adjusted analyses, CORT was associated with MSSS score ( $b = .22$ ,  $p < .01$ ) and prevalence (odds ratio 2.18, 95% confidence interval 1.24-3.84). Associations of CORT with SMetS score and prevalence were not significant.

**Conclusion:** In a multiracial sample, hair cortisol is associated with the metabolic syndrome when race-specific calculations are used. Clinicians and researchers should consider racial variation in relevant parameters when interpreting and designing studies investigating cortisol and cardiometabolic disease.

### 33) Abstract 1087

#### **INTERPERSONAL VIOLENCE, POST-TRAUMATIC STRESS DISORDER, AND SYMPTOMS RELATED TO MENOPAUSE AND AGING AMONG COMMUNITY-DWELLING OLDER WOMEN**

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**Background:** Because prior research on interpersonal violence and post-traumatic stress disorder (PTSD) has largely focused on younger women, little is known about the impact of these experiences on the health of midlife and older women.

**Methods:** Associations between lifetime interpersonal violence exposures (physical or emotional intimate partner violence, sexual violence), PTSD, and symptoms related to menopause and aging (hot flashes, night sweats, sleep difficulty, urinary incontinence, and vaginal pain with intercourse) were examined in a multi-ethnic sample of community-dwelling midlife and older women (mean age 60.5) using multivariable logistic regression. Interpersonal violence and PTSD were measured with well-validated standardized assessments. Models were adjusted for age, race/ethnicity, and body mass index. Data were drawn from the Reproductive Risk of Incontinence Study in Kaiser (RRISK), an observational cohort study ( $n=2,106$ ) of long-term enrollees in the Kaiser Permanente Northern California health care system.

**Results:** In this multi-ethnic sample (40% non-Latina White, 20% Latina White, 20% Black, and 20% Asian), 24% of participants reported current or past intimate partner violence, 19% reported having experienced sexual violence, and 22% had clinically significant PTSD symptoms. Intimate partner violence was associated with night sweats (OR 1.42,  $p < .01$ ), sleep difficulty (OR 1.45,  $p < .001$ ), vaginal pain with intercourse (OR 1.43,  $p = .04$ ), and urinary incontinence (OR 1.42,  $p < .01$ ). Sexual violence was associated with vaginal pain with intercourse (OR 1.46,  $p = .04$ ). Women with clinically significant PTSD symptoms were more likely to report hot flashes (OR 1.76,  $p < .001$ ), night sweats (OR 1.78,  $p < .001$ ), sleep difficulty (OR 3.10,  $p < .001$ ), and vaginal pain with intercourse (OR 2.12,  $p < .001$ ).



**Conclusions:** Interpersonal violence and PTSD were prevalent in this sample, and contributed to risk for disruptive menopause- and aging-related symptoms. These findings highlight the importance of systematic screening and early intervention among midlife and older women, and the need to determine best approaches for trauma-informed care of these common symptoms.

### 34) Abstract 1154

#### **INFLAMMATION AND CIRCULATING ENDOTOXIN ARE INDEPENDENT PREDICTORS OF DEPRESSIVE SYMPTOMS AND FATIGUE IN STABLE KIDNEY TRANSPLANT RECIPIENTS**

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Over 40% of kidney transplant recipients (KTRs) report severe fatigue and approximately 25% are clinically depressed. Persistent inflammation may greatly enhance vulnerability to these syndromes. A recent discovery is that inflammation may, in part, be driven by the translocation of gut bacteria ('leaky gut'), which increases circulating inflammatory bacterial products, such as the endotoxin lipopolysaccharide (LPS). The present study investigated if plasma LPS predicted systemic inflammation in KTRs and symptoms of depression and fatigue.

This study enrolled 128 stable KTRs who were >24 months post-transplantation [Mean age = 50 SD±15; 56% male]. Symptoms of depression and fatigue were assessed using the Hospital Anxiety and Depression scale and the Multidimensional Fatigue Inventory. Fasting blood was analyzed for LPS, and inflammation was assessed as C-reactive protein (hsCRP). Analyses were adjusted for clinical and demographic markers, including age, ethnicity, gender, BMI, comorbidity, and kidney function (eGFR).

As expected, LPS levels predicted hsCRP ( $\beta=.39$ ,  $p<.001$ ). In turn, both LPS and hsCRP predicted depressive symptoms ( $\beta=.31$  and  $\beta=.24$ , respectively,  $p<.01$ ), as well as several dimensions of fatigue ( $\beta>.17$  and  $<.31$ ,  $p<.01$ ). After adjustment for inflammation, LPS remained an independent predictor of depressive symptoms ( $\beta=.28$ ,  $p<.01$ ) as well as various dimensions of fatigue ( $\beta>.19$  and  $<.29$ ,  $p<.001$ ).

This study is the first to identified circulating LPS as an independent predictor of depressive symptoms and fatigue. Control of circulating LPS, e.g., through dietary manipulation of gut permeability, may help to improve mood and fatigue in patients.

### 35) Abstract 1159

#### **NEIGHBORHOOD ADVERSITY AND CORTISOL SECRETION ACROSS THE LIFE SPAN**

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Previous studies have shown that living in poor neighborhoods is associated with increased morbidity and mortality. However, researchers are now investigating the biological pathways responsible for the deleterious effects of neighborhood disadvantage on health. Here, we investigated whether objective neighborhood adversity was associated with cortisol measured in two sampling matrices, saliva and hair, and whether this link would be mediated by subjective perceptions of neighborhood adversity. In Study 1, one hundred older African Americans were recruited from 39 Detroit census tracts across five strata of census tract adversity. Participants were interviewed face-to-

face to collect psychosocial measures. Next, participants collected four saliva samples a day for seven consecutive days. Our analyses revealed that higher subjective neighborhood adversity mediated the link between higher objective neighborhood disadvantage and steeper diurnal cortisol slopes. In Study 2, the same finding was replicated in a sample of seventy-eight African American children affected by asthma and living in Detroit. In Study 3, we found that subjective neighborhood disadvantage predicted flatter cortisol slopes in a nationally representative sample of adults. Lastly, in Study 1 a subsample provided a hair sample for analysis of cortisol. When the same analyses were run using hair cortisol as the main outcome, we found that higher objective neighborhood adversity was associated with higher levels of hair cortisol levels and than subjective neighborhood disadvantage partially explained this association. In sum, these results demonstrate a link between objective and subjective neighborhood adversity and daily cortisol as well as hair cortisol—a retrospective indicator of long-term hypothalamic pituitary adrenal (HPA) axis activation—across the lifespan.

## POSTERS

### 36) Abstract 1277

#### TRACKING DAILY ACTIVITY IN FATIGUED BREAST CANCER SURVIVORS. AN EXPLORATORY STUDY

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**Background:** Cancer-related fatigue (CRF) is the most prevalent and distressing problem in cancer survivors that can persist many years beyond successful cancer treatment. Given steadily increasing rates of mobile phone ownership, mobile phone interventions may have the potential to reduce CRF via improved self-efficacy, management of physical symptoms and physical activity.

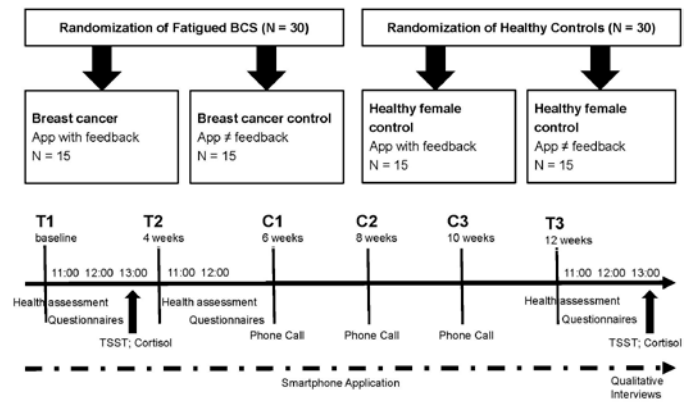
**Objective:** 1) to learn more about daily activity in fatigued breast cancer survivors; 2) to test whether a smart phone application can maintain and/or increase daily physical activity in fatigued breast cancer survivors over a supervised period of time; 3) to assess whether changes in physical activity will be reflected in self-report and physiological measures.

**Methods:** A total of 30 fatigued breast cancer survivors (FACIT-F score  $\leq 34$ ) will be randomly assigned to either the intervention ( $n = 15$ ) or cancer control group ( $n = 15$ ). Healthy participants without a history of cancer will also be randomly assigned to an intervention ( $n = 15$ ) or control group ( $n = 15$ ). While the intervention groups will receive a smartphone application with feedback regarding their daily activity, the control groups will receive the application without feedback (Figure 1). Behavioral data will be collected by means of GPS and Wi-Fi for localization, and accelerometer, barometer, magnetometer and gyroscope for activity recognition. Primary outcomes will be fatigue (FACIT-F) and physical activity. Secondary outcomes include pain, depression, psychological distress, quality of life, heart rate, and cortisol level. Outcome measures will be completed at baseline (T1), 4 weeks (T2) and 12 weeks (T3). Group differences will be tested by one-way analysis of variance (ANOVA). Intervention effects will be analyzed using mixed models with repeated measurements: fixed factors will include group and time; dependent variables will be the primary and secondary outcomes described above.

**Hypotheses:** The cancer survivor intervention group will demonstrate higher levels of physical activity, lower levels of fatigue, pain, psychological distress and normalization of cortisol levels at 12 week follow-up in comparison to the cancer survivor control group.

#### Conclusion

The aim of this exploratory study is to evaluate a theoretically guided smartphone application for fatigued breast cancer survivors.



### 37) Abstract 1642

#### TO RCT OR NOT TO RCT? A REAL WORLD PREFERENCE-BASED COMPARATIVE EFFECTIVENESS TRIAL OF MINDFULNESS BASED CANCER RECOVERY AND TAI CHI/QIGONG IN CANCER SURVIVORS (THE MATCH STUDY)

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Although randomized controlled trials (RCTs) have long been the gold standard in behavioural research, it may be time to move beyond this approach and instead design behaviour trials according to a more pragmatic, real world approach. Research has documented that successful treatment of cancer does not necessarily mean total recovery of function. A growing number of cancer survivors suffer lingering high levels of distress, depression, and stress along with sleep disturbances, pain, and fatigue. Two mind-body interventions with evidence for treating these problems are Mindfulness-Based Cancer Recovery (MBCR) and Tai chi/Qigong (TCQ). However, while both interventions show efficacy compared to usual care, they have never been directly compared nor have they been examined under real world, pragmatic conditions where factors such as preference or availability are taken into account. Toward this goal, we have designed an innovative study comparing MBCR and TCQ to treat distressed cancer survivors according to their preferences, while still maintaining the rigor of a traditional RCT. Participants ( $N = 600$ ) with a preference will receive their preferred intervention; while those without a preference will be randomized into either intervention. All participants will also be randomized into immediate intervention groups or wait-list control, providing randomized usual care comparisons for each condition.

Groups will be compared pre- and post-intervention and at a 6-month follow up. The Profile of Mood States (POMS) Total Mood Disturbance is the primary outcome. Quality of life, psychological measures, cancer-related symptoms and physical functioning will also be assessed. We will also explore the effects of these interventions on biomarkers (e.g., cortisol slopes, cytokines, blood pressure/heart rate variability, telomere length, gene expression), which may uncover important effects on key biological regulatory and antineoplastic functions. Lastly, health economic measures will be assessed to determine potential savings to the health care system associated with adopting these complementary therapies for cancer survivors. This approach will allow us to examine the real world benefits of MBCR and TCQ for cancer patients, including analyses of which program best targets specific symptoms in particular groups of survivors, based on preferences and patient demographics.

### 38) Abstract 1352

#### APP INTERVENTION BASED ON MIND BODY MEDICINE FOR CANCER PATIENTS (AIM-C)

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**Background:** Standard cancer treatment often neglects distress in cancer patients and Mind Body Medicine (MBM) interventions are effective to reduce cancer related distress if they are delivered in a face to face setting. This study will evaluate the benefits for patients and the feasibility of a mind-body medicine mobile app with mindfulness meditation, guided imagery and progressive muscle relaxation in cancer patients (registered at DRKS00010481). The intervention is delivered via a mobile app and enables a simultaneous assessment of patient's distress and the satisfaction with the intervention. **Methods:** We conduct a prospective observational study with a mixed methods approach in 160 adult cancer patients. Patients can use the App for twenty weeks in addition to face to face MBM treatment or in addition to usual cancer care. Quantitative data include clinical data, self-reported health outcomes (i.e. PROMIS 29, HADS, FACT-G, Distress Thermometer and mindfulness) and treatment satisfaction by questionnaires and via a continuous assessment in the app. Interviews with patients and healthcare professionals about the feasibility and satisfaction with the App will be done after the App use. The study is guided by the RE-AIM evaluation framework (Reach the target population; Effectiveness, Adoption by target staff, setting, or institutions; Implementation consistency, costs and adaptations made during delivery; Maintenance of intervention effects in individuals and settings over time). **Results and Discussion:** The development of the MBM App was finished in April 2016 and the recruitment of patients started in July 2016. First data on use and feasibility will be available by March 2017. The study will allow insights, if new technologies are able to deliver MBM interventions in a feasible and effective way for patients with chronic illnesses and will allow conclusions about the acceptance of MBM apps in patients as well as healthcare professionals.

### 39) Abstract 1554

#### PRESURGICAL SLEEP QUALITY, INDIVIDUAL RESILIENCE, AND POSTSURGICAL INFLAMMATION AMONG WOMEN WITH SUSPECTED GYNECOLOGIC CANCER

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**Background:** Sleep disturbance is the most common behavioral health issue in cancer patients. It is associated with high inflammation, which may have deleterious effects on outcomes. In contrast, resilience (i.e.,

adaptability to stress) is associated with less inflammation. Few studies have examined relations among resilience, sleep, and inflammation in cancer patients, especially during cancer treatment. Therefore, the current study examined whether resilience moderated the relationship between presurgical sleep quality and postsurgical serum IL-6.

**Methods:** Participants were 21 women ( $M_{age}=57.71$  yrs;  $SD=11.22$ ) with clinically significant sleep disturbance that were enrolled in an RCT examining cognitive-behavioral effects on sleep, pain, and cytokines in gynecologic cancer. Preoperative sleep quality was measured by the Pittsburgh Sleep Quality Index (PSQI; Buysse et al., 1989). Personal resilience was captured via the Connor-Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003). Postoperative inflammation was measured via serum concentrations of IL-6 using standardized ELISA assays at a postsurgical clinical visit.

**Results:** Using linear regression analyses, resilience significantly moderated the relationship between presurgical daytime dysfunction due to sleepiness and postsurgical IL-6 ( $\beta=-0.470$ ,  $p=.041$ ), such that high resilience buffered the relationship between high presurgical daytime dysfunction and high postsurgical IL-6. The overall model accounted for 27% of the variance in postsurgical IL-6. Resilience did not moderate the relationship between Global PSQI score and IL-6 or other PSQI component scores and IL-6.

**Conclusions:** These findings contribute to existing literature on biobehavioral relationships between psychosocial well-being and immunity in gynecology oncology. High personal resilience may attenuate the deleterious effects of daytime dysfunction due to sleepiness on systemic inflammation among women undergoing surgical resection for gynecologic cancers. High daytime dysfunction was endorsed among women with the most severe overall sleep disturbance and may represent a phenotype that confers especially high risk for inflammation and other clinical outcomes. Future research should examine whether interventions that improve resilience and reduce daytime dysfunction can optimize immunity and clinical outcomes in women with cancer.

### 40) Abstract 1409

#### HEART-TO-HEART: A DYADIC PSYCHOSOCIAL INTERVENTION FOR COUPLES COPING WITH METASTATIC LUNG CANCER

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Over half of new lung cancer (LC) cases are diagnosed with already distant metastases. Given the incurable nature, short survival and high symptom burden of metastatic LC, patients and their families are at risk of experiencing psychological and existential/spiritual distress. To address these concerns, we developed a dyadic intervention integrating meditation training with emotional disclosure exercises to facilitate intra- and interpersonal adjustment. The intervention is based on the Broaden-and-Built Theory of Positive Emotions and involves 4 weekly, 60 min sessions along with homework. Each session focuses on skills to cultivate mindfulness, compassion, gratitude and purpose. The goal of this initial study was to examine intervention acceptability. We conducted focus groups involving 7 patients with metastatic LC ( $\mu_{age}=64.5$  yrs;  $\mu_{time\ since\ dx}=4.2$  mo.; female:  $n=3$ ) and their partners ( $\mu_{age}=55.3$  yrs; female:  $n=4$ ). Each focus group consisted of 1 couple, the interventionist and an interviewer. Intervention content for the 4 sessions was condensed into 2, 90 min. sessions. Couples participated in the exercises and then completed semi-structured interviews and

written evaluations including Likert-scale and open-ended questions to solicit their feedback regarding content and materials. Sessions were video/audio-recorded and then transcribed. All study participants perceived each component of the intervention to be either “beneficial” or “very beneficial” (0-4 scale;  $\mu$ 's=3.7-3.9). On 6-point scale, participants indicated that during the sessions they felt “calm” ( $\mu$ =4.8, SD=1.2), “relaxed” ( $\mu$ =5.3, SD=0.8), and “energized” ( $\mu$ =4.6, SD=1.4). None of the participants endorsed feeling states of “nervous,” “tense,” “upset” or “sad.” On 6-point scale, immediately after the sessions, participants endorsed having improved their emotional ( $\mu$ =4.6, SD=1.3), social ( $\mu$ =4.3; SD=1.4), and physical ( $\mu$ =4.8, SD=1.0) wellbeing. All participants would recommend the program to other couples. Open-ended comments were very encouraging regarding general acceptability and usefulness of the program. As the intervention was deemed acceptable, we are currently conducting a 3-arm trial, randomizing couples to either the intervention, an attention control, or usual care control group to examine the feasibility and initial efficacy of this novel treatment for an understudied population.

#### 41) Abstract 1284

##### **THE EFFECTS OF HEART-RATE VARIABILITY BIOFEEDBACK ON LEVELS OF THE TUMOR MARKER CEA IN METASTATIC COLON CANCER: A PILOT CONTROLLED STUDY**

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**Background:** High activity of the vagus nerve, indexed by heart-rate variability (HRV), predicts better prognosis in many cancers. Furthermore, in several studies, an intact vagal nerve causes less metastasis. This pilot study tested the effects of vagal activation via HRV-biofeedback (HRV-B) on levels of a tumor marker in patients with metastatic colon cancer.

**Methods:** This preliminary pilot study used a matched-controlled pre-post design. Three patients with stage 4 colon cancer performed HRV-B for approximately 20 min/day, during 3 months. They were guided to increase their vagal nerve activity via paced slow breathing with an HRV-B device. These patients were matched with three others on 1. Cancer type; 2. Cancer stage; 3. Type of chemotherapy treatment; 4. Baseline CEA (the tumor marker of colon cancer). Data were extracted from medical files. CEA level was the main outcome variable.

**Results:** Levels of CEA did not change in controls, while they declined in the HRV-B condition, a difference approaching statistical significance at 3 months ( $p = 0.055$ ). Patients in the HRV-B condition were able to perform this self-intervention daily and it appeared feasible.

**Conclusions:** The results of this preliminary matched-controlled pilot study suggest that vagal nerve activation via HRV-B is feasible and may possibly have promising effects on tumor burden in colon cancer. However, before claiming any positive effects with certainty, this requires testing HRV-B in a large randomized controlled trial, which is planned.

#### 42) Abstract 1444

##### **COMPARISON OF THE TREATMENT OUTCOME IN PATIENTS WITH AN EATING DISORDER WITH A PATIENTS WITH A PSYCHOSOMATIC DISORDER**

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Patients with severe depressive, anxiety, eating, somatoform, personality and trauma related disorders improve during a multidisciplinary, multimodal psychotherapeutic in-patient/day clinic treatment. We explored whether the treatment outcome was differentially affected by the presence of an eating disorder.

From 6/2006 until 8/2016 928 patients (mean age of patients with psychosomatic disorders  $40.7 \pm 14.6$ ; 65.5% female, patients with eating disorders,  $25.4 \pm 9.5$ ; 94.7% female) were treated as in-patients and/or in the day clinic of the Department of Psychosomatic and Psychotherapeutic Medicine of a non-profit private hospital. 39.7% suffered from a depressive disorder as main diagnosis, 9.6% from anxiety disorders, 24% from eating disorders, 5.4% from somatoform disorders, 5.4% from personality disorders and 7 % from disorders related to trauma.

All patients were assessed at the beginning and at the end of treatment with the SF36 (Short Form 36 Quality of Life Questionnaire), BSCL (Brief Symptom Checklist), HADS (Hospital Anxiety and Depression Scale), and (for patients with eating disorders only) EDI-2 (Eating Disorder Inventory).

Patients treated for an eating disorder were stat. sig. younger, female, single and still in education ( $p < .05$ ). There was no difference in the divorce rate of the parents. The improvement of the mental component of QOL ( $F(2, 679) = 54.94, p < 0.0001, R^2 = 0.1393$ ), depressive symptoms ( $F(2, 675) = 110.09, p < 0.0001, R^2 = 0.246$ ), anxiety ( $F(2, 675) = 99.61, p < 0.0001, R^2 = 0.228$ ), distress ( $F(2, 297) = 81.02, p < 0.0001, R^2 = 0.353$ ) and somatization ( $F(2, 297) = 71.72, p < 0.0001, R^2 = 0.3257$ ) was equal in the two groups and was predicted by the value at the beginning but was not affected by the presence of an eating disorder. However, the presence of an eating disorder affected stat. sig. the physical component of QOL ( $F(2, 679) = 313.20, p < 0.0001, R^2 = 0.48$ ).

The improvement in QOL, distress, depressive symptoms, anxiety and somatization is comparable in patient with psychosomatic disorders and patients with eating disorders. Only the physical component of QOL is differentially affected by the presence of an eating disorder.

#### 43) Abstract 1447

##### **IMPACT OF TREATMENT OUTCOME ON QUALITY OF LIFE IN PATIENTS WITH AN EATING DISORDER**

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Patients with severe eating disorders are offered a multimodal in-patient/day clinic treatment. We assessed the treatment outcome and explored the impact of treatment outcome on Quality of Life.

From 6/2006 until 8/2016 436 patients with an eating disorder (mean age  $24.5, 25.4 \pm 9.5$ ; 95.1% female) were treated as in-patients and/or in the day clinic of the Department of Psychosomatic and Psychotherapeutic Medicine of a non-profit private hospital. Outcome data were available at the end of treatment for 293 (66.9%) patients.

Patients were assessed at the beginning and at the end of treatment with the SF36 (Short Form 36 Quality of Life Questionnaire) and EDI-2 (Eating Disorder Inventory). A follow up assessment 6 months after the end of treatment was carried through since 2 years with the SF36.

46.08% reached a good treatment outcome defined as a Total score of the EDI at the end of treatment below the 70<sup>th</sup> percentile of an unselected female population. 16% had a poor outcome with a Total EDI Score at the end being higher than at the beginning. 38% of the patients showed an improvement of the Total EDI score, however the value of the score continued to be over the 70<sup>th</sup> percentile at the end of treatment.

The physical dimension of QOL at the beginning and a good treatment outcome had a positive impact on the physical dimension of QOL at the end of treatment ( $F(2, 284) = 79.63, p < .0001; R^2 = 0.3593$ ). The physical dimension of QOL at the beginning but not treatment outcome

had a positive impact on the physical dimension of quality of life at follow up ( $F(2, 44) = 8.18, p = .0001; R^2 = 0.2709$ ).

The mental dimension of QOL at the beginning and a good treatment outcome had a positive impact on the mental dimension or QOL at the end of treatment ( $F(2, 284) = 79.03; p < .0001; R^2 = 0.3576$ ). Treatment outcome only but not the mental dimension of QOL at the beginning had a positive impact on the mental dimension of quality of life only at follow up ( $F(2, 44) = 8.03, p = 0.0011, R^2 = 0.2673$ ).

46% of the patients with an eating disorder reached a good treatment outcome, 38% a moderate and 16% got worse. The physical and mental dimensions of QOL of life are differentially affected by treatment outcome. Treatment outcome impacts more the mental dimension of QOL than the physical.

#### 44) Abstract 1392

##### **MOOD VARIABILITY AND REACTIVITY IN BIPOLAR SPECTRUM DISORDERS: AN ECOLOGICAL MOMENTARY ASSESSMENT STUDY**

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**Aim:** Ecological Momentary Assessment (EMA) is an important tool in identifying mood fluctuations that may characterize specific types of mood disorder. We evaluated differences in mood disorder groups in emotional reactivity to daily events, and variability in the intensity and tonality of emotional states.

**Method:** Participants with bipolar I disorder (BP-I;  $n=33$ ), bipolar II disorder (BP-II;  $n=37$ ), major depressive disorder (MDD;  $n=116$ ), anxiety disorders without comorbid mood disorders ( $n=36$ ) and unaffected controls ( $n=65$ ) completed two weeks of EMA measuring emotional status (low mood & anxious mood) and daily event occurrence (positive-negative-neutral). All analyses were corrected for age and sex.

**Results:** Individuals with BP-I disorder experienced a significantly greater decrease in sad and anxious mood following positive events than controls. By contrast, individuals with BP-II, MDD or anxiety disorders experienced greater increases in anxious mood than controls specifically following negative events. The BP-II group showed the greatest variability in mood states. Compared to controls, significantly increased variability was observed in BP-II and MDD groups for low and anxious moods, and in BP-I for anxious mood.

**Conclusion:** The findings suggest that mood variability is a nonspecific characteristic of diverse forms of psychopathology. However, the finding that people with BP-I have greater reactivity to positive events, whereas those with BP-II, MDD and anxiety have greater reactivity to negative events provides further support for distinguishing these subtypes. Future research is needed to examine whether reactivity patterns comprise an endophenotype that indexes heterogeneity of bipolar spectrum disorders.

#### 45) Abstract 1568

##### **PSYCHOLOGICAL DISTRESS AND ANTIBODIES TO STRESS PROTEIN (ANTI-HSP60) IN VENEZUELA**

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**Introduction/Background:** Research on socio-political conflicts has focused on the association between violence, psychological stress and health and Venezuela has been declared by Human Rights Watch and The American Organization of Estates as a country suffering of a Humanitarian Crisis. In stressed individuals antibodies to “Stress Proteins” or Heat Shock Proteins (Hsps) have been associated with atherogenesis, hypertension and coronary heart disease therefore we investigated the association of these antibodies (Anti-Hsp60) in a sample of men and women from Venezuela. **Method:** This is a quantitative transversal study of 117 healthy voluntary individuals, 53 men and 64 women, with age between 20 and 70 years old. Clinical exam, resting standard 12-lead ECG, routine laboratory tests, 2 psychosocial tests [the life event scale (Holmes) and the Stress Reactivity Index (SRI-32)] were performed, a serum sample was collected and frozen for determination of Anti-Hsp60. **Results:** 43% of individuals showed high psychological test scores, 44% of women and 40% of men showed high psychological test scores. The mean Anti-hsp60 in High Psychological Test Scores Individuals was 330ng/ml versus 181ng/ml in Low Psychological Test Scores individuals ( $P < 0.05$ ). Pearson correlation showed a moderate tendency that the higher the Psychological Tests Scores the higher the Anti-Hsp60 concentration. **Conclusions:** Anti-Hsp60 titer could serve as markers of cardiovascular risk in these individuals with High Psychological Test Scores.

#### 46) Abstract 1476

##### **THE MEDICAL INCAPACITY HOLD: A NOVEL HEALTHCARE POLICY ADDRESSING AN EXISTING GAP IN COMMITMENT STATUTES**

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##### **Introduction**

Inpatients with altered mental status often lack capacity to make informed healthcare decisions and are at risk of harm, disability, or death if they leave the hospital. Despite this, relevant statutes do not have provisions for involuntarily detaining a patient who lacks capacity. Instead, the only forms of civil commitment permitted are intended for patients with mental disorders, resulting in the inappropriate use of involuntary psychiatric holds (IPH) even in cases where no mental disorder is present. This study examines outcomes after a novel healthcare policy known as a medical incapacity hold (MIH), which permitted involuntary detainment of patients who lacked capacity to leave but did not meet probable cause for a mental disorder, was introduced.

##### **Methods**

A retrospective chart review was conducted on all patients over the age of 18 placed on an IPH ( $n=64$ ) at two academic medical centers over a 3-month period. These cases were then compared to all patients placed on an IPH ( $n=X$ ) or a MIH ( $n=33^*$ ) over a 3-month period after the introduction of the MIH. The primary outcome compared was the frequency of inappropriate use of IPH in patients without probable cause of a mental illness. Statistical analysis was conducted using Microsoft Excel.

##### **Results**

Prior to the MIH policy, 18.8% (12/64) patients were determined to have been placed on an IPH with minimal or no evidence of a mental disorder as the cause of their lack of capacity. The most common diagnoses necessitating the use of the MIH were delirium and substance withdrawal. The MIH policy resulted in a reduction in inappropriate use of IPH from 18.8% to Y%.

##### **Discussion**

Our results demonstrated that inappropriate use of IPH decreased\* after implementation of the MIH policy. Further improvements are expected with further dissemination of this policy to relevant departments. While this represents an improvement, it should be noted that the MIH in our study was a hospital policy rather than representing a change in law.

Further studies should be conducted to replicate these findings before proposing changes to relevant statutes.

Note: At the time of submission, only 2 months of data since the introduction of the MIH policy were available. Any numbers substituted by a letter or marked by \* represent preliminary data based upon available information.

#### Poster 47) WILL NOT BE PRESENTED

#### 48) Abstract 1386

##### ONLINE TREATMENTS FOR MOOD AND ANXIETY DISORDERS IN PRIMARY CARE: A RANDOMIZED CONTROLLED TRIAL

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**Background:** Internet support groups (ISGs) that enable individuals with similar conditions to access and exchange self-help information and emotional support have proliferated, yet clinical trials have not established their benefit. Conversely, several computerized cognitive behavioral therapy (CCBT) programs have been proven effective at treating mood and anxiety disorders and used by hundreds of thousands of people outside the U.S., yet CCBT is largely unknown within the U.S.

**Methods:** Primary care physicians (PCPs) at 26 Pittsburgh-area practices referred patients to our trial via an EMR-generated prompt that launched when “depression”, “anxiety” or “panic” was entered as a visit diagnosis for patients aged 18-75. We randomized consenting patients with at least moderate levels of mood and/or anxiety symptoms (PHQ-9 or GAD-7  $\geq 10$ ) and Internet access in a 3:3:1 ratio to either: (1) six months of care manager-guided access to the 8-session *Beating the Blues* CCBT program (CCBT-only); (2) CCBT-only plus access to a care manager-moderated ISG accessible via personal computer or smartphone (CCBT+ISG); or (3) their PCP’s “usual care” (UC). Blinded telephone assessors administered the PROMIS Depression and Anxiety Short Forms at baseline, 3-, 6- and 12-months follow-up.

**Results:** From 8/12-9/14, PCPs made 2,884 electronic referrals and 704 patients met all protocol-eligibility criteria and consented to randomization (301 CCBT-only, 302 CCBT+ISG, 101 UC); their baseline characteristics were similar by study arm (mean age: 42 years, 80% female, 82% White, mean PHQ-9: 13.3 (SD: 5.0) and GAD-7: 12.9 (4.4)). At 6-months, 86% of all patients with CCBT access started the program and 37% completed all 8 sessions (mean sessions completed: 5.4); 75% of CCBT+ISG patients logged into the ISG at least once, and 46% commented at least once (mean: 9.5). Compared to UC, CCBT-only patients reported 6-month improvements in mood (effect size (ES): 0.31;  $P=0.006$ ) and anxiety symptoms (ES: 0.26;  $P=0.02$ ) that increased with program engagement (ES mood, completed:  $\geq 4$  sessions, 0.41; all 8 sessions, 0.52) and persisted 6 months later. Moreover, ES improvements for CCBT+ISG vs CCBT-only patients were similar.

**Conclusion:** Providing care manager-supported CCBT to depressed and anxious primary care patients is an effective and durable strategy for providing mental health care at scale.

#### 49) Abstract 1571

##### INTERDISCIPLINARY PAIN REHABILITATION FOR YOUNG ADULTS: PRELIMINARY FINDINGS OF A NOVEL PILOT PROGRAM

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**Introduction:** Comprehensive interdisciplinary pain rehabilitation programs for adult and pediatric populations demonstrate significant pain-related and quality of life outcomes; however these programs are not tailored to the unique psychosocial and functional needs of young adults. The present study provides preliminary results of a pilot program tailored to the needs of young adults with chronic pain and associated symptoms. **Methods:** Participants were consecutive patients of an outpatient interdisciplinary pain rehabilitation program based on cognitive-behavioral principles, which included daily occupational and physical therapy. Novel programming components included individualized vocational assessment and counseling, financial planning, sexual health, and skills training for parents. Inclusion criteria were ages 19 to 29; completion of high school; and functional or financial dependence on parents. Patients completed a computerized survey at admission and program completion. Analyses examined pre-versus post-treatment differences in measures of pain (MPI, PCS), quality of life (SF-36), and depressive symptoms (CES-D). Prospective data will be collected at 3 and 6 months post-treatment. **Results:**

Participants (N=31) had a mean age of 21 years (range: 18-26) and were predominantly female (88.6%). Generalized pain was the most common diagnosis (17.4%), followed by abdominal pain, headache/migraine, and POTS (all 13.0%). 60.8% noted secondary pain/symptoms, the most common of which were fatigue and POTS-like symptoms (both 21.4%). Mean duration of pain/symptoms was 6.5 years (range: 0.5-14). Results demonstrate significant improvements at program completion. Participants reported reduced pain severity ( $t(30)=4.85, d=.87$ ), pain interference ( $t(30)=6.78, d=1.22$ ), pain catastrophizing ( $t(30)=7.53, d=1.35$ ), and depressive symptoms ( $t(30)=5.44, d=.98$ ) (all  $ps<.001$ ), as well as improvements in mental ( $t(30)=-9.80, d=-1.76$ ) and physical ( $t(30)=-10.20, d=-1.83$ ) quality of life. **Conclusion:** Findings demonstrate the clinical success of a pain rehabilitation program tailored to young adults to significantly reduce pain-related outcomes and depressive symptoms, and improve quality of life. Programming tailored to the needs of this age group may mitigate the otherwise negative impact of chronic pain and symptoms on young adults’ functional and psychosocial well-being.

#### 50) Abstract 1006

##### DISTRESS IN A LONGITUDINAL STUDY OF A POPULATION WITH NONSPECIFIC LOW BACK PAIN

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**Background:** As chronic low back pain (LBP) is one of the greater burdens of health care systems in the industrialized nations, the German national research network for Medicine in Spine Exercise (MiSpEx) was founded to clarify aspects of LBP development and treatment using an interdisciplinary approach that includes a social science perspective. One longitudinal study conducted by the network aimed at finding out more about the physiological and psycho-social risk factors for LBP and their development over time. One of the main psychosocial risk factors is stress and chronic stress. One difficulty is to define the kind of stress which influences LBP development. Another question concerns the stability or variability over time, which influences the pain predictions in later analyses.

**Methods:** Over a time frame of 2 years N=1048 participants were included at 7 measurement points between 2012 and 2014. Both psychosocial factors and biomechanical as well as medical parameters were assessed, respectively. Chronic pain was assessed through the



Chronic Pain Grade questionnaire. Psychosocial stress was evaluated in a broad manner: perceived stress, chronic stress experiences, vital exhaustion and life event stress. Furthermore, self-efficacy was assessed. To be able to estimate the stability over time, ANOVA with repeated measures were conducted for each of the stress measures. To assess the predictive strength regression analyses were conducted.

**Results:** It could be shown that some aspects of stress, especially chronic stress experiences, show the required stability that makes them useful predictors for LBP development. Further, the stress variables serve as predictors for LBP over a time period of up to 2 years.

**Conclusion:** The reported 2-year observation shows the difficulty of assessing stress as a Yellow Flag risk factor for the development of LBP. It points out the caution researchers should have in the election of their psychometric measurements, since some of them might change over time due to third unknown individual processes. One of these might be the occurrence of critical life events. Additional moderating factors which influence both stress and pain should be taken into account, such as physical activity and social support.

### 51) Abstract 1107

#### **SLOWLY REPEATED EVOKED PAIN (SREP) PROTOCOL VERSUS PAIN THRESHOLD AND TOLERANCE AS PAIN EVOKED MEASURES IN FIBROMYALGIA: ASSOCIATIONS WITH CLINICAL-PSYCHOLOGICAL FACTORS.**

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**Introduction.** The pathophysiology of fibromyalgia (FM) has been related to central pain sensitization. Traditional pain evoked measures (threshold and tolerance) indicate this sensitization, but these indices are influenced by individual pain sensitivity and emotional-cognitive factors. Our novel index Slowly Repeated Evoked Pain (SREP) protocol appeared as a potential marker of pain sensitization and FM status.

**Objective.** To examine the association between SREP and some clinical-psychological factors, in comparison with associations with pain threshold and tolerance.

**Method.** Twenty-four FM patients and 24 healthy females were interviewed to measure clinical pain, fatigue, catastrophizing, anxiety and depression. The SREP protocol consisted of a single series of nine low intensity pressure stimuli in the left third finger nail of 5s duration and 30s inter-stimulus interval. SREP sensitization was quantified as the difference between 9<sup>th</sup> and 1<sup>st</sup> painful stimulus. Subjective evoked pain intensity was assessed with a visual analogical scale. Pain threshold/tolerance was measured by pressure algometry in the same localization.

**Results.** Lower pain threshold and tolerance were observed in FM than healthy participants. SREP sensitization was observed in FM, but not in healthy subjects. Pain threshold and tolerance was not associated with SREP. SREP was more strongly associated with the sensory dimension of clinical pain than were pain threshold or tolerance. Regarding emotional-related aspects, higher fatigue and catastrophizing were associated to lower pain threshold and tolerance, and with higher SREP. On the other hand, higher anxiety was only related to lower pain threshold and tolerance, but not to SREP.

**Conclusions.** SREP was more predictive of overall clinical pain and specifically of the sensorial dimension of pain than were threshold or tolerance. SREP could have different underlying factors and seems to be associated with different clinical-psychological factors than threshold or tolerance. We concluded that the SREP protocol is a useful clinical marker in FM probably related to central sensitization that could have utility as an index of FM's pathophysiology status.

**Table 1. Correlations between Slowly Repeated Evoked Pain (SREP), pain threshold and tolerance, and clinical-psychological factors for fibromyalgia patients.**

Clinical-Psychological Factors	SREP	Threshold	Tolerance
Sensorial pain	0.63**	0.13	-0.14
Evaluative pain	0.16	-0.46*	-0.54**
Emotional pain	0.54**	-0.35	-0.48*
Total McGill Score	0.68**	-0.09	-0.40
Fatigue	0.43*	-0.45*	-0.48**
Anxiety	0.11	-0.46*	-0.50*
Depression	0.40*	-0.31	-0.45*
Catastrophizing	0.44*	-0.43*	-0.60**

\*  $p < .05$ ; \*\* $p < .01$ .

### 52) Abstract 1617

#### **THE MODERATING ROLE OF PAIN IN THE ASSOCIATIONS BETWEEN ALCOHOL USE AND DEPRESSIVE/ANXIETY SYMPTOMS AMONG LATINOS IN PRIMARY CARE**

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**Background:** Depression and anxiety are common mental health problems among Latinos in primary care. Although past work has shown that alcohol use co-occurs with anxiety and depression among Latinos, little work has examined variable that qualify such associations. The present investigation sought to address whether pain severity moderated relations between pain intensity/pain-related disability and depressive/anxious arousal symptoms among an economically disadvantaged Latino sample recruited from a primary care medical setting. **Methods:** Participants included 253 adult Latinos ( $M_{age}=38.5$  years,  $SD=10.8$ ; 86.6% female) who attended a community-based primary care clinic. **Results:** There was a significant interaction of hazardous drinking with pain intensity in relation to depressive symptoms and significant interactions of hazardous drinking and pain-related disability in relation to depressive and anxious arousal symptoms. Specifically, hazardous drinking was associated with more severe depressive/anxious arousal symptoms only when pain intensity/disability was high. **Conclusions:** This is the first study to demonstrate the moderating role of pain severity in hazardous drinking-affective associations among Latinos in a primary care medical setting. Future work is needed to develop and examine targeted interventions among the Latino population who experience severe pain and report hazardous drinking in an effort to reduce symptoms of anxiety and depression.

### 53) Abstract 1559

#### **DISENTANGLING THE RELATIONSHIPS AMONGST SOMATIZATION, PAIN SEVERITY, AND KINESIOPHOBIA IN ADULTS WITH SICKLE CELL DISEASE**

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Sickle cell disease (SCD) is the most common blood disorder, affecting over seven million individuals worldwide. Pain crises are the most common complication of SCD, and can be variable and unpredictable. Research has found that in individuals with SCD, somatization and kinesiophobia (fear of movement) are commonly experienced and are linked to poorer treatment outcomes. Presently, the nature of these relationships is unclear and warrants further investigation. The aim of the current study was to disentangle the relationships amongst pain severity, somatization, and kinesiophobia in adult African Americans with SCD as well as to extend our understanding of previous findings (Pells et al., 2007). First, we hypothesized that pain severity would significantly predict somatization. Second, we hypothesized that kinesiophobia would mediate the relationship between pain severity and somatization. Cross-sectional survey data collected as part of a five-year, IRB-approved, longitudinal study, of medical and psychosocial factors in SCD were used. Ninety-eight individuals with SCD were included in the analyses. Pain severity was found to significantly predict somatization,  $b = .31, t = 5.03, p < .001$ . There was a significant indirect effect of kinesiophobia on the relationship between pain severity on somatization,  $b = .028, BCa\ CI [.002, .080]$ . This represents a relatively small effect,  $\eta^2 = .041, 95\% BCa\ CI [.003, .118]$ . As such, kinesiophobia may be a small but meaningful mediator. These findings imply that kinesiophobia plays a role in the relationship between pain severity and somatization. The findings suggest that interventions that target kinesiophobia might be associated with decreased presence of somatization. Future research should examine the role of somatization and kinesiophobia in this context further to disentangle these relationships.

#### 54) Abstract 1635

##### **DIFFERENCES IN CARDIAC VAGAL ACTIVITY BETWEEN HEALTHY CONTROLS AND CHRONIC PELVIC PAIN PATIENTS IN RESPONSE TO A LABORATORY PSYCHOLOGICAL STRESSOR**

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Recent research evidence suggests that patients with chronic pelvic pain (CPP), specifically Interstitial Cystitis/Bladder Pain Syndrome (IC/BPS) and/or myofascial pelvic pain (MPP), can demonstrate an aberrant stress response. For example, one study found that individuals with CPP (e.g., IC/BPS) demonstrated lower vmHRV, an index of healthy autonomic function and overall health, both at rest and in response to a physiological stressor compared to healthy controls. However, research has not yet evaluated differences in vmHRV responses to a psychological stressor between healthy controls and CPP patients. Thus, the following preliminary study sought to explore differences between healthy controls' and CPP patients' vmHRV in response to the Trier Social Stress Test (TSST). Participants included healthy controls ( $n = 9$ ), and subjects with IC/BPS and/or MPP (CPP group,  $n = 9$ ). Using an ambulatory heart rate monitor, continuous data were collected while participants completed a 5-minute baseline period followed by the TSST; participants first prepared a speech (5-minutes), followed by the presentation of their speech to a panel of emotionally neutral judges. Following the speech, subjects perform serial subtraction aloud to panel of judges for 5-minutes. Anxiety was indexed using the Spielberger State Anxiety Inventory at baseline, following the math test, and following the end of the experiment. The root mean square of successive differences (natural log transformed) was calculated and used as an index of vmHRV. Results showed that in

CPP patients only, anxiety levels increased from baseline to the task, and returned to baseline levels ( $F(1,8) = 13.77, p = .006$ ). Preplanned contrasts showed a significant quadratic trend ( $F(1,15) = 4.93, p = .042$ ) in the CPP group, such that vmHRV decreased from baseline to the interview, and return to baseline levels during the math test. In contrast, the healthy controls showed no significant linear or quadratic trends in either anxiety or vmHRV trends throughout the experiment. These data suggest that patients in the CPP group showed poorer self-regulation, as indexed by decreased vmHRV and increased anxiety, during the TSST compared to healthy controls. In combination with previous research, the current study suggests that CPP patients may experience maladaptive responses to both physiological and psychological stressors.

#### 55) Abstract 1326

##### **PAIN AND THE POSITIVITY EFFECT: HOW ACUTE PAIN INFLUENCES RECALL, RECOGNITION, AND RESPONSE TIME TOWARD POSITIVE IMAGES IN OLDER AND YOUNGER ADULTS**

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The positivity effect refers to the tendency to favor positive over negative stimuli and can be assessed by measuring how well people recall, recognize, and quickly respond to stimuli of positive or negative valence. Socioemotional selectivity theory posits that as people age, they become increasingly likely to demonstrate the positivity effect, because they become more motivated to maximize positive emotions and minimize negative ones. Yet, pain can threaten positivity. The threat is particularly relevant for the 70% of older adults who report experiencing physical pain within the previous month. It was hypothesized that older adults would recall, recognize, and respond faster to positive images following pain than younger adults. Forty-eight older (ages 18-28) and 48 younger (ages 65-84) pain-free adults underwent a pain-free and a painful task where they were asked to submerge their non-dominant hand in room temperature (71.6°F) or cold (39.2°F) water for one minute, respectively. Immediately after each hand submersion, they were asked to recall, recognize, and respond to previously-seen neutral, negative, and positive images. A within-subject design was used, so that each participant experienced both the pain-free and painful task in counterbalanced order. With regard to recall, older adults remembered significantly fewer negative pictures than younger adults ( $t(98) = 3.18, p = .002$ ) but did not differ from younger adults in recall of positive ( $t(98) = 0.73, p = .46$ ) or neutral pictures ( $t(98) = 0.46, p = .65$ ). With regard to recognition, after experiencing pain, both older and younger adults were marginally more willing to judge a negative picture as having been previously seen ( $t(97) = 1.79, p = .08$ ). With regard to latency, older adults took significantly longer than younger adults to recognize negative images (age x valence interaction,  $t(97) = 7.40, p < .001$ ). The hypothesized three-way interaction of age group x pain condition x valence was not found for any of the three outcomes. The strategies older and younger adults use to maintain positivity in the face of pain may be similar in nature. Future research should investigate whether older adults have additional strategies that allow them to counteract the negativity of frequent pain, and if so, test whether those strategies can be applied to others experiencing acute pain.

#### 56) Abstract 1007

##### **THE EFFECTS OF A NEW PRACTICAL AND SYNERGETIC MULTIMODAL TREATMENT FOR CHRONIC BACK PAIN ON PAIN-RELATED COGNITIONS AND WELLBEING**

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**Introduction:** Chronic back pain (CBP) can be best described as an interaction between biological, psychological and social processes. However, to date, multimodal intervention programs for CBP that target all three aetiological factors have demonstrated limited effectiveness. This lack of supportive evidence could be due to the fact that few programs are suitable for long-term and unsupervised use in everyday life. Moreover, in combining the elements from various therapies, little attention has been paid to the mechanisms underlying the synergistic effects of the separate components. A new multimodal intervention that addressed these limitations was developed and tested in a Randomised Controlled Trial (RCT).

**Methods:** A total of 660 participants participated in one of the three treatment groups (Control:  $n = 216$ , Unimodal:  $n = 222$ , Multimodal:  $n = 222$ ). In the two treatment groups, 3 weeks of center-based training was followed by 9 weeks of unsupervised home-based training. In the multimodal treatment the sensorimotor training of the unimodal treatment was supplemented with specifically selected cognitive-behavioral and psycho-physiological techniques. Pain and pain-relevant psychosocial factors were assessed 5 times over a 6-month period. Here the effects of the intervention on pain-related cognitions and general wellbeing will be presented.

**Results:** After the center-based phase both interventions were more effective than the no-intervention control arm in reducing pain-related cognitions as well as anxiety and depression, yet no difference was observed between the unimodal and multimodal groups. However, during the home-based training these changes were sustained or reduced further in the multimodal group compared to the unimodal and control group, suggesting that the multimodal program has a sustainable impact on pain related cognitions and wellbeing.

**Discussion:** The RCT indicated that the newly developed multimodal treatment for LBC was practical and had more sustainable effects on pain-related cognitions and wellbeing than a unimodal treatment. The unique contents of the multimodal intervention in relation to the outcomes will be discussed.

#### 57) Abstract 1203

##### **PAINFUL EMOTIONS? PROCESSING OF EMOTIONAL FACES IN PATIENTS WITH CHRONIC PAIN DISORDER: AN EYE TRACKING STUDY**

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**Background:** Problems in emotion processing potentially contribute to the development and maintenance of chronic pain. These difficulties might also become evident in attentional processing of emotional information.

**Method:** We assessed self-reported alexithymia, attentional orienting to and maintenance on emotional stimuli using eye tracking in 17 patients with chronic pain disorder (CP) and two age- and sex-matched control groups, 17 healthy individuals (HC) and 17 individuals who were matched according to depressive symptoms (DC). In a choice viewing paradigm, a dot indicated the position of the emotional picture in the next trial to allow for strategic attention deployment. Picture pairs consisted of a happy or sad facial expression and a neutral facial expression of the same individual. Participants were asked to explore picture pairs freely.

**Results:** CP and DC groups reported higher alexithymia than the HC group. HC showed a previously reported *emotionality bias* by preferentially orienting to the emotional face and preferentially maintaining on the happy face. CP and DC participants showed no

facilitated early attention to sad facial expressions, and DC participants showed no facilitated early attention to happy facial expressions. We found no group differences in attentional maintenance.

**Conclusion:** Our findings are in line with the clinical large overlap between pain and depression. The blunted initial reaction to sadness could be interpreted as a failure of the attentional system to attend to evolutionary salient, potentially rewarding emotional stimuli or as an attempt to suppress negative emotions. These difficulties in emotion processing might contribute to etiology or maintenance of chronic pain and depression.

#### 58) Abstract 1625

##### **A MULTI-DIMENSIONAL MODEL OF MENTAL HEALTH IN ADULTS WITH CHRONIC PAIN**

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Chronic pain has been defined as pain that persist past the normal time of healing, usually more than three months. Patients experiencing unrelenting pain are more likely to develop psychiatric co-morbidities including depression, anxiety and sleep disturbances, which adversely impact their ability to manage pain effectively. In addition, the growing epidemic of medication misuse and associated addiction, accidental overdose and increased rates of mortality have spurred attention to the need for mental health providers to more effectively identify at-risk patients and provide alternative modes of treatment and long-term care. While there is consensus that a multidisciplinary approach is the gold standard in pain management; there is considerable variation in the composition of patient management teams and methodologies used to derive and implement treatment recommendations. We propose a comprehensive, empirically-based, multidimensional model for patient risk assessment and treatment currently implemented in the outpatient chronic pain management psychology clinic as part of a multidisciplinary pain clinic at a major academic medical center in the Southeast US. Based on the biopsychosocial model of pain, the multidimensional approach spans multiple domains including: 1) Psychosocial Assessment/Evaluation, 2) Crisis Intervention, 3) Consultation Liaison, 4) Staffing, 5) Treatment (i.e. psychotherapy, behavioral pain management and coping skills training, Biofeedback), 6) Referral, 7) Teaching/Training and 8) Research and Implementation. A primary outcome of this model is the integration of information across domains to derive a risk level, assigning a rank of 1-4 corresponding to treatment recommendations including suitability for chronic opioid management and surgical considerations for neuromodulation with implantable devices and/or targeted drug delivery systems. Advances in the field of pain have guided changes in standards of practice in primary care settings and other specialties. Given the inherent complexities involved in safely and effectively treating chronic pain, we propose that this comprehensive model assessing eight dimensions and four levels of functioning, may provide a defined structure for integrated care of chronic pain patients for medical psychologists and other providers working as part of a multidisciplinary pain management team.

#### 59) Abstract 1513

##### **CLINICAL CHARACTERISTICS OF PATIENTS SEEN BY A CHILD PSYCHIATRIST EMBEDDED IN AN OUTPATIENT MULTIDISCIPLINARY PEDIATRIC CHRONIC PAIN CLINIC.**

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**Background:** In general pediatric practice, chronic pain is reported by 2/3 of school-age children, while 6% report daily pain lasting 3 months

or longer.<sup>1</sup> Pediatric chronic pain is associated with significant functional impairment, poor quality of life, and increased risk for psychopathology, including a somatic symptom disorder.<sup>2</sup> Physical rehabilitation and cognitive-behavioral therapy are evidence based treatments. Informal survey of pediatric pain clinics in the U.S. shows that they commonly involve psychologists, but rarely involve psychiatrists. We describe demographic and clinical characteristics of patients seen by a part-time psychiatrist embedded in a multidisciplinary pediatric pain service which includes 4 psychologists who regularly perform initial evaluations. **Methods:** We conducted a retrospective clinical database review of patients seen by a pain clinic at a tertiary pediatric academic center from 2012–2016. Primary outcomes included measures of functional disability, anxiety, and depression including CDI-2, FDI, RCMA-2, PedsQL, PCS, CSI, and FOPQ. Psychological inventories and demographics were compared between patients referred to a psychiatrist versus those who were not referred. Wilcoxon's Rank Sum tests were used for between-group comparisons; significance was determined at  $p < 0.05$ .

**Results:** Of the 976 patients seen at the clinic, 45 were referred to the psychiatrist. The majority of these patients were female (80%) with a mean age of 15 years. Overall, patients seen by the psychiatrist had significantly higher scores for depression ( $p = 0.01$ ), anxiety ( $p = 0.02$ ), somatic complaints ( $p = 0.05$ ) and fear of pain ( $p = 0.02$ ), as well as poorer quality of life ( $p = 0.03$ ).

**Conclusion:** Children with chronic pain are a vulnerable population. A subset of patients with comorbid psychiatric conditions and more severe impairment and disability will benefit from ready access to psychiatric evaluation and management. Pediatric pain clinics should consider staffing models that include a psychiatrist in an integrated care model. 1. Rask, C.U., et al., Functional somatic symptoms and associated impairment in 5-7-year-old children: the Copenhagen Child Cohort 2000. *Eur J Epidemiol*, 2009. 24(10): p. 625-34. 2. Santalahti, P., et al., Have there been changes in children's psychosomatic symptoms? A 10-year comparison from Finland. *Pediatrics*, 2005. 115(4): p. e434-42.

#### 60) Abstract 1536

##### IS FLOURISHING A RESILIENCY FACTOR IN CARDIOVASCULAR DISEASE RISK AMONG AFRICAN AMERICANS? PRELIMINARY FINDINGS

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Amid growing acknowledgement of the importance of psychosocial factors in exacerbating the risk and impact of cardiovascular disease (CVD) among African Americans, there is a need to identify factors which may be protective of mental and physical health. *Flourishing*, a state of positive mental health characterized by high levels of psychological, emotional, and social well-being, has been associated with a decreased risk of CVD mortality. Given the disparate CVD burden faced by African Americans, our aim in the present study was to examine the potential association between flourishing and subclinical CVD risk in a sample ( $N = 63$ ) of African American emerging adults (mean age =  $21.9 \pm 5.5$ , 66% female). Cardiovascular functioning was determined via baseline assessments of blood pressure (BP). Anthropometric data (i.e. body mass index and waist circumference) and self-reported physical activity were also obtained. Flourishing was assessed using the Mental Health Continuum- Short-Form (MHC-SF) which yields categories (i.e. Languishing, Moderate and Flourishing) describing current mental health status. Approximately 50% of the sample met criteria for flourishing; while 40.3% and 9.7% of participants were classified as having moderate or languishing mental health, respectively. Separate general linear models revealed no differences in systolic BP or anthropometric data as a function of flourishing status. However, there was a significant main effect of

flourishing on diastolic blood pressure (DBP) and physical activity ( $p$ 's  $< .05$ ). Flourishers endorsed higher levels of physical activity compared with moderates and languishers. Moreover, individuals classified as having flourishing or moderate mental health exhibited lower DBP compared to individuals with languishing mental health, and this pattern was enhanced when accounting for differences in physical activity. Previous research has suggested that African Americans may possess a modest mental health advantage due to greater-than-average levels of flourishing. Although preliminary, our findings provide initial evidence indicating that this benefit may extend to cardiovascular functioning among African American emerging adults. Additional research is needed to determine whether flourishing is associated with lower CVD risk across the lifecourse among African Americans and other groups affected by CVD disparities.

#### 61) Abstract 1034

##### CORTISOL DAY PROFILES IN PATIENTS WITH STABLE CORONARY HEART DISEASE AND ASSOCIATIONS WITH ANXIETY - DATA FROM THE SPIRR-CAD TRIAL

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**Introduction:** Anxiety has been posited as an independent risk factor for incident coronary heart disease (CHD) and CHD mortality. The cortisol awakening reaction (CAR) has been widely used as a distinct indicator of HPA axis functioning. In a previous study, higher anxiety values were associated with a higher total cortisol output within the first hour of awakening (area under the curve with respect to ground, AUC<sub>g</sub>) and a nonsignificant trend towards a more pronounced increase within the first 30 min of awakening (area under the curve with respect to increase, AUC<sub>i</sub>). We aimed to check these associations in a subsample from the German multicenter SPIRR-CAD trial.

**Methods:**

In 87 CHD patients (59 (SD 8) y, 18 f) from the SPIRR-CAD study sample (HADS depression score  $> 7$ ) complete saliva sets were available. Samples were collected following a standardized sampling protocol (+0, +30, +45, +60 min after awakening). Cortisol was measured via radioimmunoassay. AUC<sub>g</sub> and AUC<sub>i</sub> were computed using standardized formulas. Anxiety was measured using the HADS. Patients were grouped following the cut-off ( $> 10$  vs 10 and below).

**Results:**

Repeated measures ANOVA (4 steps, 2 groups) yielded a significant time effect ( $F[df2.271] = 10.370$ ;  $p < 0.0001$ ) and a significant quadratic time effect ( $F[df1] = 25.854$ ;  $p < 0.0001$ ) referring to the typical CAR with steep increase of cortisol levels within the first 30 min of awakening. There was a significant time by group interaction ( $F[df3.963] = 3.963$ ;  $p = 0.017$ ) referring to a steeper increase in the anxious group.

AUC<sub>i</sub> was significantly higher in the anxious patients ( $F[df1] = 5.089$ ;  $p = 0.027$ ).

High anxiety subjects showed significantly lower cortisol levels compared to the high anxiety subjects at +0 min ( $9.3$  (SD 5.4) vs  $13.6$  (SD 8.5) nmol/l; ( $F[df1] = 7.141$ ;  $p = 0.009$ ).

#### Conclusion:

Our data suggest a steeper increase of cortisol within the first 30 min of awakening (AUC<sub>i</sub>) in anxious CHD patients but no difference in the total cortisol output (AUC<sub>g</sub>). These findings are backed by the literature but do not fully replicate our previous findings. Limitations are a) preselection of depressed CHD patients (HADS depression score >7) and b) singular sampling (one day). Therefore findings cannot be regarded as representative. However, anxiety as a substrate of psychosocial stress may be mirrored by a distorted HPA axis functioning.

#### 62) Abstract 1524

##### EFFECTS OF VERBAL SUGGESTIONS ON PSYCHOSOCIAL PARAMETER IN FEMALE PATIENTS WITH STRESS-INDUCED CARDIOMYOPATHY

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Placebo and nocebo effects are conceptualized as clinical outcomes of positive respectively negative expectations towards a treatment. Outcome expectations can be elicited by verbal suggestions, accompanying drug delivery. The present study aimed to investigate placebo and nocebo effects in patients who experienced a Stress-induced-Cardiomyopathy (SCM) as compared to catheter-confirmed heart-healthy individuals. The etiology of SCM – a very rare, reversible, and acquired form of primary myocardial disorders – is not yet fully explained. Preceding, extremely stressful events are supposed to be triggers and an exaggerated, inadequate activation of the sympathetic nervous system is discussed to be of key importance. Hence, one may assume that the cardiological regulation of patients diagnosed with SCM differs from that of heart-healthy individuals.

Within this randomized, single-blind experiment, 20 patients with a history of SCM and 20 catheter-confirmed heart-healthy individuals were examined in a single session. After a baseline period, saline solution (NaCl) was successively administered three times in combination with either neutral, positive, or negative verbal suggestions that the given substance (NaCl) would either support or burden the heart, or would cause no changes. Numeric stress ratings and blood samples (copeptin, cortisol) were repeatedly obtained, and the electrocardiogram was continuously assessed.

Results revealed nocebo effects on subjective stress levels and heart rate, with no differences between SCM patients and heart-healthy individuals. There was a significant increase in stress after the negative suggestion as compared to both other conditions ( $p < .001$ ). Correspondingly, the mean heart rate showed no group difference, but a statistical trend for increase after negative suggestions as compared to positive ones ( $p = .06$ ). Analysis of heart rate variability and hormonal correlates did not reveal any statistically significant results and positive verbal suggestions had no beneficial effects.

In conclusion, the hypothesis that SCM-patients are generally more vulnerable for aversive stimuli, represented here in form of a nocebo treatment, received no support by the present results.

#### 63) Abstract 1022

##### EFFECTS OF A 1-DAY INTERVENTION ON ANXIETY AND VASCULAR DYSFUNCTION

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**Background:** Anxiety is commonly present in those at risk for vascular disease and independently contributes to risk of vascular events, morbidity, and mortality. Yet, anxiety is an underappreciated risk factor and effective treatments have rarely been investigated. Acceptance and Commitment Therapy (ACT) is an empirically supported behavioral therapy that incorporates acceptance and mindfulness strategies with behavioral change modalities. ACT is effective in treating depression and anxiety which are common in patients with cardiovascular disease, as well as illnesses like chronic pain. Importantly, when presented as a brief intervention, ACT has resulted in positive long-term outcomes. **Objective:** To examine the efficacy of a 1-day (6-hour) Acceptance and Commitment Training group workshop (ACT) compared to Treatment as Usual (TAU) on forearm blood flow and on anxiety symptoms. **Method:** 55 patients with significant anxiety were randomly assigned to an 1-day ACT workshop or to Treatment as Usual (TAU). Assessment of anxiety and blood vessel flow were completed prior to the workshop and 3 months following the workshop. **Results:** At the 3-month follow up, participants in the ACT condition exhibited significantly improved forearm blood flow ( $p < .05$ ) and significantly greater improvements in anxiety symptoms ( $p < .01$ ) than patients in the TAU group. **Conclusion:** A 1-day ACT workshop is a promising approach for the treatment of anxiety and may improve vascular disease risk factors. Brief interventions, such as the 1-day intervention developed for this study, offer the potential for optimal treatment adherence, participant acceptability, and broad dissemination.

#### 64) Abstract 1028

##### WE GOT THE BEAT: LOWER SLEEP-WAKE RHYTHMICITY IS ASSOCIATED WITH LARGER BRACHIAL ARTERY DIAMETER

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Psychosomatic medicine has demonstrated that psychological, social, and behavioral factors contribute to cardiovascular health. More recently, this work has extended to sleep. Yet, our waking and sleeping lives are not independent of one another – they are, in fact, interdependent. Examination of objective rest-activity patterns over the 24-hour day will advance our understanding of the interdependent effects of our waking and sleeping lives on cardiovascular health. Here, we used actigraphy-assessed rest-activity rhythms (RARs) to capture sleep and wake patterns in relation to structural and functional measures of vascular health. We hypothesized that fragmented or inconsistent sleep-wake rhythms would be associated with poorer cardiovascular health. That is, the beat of an individual's 24-hour day would be related to the beat of one's heart and vasculature.

Participants were 156 adults (aged 36-82; 102 female) who completed wrist actigraphy collection and clinical assessments of vascular health including brachial artery diameter (BAD), flow-mediated dilation, carotid intima-media thickness, and carotid-femoral pulse-wave velocity. Vascular measures were collected in the fasting state. Three RAR measures were computed: (1) intraday variability, with higher values reflecting fragmented nocturnal sleep and frequent transitions between rest and activity during the day; (2) interday stability, with lower values reflecting a more variable sleep-wake schedule across days; and (3) acrophase, with higher values reflecting a later transition from sleep to wake.

After false discovery rate correction at  $q < 0.1$ , univariate analyses revealed only one significant association between RAR-assessed intradaily variability and brachial artery diameter ( $\beta = 0.28, p = 0.002, q = 0.04$ ). This association remained significant after adjusting for sex, age, smoking, body mass index, diabetes, and hypertension ( $\beta = 0.15, p = 0.03, R^2 = 0.5$ ).

Lower sleep-wake rhythmicity is associated with larger brachial artery diameter, a structural indicator of subclinical vascular disease. Thus, the beat of one's day does seem to be related to the beat of the heart. Future studies of cardiovascular disease risk should probe the sleep-wake relationship further by using other measures of heart structure, as well as look at the relationship longitudinally.

#### 65) Abstract 1604

##### EMOTION REGULATION IN PATIENTS WITH CHRONIC HEART FAILURE: RELATIONSHIP TO DEPRESSIVE SYMPTOMS

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**Introduction:** Chronic heart failure (CHF) is a progressive condition with significant morbidity and mortality. Despite treatment advances, long-term prognosis is still poor, and comorbid depression contributes to the adverse prognosis. Recent evidence suggests that emotion regulation is a key factor in the development and treatment of depression, but its role for mental and physical health in CHF is unknown. Therefore, we explored the relationships between emotion regulation, depressive symptoms, and rehospitalization in patients with CHF using data from a previous study (Rollman et al., 2012).

**Methods:** Hospitalized patients with CHF (ejection fraction  $<40\%$ , NYHA class II-IV) were screened for depressive symptoms with the 2-item Patient Health Questionnaire (PHQ-2) and classified as screen-positive if they endorsed at least one item. For the present analysis, we included 394 patients ( $n=311$  screen-positive) who had completed the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003) 1-month after hospital discharge. The ERQ assesses individual differences in two emotion regulation strategies: suppression (i.e., inhibition of emotional expression) and reappraisal (i.e., change the way you think about an emotional event). Outcomes were depression symptoms using the PHQ-9 assessed at 1-, 3-, and 6 months after discharge and all-cause rehospitalization (6 months follow-up). Cox proportional hazard models were adjusted for CBAG, sex, age, statin use and hyperlipidemia.

**Results:** In our sample ( $N=394$ ), only suppression was associated with PHQ-9 scores 1-month after discharge ( $r=.15; p < .003$ ). Overall, PHQ-9 scores decreased from month 1 to 6 ( $-0.12$  points/month;  $p < .01$ ), but neither ERQ scale modulated the slope of that change. The adjusted Cox models revealed that reappraisal and suppression were not related to rehospitalization in the whole sample, but reduced all-cause rehospitalization risk by 24% ( $HR=0.76; p < .03$ ) for screen-positive patients.

**Discussion:** Suppression and reappraisal seem to relate differently to CHF key outcomes: Suppression was related to PHQ-9 scores, whereas reappraisal was associated with rehospitalization in patients screened positively for depression. Further studies are needed to examine whether emotion-regulation skill training improves mental and physical health in depressed CHF patients or might prevent depression in those at risk.

#### 66) Abstract 1129

##### PREDICTORS OF SEXUAL CONFIDENCE, INTEREST AND SATISFACTION IN THE YEAR AFTER PERCUTANEOUS CORONARY INTERVENTION - THE THORESCI STUDY

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**Background** - Prior studies show severity of coronary artery disease (CAD) is related to changes in sexual functioning. Also, gender differences exist. Patients undergoing percutaneous coronary intervention (PCI) for obstructed coronaries may either be treated acutely, or electively in a daycare setting. Little is known about sexual functioning in these subgroups. Therefore, we examined predictors of sexual satisfaction, confidence and interest in sex across the first year post-PCI in elective and acute patients.

**Methods** - 510 PCI patients (33% elective treatment; Mean age= $66 \pm 11$  years; 79.8% men; 87% married) filled out a psychosocial survey at the time of the index PCI and a year later. We used dedicated questions (WHOQOL-bref, Cardiac Self Efficacy scale, BDI) to gauge sexual functioning.

**Results** - At baseline (BL), 31% of women, and 13% of men reported substantial loss of interest in sex ( $OR=2.06; p=.026$ ). Interest was not associated with PCI indication (elective vs. acute) or cardiac history, but was predicted by lower education ( $OR=3.60; p<.0001$ ), use of beta-blocking agents ( $OR=2.86; p=.001$ ), diabetes ( $OR=2.28; p=.025$ ) and depression ( $OR=1.11; p=.001$ ) and anxiety ( $OR=1.14; p=.0003$ ). At 1 year FU, anxiety and depression remained significant predictors of loss of interest. Importantly, elective PCI patients had a substantial loss of interest at FU ( $OR=2.49; p=.014$ ). Reduced confidence (13% men; 12% women) was related to lower education ( $OR=3.41; p<.0001$ ), cardiac history ( $OR=1.91; p=.049$ ), diabetes ( $OR=2.93; p=.006$ ), anxiety ( $OR=1.15; p=.00006$ ) and depression ( $OR=1.13; p=.0001$ ). After one year, only diabetes, anxiety and depression remained significant predictors of low confidence. At baseline, 23% of men vs. 15% of women were dissatisfied with their sexual functioning ( $OR=2.02; p=.027$ ). At one year follow-up, elective PCI patients felt more dissatisfied than acute PCI patients ( $OR=2.11; p=.044$ ). Further, depression (BL:  $OR=1.13; p=.0001$ ; FU:  $OR=1.16; p=.0004$ ) and anxiety (BL:  $OR=1.15; p<.0001$ ; FU:  $OR=1.27; p<.0001$ ) were significantly associated with reduced satisfaction with the sexual relationship at both time points.

**Discussion** - Elective PCI was associated with poorer sexual functioning at 1 year FU. Further, emotional distress played an important predictive role. In the clinic, sexual functioning should be discussed with CAD patients regularly.

#### 67) Abstract 1202

##### OPENNESS TO EXPERIENCE AND STRESS RESPONSIVITY: AN EXAMINATION OF CARDIOVASCULAR AND UNDERLYING HEMODYNAMIC TRAJECTORIES WITHIN AN ACUTE STRESS EXPOSURE

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The personality trait of openness to experience has been implicated in cardiovascular wellbeing, however underlying mechanisms of effect remain unclear. Research examining cardiovascular stress responsivity have typically examined the stress response by reducing it to a single measurement. Facilitated by continuous cardiovascular technology, this study examined the role of openness in cardiovascular responsivity during an acute psychological stress exposure. Blood pressure, heart rate, and hemodynamic response data was collected for 62 young female adults. All cardiovascular data were reduced to mean 10 second



readings, with phases determined through examinations of shifts in responsivity between each 10 second pairing. Analyses revealed a significant linear interaction for openness across the entire exposure for systolic blood pressure, and cardiac output. A significant between-subjects effect for heart rate also emerged. Those higher in openness exhibited an increasingly myocardial hemodynamic response profile throughout the exposure, with their lower counterparts displaying an attenuated myocardial trajectory. Comparisons of response curves suggest adaptive stress response trajectories for those higher in openness compared to diminished responsivity characterizing their lower counterparts. While being the first to examine a stress exposure in this manner, this study provides evidence that an attenuation of myocardial responsivity during a stress exposure may underpin blunted blood pressure responding. This study implicates openness in cardiovascular stress responding and provides a potential mechanism in reported health associations.

#### 68) Abstract 1550

#### CHOLESTEROL PARTIALLY MEDIATES THE RELATIONSHIP BETWEEN DEPRESSION AND ENDOTHELIAL FUNCTION IN CARDIAC PATIENTS

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**Objective:** Research suggests depression is associated with endothelial function (EF), a measure of prognostic value in predicting cardiovascular disease (CVD). However, mechanisms explaining this relationship are unclear. High cholesterol levels and inflammation stimulate atherosclerosis, a process contributing to poor EF. This study aimed to assess cholesterol and C-reactive protein (CRP), a marker of inflammation, as potential mediators for the relationship between depression and EF in cardiac patients.

**Methods:** A sample of outpatients referred for myocardial perfusion single photon emission computed tomography stress testing at the Montreal Heart Institute was recruited (n = 289). Patients were administered the PRIME-MD, a brief psychiatric screening interview, by a graduate student or trained research assistant, to assess the presence of a DSM-IV-TR mood disorder. Brachial artery reactivity, a proxy of EF, was assessed using a nuclear medicine variation of the well-established ow-mediated dilatation technique, which calculates the rate of uptake ratio (RUR) between hyperaemic and non-hyperaemic arms. A blood sample was drawn to quantify fasting cholesterol and CRP levels. Analyses were performed with SAS 9.3 using the PROCESS macro.

**Results:** In a model assessing cholesterol as a potential mediator, a significant direct effect of mood disorder predicting RUR was observed ( $\beta = -.87$ ,  $t = -3.17$ ,  $p < .01$ ). This relationship was partially mediated by total cholesterol levels, 95% Bootstrap CI (-.24, -.01). In a separate model assessing CRP, a significant direct effect of mood disorder predicting RUR was observed ( $\beta = -.96$ ,  $t = -3.39$ ,  $p < .01$ ). However, this relationship was not mediated by CRP, 95% Bootstrap CI (-.14, .06). All models were adjusted for a priori defined covariates.

**Conclusions:** These results suggest a significant relationship between depression and EF that is partially mediated by cholesterol, but not CRP. It is possible this relationship may be explained by disordered eating habits and negative health behaviours that are features of depression, which in turn increase cholesterol levels and could lead to impaired EF. Another theory suggests that the dysregulated inflammatory processes often associated with depression explain depression's relationship with EF. As CRP was not a mediator in this study, our results are not consistent with this theory.

#### 69) Abstract 1150

#### HEALTH STATUS AND PSYCHOSOCIAL FACTORS IN NONOBSTRUCTIVE CORONARY ARTERY DISEASE; SEX DIFFERENCES AND EFFECT OF AGE AND EDUCATION.

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**Background.** Women present more often with cardiac complaints in the absence of obstructive coronary artery disease (CAD), and report a poor quality of life and higher levels of psychosocial distress compared to men. We examined sex differences in health status, mood, and personality between patients with nonobstructive CAD (NOCAD; wall irregularities, occlusion < 60%), and an age and sex matched reference group of the general population.

**Method:** Generic and disease specific health status (SF12 and SAQ), and psychosocial factors were compared between 523 patients (61 years, SD 9, 49% male) with NOCAD, as part of the 'Tweesteden mild Stenosis' TWIST observational cohort study, and an age and sex matched group of 1347 people from the general population.

**Results:** Both women and men with NOCAD reported poorer health status, more fatigue (FAS), anxiety, depressive symptoms (HADS), negative affect (DS14), and Type D personality, and less positive affect compared to the reference group (all  $p < .001$ ). Women with NOCAD reported significantly poorer physical and mental health status ( $p < .001$ ), poorer physical limitation ( $p < .001$ ), more fatigue ( $p = .007$ ) and anxiety ( $p < .001$ ), and less positive affect ( $p = .038$ ) compared to men with NOCAD, but no differences in depressive symptoms ( $p = .28$ ), angina frequency, stability, disease perception or treatment satisfaction ( $p > .35$ ), or Type D personality ( $p = .105$ ). No significant sex-by-group interaction effects were observed. Additional adjustment for age, education, partner, employment and alcohol use showed that these gender and diversity factors explained the sex differences in psychosocial factors in the NOCAD group (Figure 1; anxiety and depression). Overall, higher educated men over 55 years had lower anxiety and depression scores, whereas lower education and being a women were related to more anxiety and depression.

**Conclusion:** In both women and men, NOCAD is associated with worse health status, negative mood and Type D personality when compared to a reference population. Within the NOCAD group women, showed more anxiety, generic health status and less positive affect, and these differences reflected gender and diversity rather than sex differences.

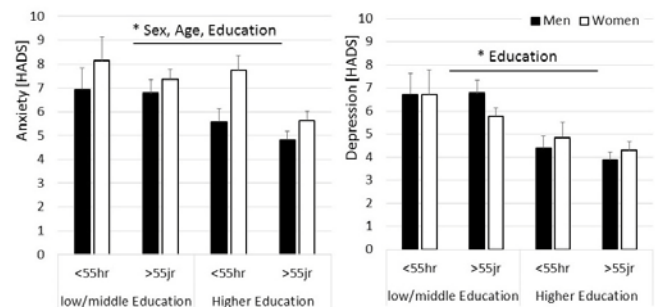


Figure 1. Sex, age, and education stratified anxiety and depression scores in patients with NOCAD. Significant group differences were observed for sex, age, and education level in anxiety, and for education in depression.

Poster 70) WILL NOT BE PRESENTED

### 71) Abstract 1307

#### COPING WITH MEDICAL PROCEDURES: INTRODUCTION OF A NEW INVENTORY

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Past research has shown that anxiety is associated with higher reports of psychosomatic symptoms. Environments which cause anxiety for a lot of people are hospitals or doctor appointments. The question arises whether better coping with anxiety may improve psychosomatic symptoms. Hence, the assessment of how individuals cope with medical procedures may lead to a better understanding of the association of anxiety, coping and health in general. This study reports on the construction and empirical evaluation of a coping inventory focusing on medical settings.

The "Coping in Medical Situations" (German: "Angstbewältigungsinventar für medizinische Situationen", ABI-MS) was constructed based on the model of coping modes. It aims to assess vigilant and cognitive avoidant coping in potentially threatening medical scenarios, e.g. colonoscopy. It is organized as a stimulus-response inventory with forced-choice ratings (true/not true). To evaluate the factorial structure of the inventory, we conducted an online survey on a sample of  $n=471$  individuals (345 women, 126 men) with a mean age of 28.4 years. Participants completed the ABI-MS and the Mainz Coping Inventory (MCI). Psychometric properties were examined and exploratory full-information factor analysis based on the item response theory were computed.

Four scenarios proved particularly suitable with good model fit indices (RMSEA and CFI) to assess vigilance (VIG), and cognitive avoidance (CAV): venipuncture, wound care of a cut injury, narcosis prior to surgery, and colonoscopy. Final factor structure revealed two factors for each of the scenarios, with 4 items each, resulting in a total of 32 items. Cronbach's alphas were satisfactory ranging between .74 and .77. Pearson correlations revealed convergent validity of the ABI-MS with significant correlations with the physical threat (VIG:  $r = .51$ ,  $p < .001$ ; CAV:  $r = .52$ ,  $p < .001$ ) and the ego threat sub scale (VIG:  $r = .35$ ,  $p < .001$ ; CAV:  $r = .32$ ,  $p < .001$ ) of the MCI. Taken together, results indicate that the newly developed questionnaire successfully detects behavior tendencies across situations. Results further show that the ABI-MS is a reliable and valid instrument to assess vigilant and cognitive avoidant coping in medical settings. Future research using this inventory will have to show whether better coping with anxiety will be predictive of better health outcomes.

### 72) Abstract 1141

#### ADAPTATION OF MEANING CENTERED PSYCHOTHERAPY TO PORTUGUESE LANGUAGE

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**Introduction:** Meaning Centered Psychotherapy (MCP) is a new modality of psychotherapy that specifically address loss of spiritual well-being or sense of meaning in life that often arise in patients with advanced cancer. It was developed by Breitbart Group, inspired in the work of Frankl. MCP is a structured psychotherapy involving a combination of didactic teaching, exercises and discussions.

**Methods:** We performed three discussion groups starting with an introduction to MCP and delivery of exercises handouts for discussion.

The groups were composed by two patients with breast and stomach cancers, three mental health professionals without MCP knowledge and three patients with breast and head and neck cancers. All the patients had about 50 years old and were in full remission; the majority was women and with jobs with average differentiation.

Between the second and third groups, the authors adapted the handouts content.

**Results:** Difficulties were felt with the concepts "historical/attitudinal/creative/experiential sources of meaning", with the necessity of clarification to "achieve meaning through our personal history/ attitude to life/capacity to create and build/life experiences". In the case of experiential sources of "love, beauty and humor" it was needed to ask examples of "memories, thoughts and emotions triggered by these sources". Other difficulties emerged with concepts of "disconnection/connection (to meaning)" (clarified to "turn off/on"), "legacy" ("life as something that we received and transmit"), "transcendence" ("to cross certain barriers becoming superior to certain circumstances") and "good death" ("quiet death").

**Discussion:** The adaptation of MCP triggered some doubts about the core concepts. These questions seem more culturally determined and independent of patients' educational level, as the group with mental health professionals raised nearly the same issues.

Between the second and third group, authors did a clarification of the concepts, not eliminating the original text, what substantially improved the comprehensibility.

**Conclusions:** Despite group size limitation, it was clear that existential issues and "meaning" (of life) were difficult to understand. The authors conclude that MCP adaptation to portuguese patients need some clarifications, keeping in mind that thinking about ones' existence and meaning in life is culturally determined.

### 73) Abstract 1628

#### POLYPHARMACY EN MENTAL HEALTH IN PRIMARY CARE

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**Introduction.** There are indications that polypharmacy, the i.e., the cumulative use of prescribed medications, may have serious psychological side effects but this issue received scant attention. The present analyses aimed to explore associations between polypharmacy and psychiatric diagnoses.

**Methods.** Participants were recruited among patients attending GP practices throughout Germany, as part of a larger nation-wide study on cardiovascular risk factors in primary care (The Detect Study). Primary physicians provided data on prescribed medication and ICD-09 psychiatric diagnoses (rated as none, possible, and probable). The number of different prescribed medications was categorized (0-2, 3-4, 5-6, 7 and more).

**Results.** Complete data was available on 3056 patients (59 % female; mean age 61years; range 19-95). The number of medications prescribed varied between 0 – 11. Cardiovascular diseases explained the majority of prescribed medications (e.g., beta-blockers, antihypertensive drugs, statins), followed by anti-diabetic medication. Regression analysis (adjusted for age and gender) showed consistent associations between cumulative medication use and depressive disorder (Beta = .150;  $p < .0001$ ), pain disorder (Beta = .145;  $p < .0001$ ), sexual disorder (Beta = .102;  $p < .0001$ ) and sleep disorder (Beta = .084;  $p < .0001$ ).

**Conclusion.** Based on these analyses we conclude that the possible psychological and psychiatric side effects of polypharmacy, and in particular polypharmacy related to cardiovascular diseases and their risk-factors, warrant further attention in research and clinical practice.

#### 74) Abstract 1121

##### **DISTRACTION COPING AFTER ACUTE PSYCHOSOCIAL STRESS PREDICTS STEEPER POST-STRESS CORTISOL DECLINE**

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Psychosocial stress represents an unavoidable and often long-lasting burden over the lifespan. While chronic exposure to stress is considered as antecedent of stress-related disease, individuals' ability to cope efficiently with everyday stress might also be necessary to prevent adverse health outcomes. Furthermore, designing interventions to promote healthy coping behavior requires a better understanding of the efficiency of state-dependent coping mechanisms in acute stress situations.

In order to assess the natural occurrence of state coping manifestations after psychosocial stress and to evaluate their differential stress-buffering impact on HPA axis activity, fifty-nine healthy adults (59.3% female, mean age = 22.93 years) underwent the Trier Social Stress Test (TSST) and provided salivary cortisol samples 1 min before as well as 1, 20, 30, 45, and 60 minutes after stress exposure. Self-reported coping responses were obtained immediately after TSST using a 42-item state coping questionnaire (SVF ak-42). Subsequent factor-analyses revealed three factors ("denial coping", "distraction coping", and "stressor-devaluation/self-comforting") whose relative importance on curve progressions of cortisol increase and decline was assessed using hierarchical linear modeling (HLM).

Independent of sex, age, BMI, chronic stress, and self-reported depressiveness, "denial coping" was related with higher baseline levels of cortisol ( $\beta = 0.0798$ ,  $SE = 0.0381$ ,  $p = 0.04$ ) while "distraction coping" significantly predicted steeper recovery after stress (linear effect:  $\beta = -0.0430$ ,  $SE = 0.0184$ ,  $p = 0.02$ ) and less pronounced curvature (quadratic effect:  $\beta = 0.0043$ ,  $SE = 0.0017$ ,  $p = 0.02$ ). "Stressor-devaluation/self-comforting" was unrelated with cortisol response and recovery (all  $p$ 's > 0.72).

The explorative assessment of state-dependent coping manifestations and their relative importance in the prediction of cortisol reactivity and recovery reveal better cortisol recovery among individuals with high capacity to distract from psychosocial stress. Since analysis of HPA axis activity alone is insufficient to provide evidence of this assumed health-promoting effect of distraction coping, future investigations linking distraction coping and inflammatory processes should shed further light on the relationship between cognitive coping and health.

#### 75) Abstract 1224

##### **ANXIETY SENSITIVITY MODERATES THE RELATIONSHIP BETWEEN STRESS AND PHYSICAL HEALTH**

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The Shared Vulnerability Model states that psychological vulnerabilities (ie, anxiety sensitivity, AS), predispose individuals to disabling conditions (PTSD, chronic pain) following life events. Those high in AS fear anxiety-related symptoms, believing these to have serious health consequences. AS may amplify negative emotional reactions to stressful life events. The present study examines AS as a potential moderator of the relationship between stress and physical health. In accordance with the shared vulnerability model, we hypothesized that health consequences of stress would be most evident among those with high levels of AS.

Participants were 94 students enrolled in General Psychology at Kent State University Stark Campus (33 males and 61 females; ages 18-54; 87.5% Caucasian). Subjects completed surveys: Anxiety Sensitivity Index, Perceived Stress Scale, Traumatic Stress Schedule, and the Patient Health Questionnaire-15. Regression models controlled for demographic characteristics in step one. AS and stress variables were entered in step two, centered interaction terms in step three.

Participants who perceived more stress during the previous month reported more physical health symptoms ( $R^2=.311$ ,  $p<.001$ ;  $\beta=.483$ ,  $p<.001$ ), with AS significantly moderating this relationship ( $R^2=.030$ ,  $p=.023$ ;  $\beta=.196$ ,  $p=.023$ ). Decomposition analyses revealed the slope of perceived stress on physical health symptoms to be significant at both levels of the moderator (low AS  $t[90]=3.24$ ,  $p<.01$ ; high AS  $t[90]=6.56$ ,  $p<.01$ ). Results suggest the combination of high levels of AS and perceived stress is particularly toxic for physical health. Similarly, participants with a history of more traumatic stress reported more physical health symptoms ( $R^2=.246$ ,  $p<.001$ ,  $\beta=.283$ ,  $p=.001$ ). AS significantly moderated this relationship ( $R^2=.030$ ,  $p=.034$ ,  $\beta=-.182$ ,  $p=.034$ ). In decomposition analyses, the slope of traumatic stress on physical health symptoms was significant only at low levels of AS ( $t[90]=3.64$ ,  $p<.01$ ). Participants with low levels of both trauma history and AS reported the fewest physical symptoms, while those with high levels of AS reported greater physical symptoms regardless of traumatic stress burden. The present results support The Shared Vulnerability Model, suggesting that AS influences the relationship between life events and physical health.

#### 76) Abstract 1358

##### **INDUCING NEGATIVE AFFECTIVE STATES TO ELEVATE SOMATIC SYMPTOM REPORTS IN FUNCTIONAL SYNDROME PATIENTS: THE MODERATING EFFECT OF DIFFICULTY IDENTIFYING FEELINGS**

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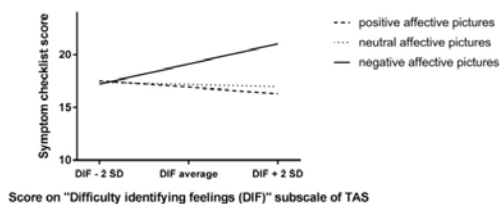
**Background:** Previous research has shown that patients with functional syndromes, such as fibromyalgia (FM) or Chronic Fatigue Syndrome (CFS), and high habitual symptom reporters report more somatic symptoms after induction of negative affect, while healthy controls and low habitual symptom reporters do not. The goal of this study was to investigate the role of possible moderators of this effect within a patient group, with a focus on alexithymia, trait negative affectivity (NA), and somatization.

**Methods:** Patients with FM and/or CFS ( $N=66$ ) and healthy controls (HC,  $N=35$ ) watched one block of neutral, one block of positive and one block of negative affective pictures. After every picture series, participants filled out a somatic symptom checklist and rated emotions experienced during the picture series on valence, arousal and perceived control. Trait NA was measured with the trait version of the PANAS, Alexithymia was measured with the Toronto Alexithymia Scale (TAS) and somatization was measured with the PHQ-15.

**Results:** Participants reported more somatic symptoms after viewing negative pictures compared to the neutral and positive pictures. Patients reported more symptoms overall, but, in contrast to our expectation, did not report relatively more symptoms after negative picture viewing than HC (condition by group interaction,  $p = .114$ ). However, the effect of negative pictures on symptom reporting was more pronounced in patients who scored high on the "difficulty identifying feelings (DIF)" subscale of the TAS (condition x DIF interaction,  $p = 0.004$ ). Moreover, patients scoring high on DIF gave less positive valence ratings for neutral and positive pictures but higher arousal ratings for negative pictures and overall lower feelings of control. Other potential moderators (trait NA, total alexithymia, or somatization) did not significantly influence somatic symptom reporting in a negative affective state.

**Conclusion:** Both patients with FM/ CFS and healthy controls report more somatic symptoms after watching negative pictures compared to positive and neutral pictures. In patients, this effect is moderated by their self-reported difficulty to identify feelings (DIF): patients scoring high on this trait reported more somatic symptoms after negative, but not positive or neutral picture viewing.

Predicted symptom checklist score after viewing positive, neutral or negative affective pictures by Difficulty Identifying Feelings (patients only)



## 77) Abstract 1215

### AUTONOMIC AND AFFECTIVE CONCOMITANTS OF RUMINATION IN CHILDREN: MODERATING ROLE OF FAMILY FUNCTIONING AND PARENTS DISPOSITIONS

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Although rumination has been broadly investigated in adults, less is known about its developmental antecedents. In this study, family functioning assessment was combined with rumination induction and concomitant physiological assessment in children to shed light into the multiple factors involved in the origin of rumination. Forty children (20 girls, mean age = 9.8 years; 20 boys, mean age = 9.4 years) were asked to describe their tendency to ruminate about four prototypical situations depicted in a series of ad-hoc developed vignettes while the ECG was continuously recorded to derive heart rate (HR) and its variability (HRV). After the state rumination induction, children performed a low demanding task with thought probes. We hypothesized that episodes of rumination detected during the task would be associated with impaired attention (indexed by reaction times; RT) and decreased HRV. The associations between such markers of emotion regulation capacities and family functioning as well as with parents and children's dispositional tendencies to ruminate were examined. As expected, rumination was associated with higher HR ( $F = 14.28, p < .0001$ ) and lower HRV ( $F = 45.8, p < .0001$ ), mood worsening ( $F_s > 7.92, p_s < .01$ ), and slower RT ( $F = 18.15, p < .0001$ ) compared to being on task. These effects were moderated by family functioning (flexibility and cohesion) and parents' dispositions (trait rumination). Lastly, child's baseline levels of sadness ( $\beta = .50, p = .02$ ) and levels of flexibility in the family ( $\beta = -.75, p = .03$ ) predicted state rumination during the task. Findings help our understanding of the developmental origins of rumination by the use of an experimental paradigm and both subjective and objective measures of ruminative tendencies in children.

## 78) Abstract 1466

### ANXIETY CORRELATES WITH PSYCHOSOCIAL AND BIOLOGICAL FACTORS IN A PSYCHOTHERAPY TRIAL WITH DEPRESSED CAD PATIENTS (SPIRR-CAD)

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Introduction: In addition to depression, anxiety seems to be an independent risk factor for CHD and cardiac mortality. Associations with depression and no0. of PCI were demonstrated in a former study.

In the present examination we aimed to replicate these findings and to analyze the association of anxiety with psychosocial and clinical measures. Methods: In this trial, 450 men (78.9%) and 120 women (21.1%) with CAD (age 75 y) and mild to moderate depression (scoring 8 or higher on HADS), were randomized to a stepwise psychotherapy intervention (INT) or usual care (UC). Standard risk factors, EF, NYHA and psychological measures (HADS, DS14, Vital Exhaustion (VE), SF 36, MMPI hostility) were collected at baseline and at 18-months follow up. Results: High anxiety (HA, HADS > 10) patients were more depressed (HADS,  $r = .38, p < .0001$ ) and more exhausted (VE,  $r = .44, p < .0001$ ) than low anxiety (LA) patients. In a multivariate model, baseline anxiety was associated (cor  $r^2 = .06$ ,) with gender ( $p = 0.005$ ), age ( $p < .0001$ ) and severity of heart disease (NYHA;  $p = 0.034$ ). Between baseline and 18 months there was a significant decrease of anxiety in the INT- (m: 10.5 SD 3.7 to m: 7.8 SD 4.1 and UC group (m: 10.4 SD 3.7 to m: 7.6 SD 3.7), but no significant differences between groups. In a separate analysis of the total sample, 291 patients showed an anxiety decrease (AD, -4.2) and 105 an anxiety increase (AI, +1.9) during the study. AD patients had higher baseline values in negative affectivity (DS14; AD m: 15.8 AI m: 14.5;  $p < .02$ ), quality of life (physical sum scale, SF-36; AD m: 39.0 AI m: 35.5;  $p = 0.004$ ), and lower values in cynicism (MMPI; AD m: 11.9 AI m: 13.5;  $p = 0.006$ ). AD and AI predicted the course of VE (AD m: -5.7, AI m: +2.3.,  $p < .0001$ ) as well as the number of cardiovascular events during the study (AD m: .57 AI m: .82;  $p < .05$ ). Conclusion: HA patients showed higher psychosocial and cardiologic impairment than LA patients. In this CAD sample selected for depressive symptoms it was possible to replicate partly former results on CAD patients with HA. As in the former study, both groups significantly reduced their anxiety. In low anxiety patients at baseline and A-increase cardiovascular events were more detected. Psychosocial interventions in CAD, which focus on depression, need to differentiate also on anxiety. HA and LA individuals in those studies seem an interesting scope for the future.

## 79) Abstract 1274

### A COPING WEBSITE INCREASES SELF-EFFICACY AND DECREASES PERCEIVED BARRIERS TO DONATION AMONG FIRST-TIME BLOOD DONORS.

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Brochure and video interventions have been shown to enhance donation attitudes and intentions to give blood, particularly when the information provides specific suggestions for coping with donation-related concerns. Using a college student sample, positive changes in attitudes and intentions were also obtained when the coping material was presented via a website in a controlled laboratory environment. The present study examines whether similar effects can be achieved when a web-based coping intervention is provided to novice donors from a major blood center. First-time New York Blood Center whole blood donors ( $N = 161$ ; 55% female; Mean Age = 21.3, SD = 2.2) were recruited one week after their initial donation and randomly assigned to either a donation coping website or no-website control condition. Participants completed online measures of donation self-efficacy, decisional balance, and anxiety at baseline (2 weeks post-donation), completed the website intervention if so assigned (3 weeks post-donation), and repeated the online measures (8 weeks post-donation). A series of 2 Group (website, control) x 2 Time (baseline, post-intervention) ANOVAs were conducted. A significant effect of Group x Time,  $F(1, 159) = 4.12, p < 0.05$ , on action self-efficacy was observed, reflecting a significant increase in self-efficacy among the website group with no change in the no-website group. There was also a significant Group x Time effect on decisional balance - cons,  $F(1, 159) = 3.96, p < 0.05$ , indicating a significant decrease in perceived



barriers among the website group with no change in the control group. No significant effects of Group, Time, or Group by Time were observed for decisional balance - pros. Finally, a marginal effect of Group x Time was observed for anxiety,  $F(1,159) = 3.21$ ,  $p = 0.07$ , reflecting a decrease in anxiety among the website group with no corresponding change in the control group. These findings indicate that first-time blood donors, who are known to be at high risk for not providing a repeat donation, may be motivated to return by a web-based intervention that addresses their donation-related concerns. Using New York Blood Center donor database records we are currently tracking all participants to determine whether the observed changes in self-efficacy and decisional balance will be associated with increased future donation behavior.

#### 80) Abstract 1139

##### **LIVE, TELEPHONE, AND VIDEOCONFERENCED DELIVERY VENUES FOR GROUP-BASED STRESS MANAGEMENT IN CHRONIC FATIGUE SYNDROME PATIENTS**

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**INTRODUCTION.** The biobehavioral stress model of Chronic Fatigue Syndrome (CFS) holds that stress relates to physiological dysregulation and CFS symptom exacerbation. Cognitive behavioral stress management (CBSM) may offer benefit, but given the nature of CFS symptoms, patients face practical barriers to attending in-person CBSM, which may be reduced by technology-assisted delivery. **METHODS.** We present the highlights of separate randomized controlled trials (RCTs) of 3-month programs of weekly in-person group CBSM (IP-CBSM), and telephone-based group CBSM (T-CBSM), and then describe the development and preliminary results from a novel video-conferenced CBSM for patients and partners (V-CBSM). **RESULTS.** IP-CBSM involved weekly groups for patients to learn CBSM techniques and instructions to practice these between sessions. Those in IP-CBSM showed significant reductions in stress and symptoms over a 5-month follow-up vs controls. T-CBSM involved 10 weekly group conference calls on telephones with displays that allowed access to audiotape summaries of CBSM modules for review between sessions. While T-CBSM also reduced stress, direct comparisons revealed that IP-CBSM groups were more powerful in reducing stress and T-CBSM did not reduce CFS symptoms. We then created a videophone/tablet-driven videoconferenced CBSM intervention (V-CBSM) for patients and partners that features 10 weekly videoconferences attended by groups of CFS patient-partner dyads (up to 4 dyads). V-CBSM also provides access to downloadable videos covering weekly CBSM summaries; expert summaries on topics such as stress and coping, and changing cognitive appraisals; and demonstration videos for relaxation procedures. An RCT is comparing the effects of V-CBSM to a time-matched patient-partner health education control condition. Preliminary analyses show that patients in V-CBSM report increased perceived stress management skills (awareness of tension, coping, assertiveness) vs controls over 5 months suggesting that V-CBSM may be efficacious. **CONCLUSION.** Using videoconferenced CBSM may strike a balance between the intensity of in-person sessions with the convenience of home delivery in the context of partner support.

#### 81) Abstract 1059

##### **A PERSONALIZED AND INTERACTIVE WEB-BASED INNOVATION TO ADVANCE THE QUALITY OF LIFE AND CARE IN PATIENTS WITH HEART FAILURE (ACQUIRE-HF): A FEASIBILITY STUDY**

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Heart failure (HF) is a complex and debilitating condition, the end stage of most heart diseases, and comprises a global health and economic burden. Despite improved treatment options, hospitalization and mortality rates remain high. Thus, we are still searching for sustainable and successful care modalities to advance the quality of care for these patients. A multi-disciplinary, international team of experts together with end users will develop an innovative patient-centered ICT solution to empower patients to live a better and longer life with their disease. The clinical and economic impact of the innovation will be evaluated in a randomized controlled trial (RCT) design in 589 HF patients in Denmark. A full MAST (Model for ASsessment of Telemedicine) evaluation will be included. We now have data from focus group interviews and from the pilot study ( $n=26$ ). Patients completed purpose-designed and standardized and validated questionnaires at baseline and at 3 months follow-up. Both patients ( $n=10$ ) and nursing staff ( $n=3$ ) from the outpatient HF clinic were interviewed post intervention with respect to feasibility and implementation. Patients' actual use of the platform, as indicated by the number of times that patients were logged on, varied considerably from 0-105 times during the 3 months follow-up period (total number of logins=1338; mean= $58.2 \pm 37.3$  times; median = 71.0; IQR = 70). Three patients never logged on. Patients with higher expectations towards use of the platform at baseline reported a higher score with respect to their experiences after 3 months (Pearson's  $r = .41$ ;  $p = .10$ ), with expectations accounting for 17% of the variance in patients' experiences. Of the 26 patients, 19 patients had health status data at baseline and 3 months, with 8 patients deteriorating and 10 improving their health status. Of the 10 interviewed patients, 7 patients found the platform helpful, e.g. "I have been staying at home for many years. It was nice to have the platform to be able to monitor my own health. You gain knowledge about your disease and get a feeling that you are more involved in the process". ACQUIRE-HF represents an innovative and sustainable paradigm shift of HF care, with the first results showing promise both with respect to feasibility of use and impact on patients' lives, with recommendations based on the qualitative data shown in Table 1.

**Table 1.** Recommendations based on the results of the ACQUIRE-HF feasibility

study

**Use of the platform and monitoring of symptoms:**

- Should be customized to the individual patient's user level and preferences if feasible
- Should facilitate that patients can use the technology that they are familiar with
- Is not a 'one-size fits all' solution
- Is not a replacement for clinical practice
- Is a useful tool for newly diagnosed patients
- Is a useful communication tool
- Gives patients a more equal relationship with nursing staff
- Provides nursing staff with new, additional and more 'honest' information about patients
- Alignment of patients and nursing staff expectations is paramount
- Patients prefer to see total overview and evolution in scores
- Re-examination of questionnaire use for health status monitoring
- Train nursing staff close to introduction of the study and allow a few test cases to increase familiarization
- Beware that monitoring of symptoms might induce anxiety in some patients

**82) Abstract 1574**

**A PRELIMINARY STUDY ON THE ASSOCIATION BETWEEN VAGALLY MEDIATED HEART RATE VARIABILITY AND SELF-REPORTED DRUG ABUSE**

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Drug and alcohol abuse is a common issue in society, and has been linked with poorer executive brain function (e.g., prefrontal cortex), and thus poorer self-regulation and overall health. Similarly, resting vagally-mediated heart rate variability (vmHRV), an index of executive brain function and cardiac vagal tone, has also been linked with self-regulation and overall health. Specifically, lower resting vmHRV is associated with decreased executive brain function, lesser self-regulation abilities, and poorer overall health. Converging evidence has linked alcohol abuse with vmHRV reactivity (e.g., under task demands), however little research has been conducted on substance abuse and tonic (resting) vmHRV. Moreover, research has not yet linked vmHRV with general drug abuse tendencies. Therefore, the following preliminary analysis sought to examine the relationship between resting vmHRV and self-reported drug abuse tendencies in 32 college-age participants (mean age = 22; standard deviation = 5; 19 females). Subjects were attached to a 3-lead electrocardiogram (ECG) and first completed a 5-minute baseline-resting period. Participants then completed a set of self-report questionnaires, including the 28-item Drug Abuse Screening Test (DAST), with higher scores reflecting more drug abuse tendencies. High frequency heart rate variability was measured in accordance with Task Force (1996) guidelines and was regarded as the measure of vmHRV. Non-parametric ( $\rho$ ) correlations showed a significant negative relationship between resting vmHRV and DAST scores ( $r_{\rho} = -.375, p = .032$ ), such that a higher drug abuse tendencies was associated with lower resting vmHRV. These preliminary data both support the prior evidence on the link between substance abuse and vmHRV, and extend this notion into the domain of everyday drug abuse tendencies. In sum, these preliminary data

potentially assist in better understanding the neurophysiological contaminants of drug abuse, and subsequently, the complex relationship between drug abuse, self-regulation, and health.

**83) Abstract 1103**

**MOTIVATIONAL INTERVIEWING ENHANCES INTERNAL MOTIVATION FOR FUTURE DONATIONS AMONG RECENT FIRST-TIME BLOOD DONORS.**

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Self-determination theory (SDT) proposes that people are more likely to persist with behaviors that are internally-motivated, and that externally-motivated behavior can become internalized given the appropriate socio-environmental conditions. For example, SDT posits that motivation may become increasingly internalized and self-determined via satisfaction of the fundamental human need for *autonomy* (i.e., a sense of volitional control over one's behavior).

Consistent with this notion, among experienced blood donors it has been demonstrated that a telephone-delivered motivational interview that encourages autonomy in making future donation decisions enhances internal motivation and increases subsequent donations. Because many first-time blood donors do not go on to provide a second donation, the present study was designed to determine whether motivational interviewing could similarly enhance internal motivation for giving among new donors. First-time New York Blood Center donors ( $N=160$ ; 45% female; Mean Age = 21.3, SD = 2.3) were recruited and randomly assigned to either a treatment-as-usual control group or a brief (~15 minute) telephone-delivered motivational interview conducted 3 to 6 weeks after their initial donation. Participants completed the Blood Donor Identity Survey at approximately 2 weeks post-donation and again at approximately 8 weeks post-donation, and this measure was used to compute subscale scores reflecting Amotivation, External Motivation, and Internal Motivation. There were no significant group differences on these motivation subscales at the initial administration. However, examination of change scores from the first to the second administration revealed that, relative to controls, participants who received the motivational interview showed greater increases in Internal Motivation,  $F(1,159) = 4.80, p < .05$ . There were no significant differences with respect to changes in Amotivation,  $F(1,159) = 0.50, p = .48$ , or External motivation,  $F(1,159) = 0.83, p = .36$ . These findings indicate that a brief motivational interview promotes a sense of autonomy among first-time blood donors. Using New York Blood Center donor database records we are currently tracking all participants to determine whether, consistent with SDT, the observed increases in internal motivation will be associated with increased future donation behavior.

**84) Abstract 1291**

**EXAMINING ACCEPTABILITY FOR UTILIZING SMARTPHONES IN HEALTH BEHAVIOR CHANGE PROGRAMMING**

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Nearly two-thirds of adults in the US own smartphones; coupled with the expansive capabilities of smartphones to collect data and deliver content there is burgeoning interest in harnessing mobile technology to implement (either all or portions of) health promotion interventions. Yet, there is little research regarding the acceptability of utilizing a



smartphone for delivery of health behavior change programming, and if this varies across samples. **Purpose:** We investigated community perceptions about utilizing a smartphone as part of a health behavior change program in two independent studies. **Methods:** Study 1 sampled urban college students ( $n=130$ ;  $M$  age=20; 47% Caucasian) via survey; study 2 was a focus group of rural adult women ( $n=40$ ;  $M$  age=28; 93% Caucasian). Both samples answered similar items regarding smartphone ownership and rated acceptability of using the device for health behavior change (e.g., would having intervention content on the smartphone be useful; enjoyable; interesting; important; efficient). **Results:** 100% of urban student participants owned a smartphone, as did 85% of rural women. Smartphone intervention acceptability dimensions (1=not at all, 5=very much) were above the mean (i.e., 3=acceptable) for urban students: useful ( $M=3.9$ ), enjoyable ( $M=3.2$ ), interesting ( $M=3.4$ ), important ( $M=3.3$ ), efficient ( $M=3.7$ ). Acceptability dimensions (1=not at all, 7=very much) were high (4=acceptable) for rural women: useful ( $M=6.3$ ), enjoyable ( $M=5.9$ ), interesting ( $M=5.3$ ), important ( $M=5.7$ ), efficient ( $M=5.8$ ). **Conclusion:** Both groups exhibited high levels of device ownership. The majority in both studies reported the possibility of intervention content delivered via smartphone to be acceptable. Rural women expressed somewhat higher rates of acceptability than urban students for using the device as part of a health behavior change program, possibly due to greater salience of health behavior challenges. These results suggest using mobile technology for the delivery of health behavior interventions is widely accepted, supporting the feasibility of this approach. We also discuss the potential role of within group moderators of, and potential barriers to, acceptability (e.g., advanced age, design/content barriers).

#### 85) Abstract 1585

##### **RESTING HIGH FREQUENCY HEART RATE VARIABILITY AND EVERYDAY MUSIC LISTENING TENDENCIES**

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Research has compartmentalized everyday music listening tendencies into three main motivations, including cognitive (intellectual appreciation), emotional (emotional regulation), and background-stimulus (background noise) listening. Research has showed that listening to music can influence brain activity, including executive brain regions such as the prefrontal cortex, and has been linked with overall well-being. Interestingly, high-frequency heart rate variability (HF-HRV) is considered an index of both overall health and executive brain region activity, while lower HF-HRV is associated with lesser activity in executive brain regions, poorer overall health, and poorer self-regulation abilities (e.g. emotion regulation). However, to date, no study has linked HF-HRV with individuals' motivations to listen to music, as they may have consequences for both physical and psychological well-being. The following study sought to examine how HF-HRV under various conditions was associated with self-reported everyday music listening tendencies. In a sample of 36 college-aged participants (22 women), continuous heart rate data was collected via an electrocardiogram as participants first completed a 5-minute resting-baseline, followed by a physiological (standing) and psychological (memory) task, each followed by a 5-minute recovery period. During a subsequent questionnaire period, participants completed a 15-item questionnaire that assessed their music listening tendencies. Results showed a greater tendency to listen to music in an emotional manner was significantly associated with HF-HRV during the orthostatic ( $r = -.439$ ,  $p < .01$ ), orthostatic recovery ( $r = -.337$ ,  $p < .05$ ), and task

recovery ( $r = -.386$ ,  $p < .05$ ) phases. Additionally, results showed a greater tendency to listen to music in a cognitive manner was significantly associated with HF-HRV during the baseline ( $r = -.419$ ,  $p < .05$ ), orthostatic recovery ( $r = -.380$ ,  $p < .05$ ), and task recovery ( $r = -.355$ ,  $p < .05$ ) phases. However, no results were found regarding background music listening. These data are the first to examine how HF-HRV under various conditions is related to music listening tendencies. Overall, these data suggest that those with lower HF-HRV may seek external sources, such as music, for emotion regulation and cognitive purposes; important implications will be discussed.

#### 86) Abstract 1383

##### **A 12-WEEK FITBIT-ASSISTED WALKING INTERVENTION IMPROVES BODY FUNCTION SATISFACTION IN OLDER WOMEN AND DECREASES PHYSICAL LIMITATIONS IN MIDDLE-AGED WOMEN**

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**Background:** Increasing age is associated with declines and often limitations in physical functions and recent studies further emphasize the accompanying declines in body function satisfaction. Exercise intervention studies suggest that increasing physical activity can lead to increases in body function satisfaction. However, little is known 1) as to whether increasing physical activity will be beneficial for older adults as well; 2) to what extent improvements in body function satisfaction are tied to decreases in physical limitations; and 3) whether potential physical benefits are accompanied by mental health benefits.

**Method:** To address these questions, 43 sedentary females ( $59 \pm 6.5$  yrs.) were enrolled in a 12-week physical activity intervention. Participants self-reported on physical function satisfaction (Body Esteem Scale) and physical ability (SF-36) and recorded daily steps with Fitbit step counting devices during weeks 1 and 12.

**Results:** Over the course of the intervention, participants showed increases in steps ( $F=26.93$ ,  $p<.001$ ), physical ability ( $F=3.97$ ,  $p=.053$ ) and physical function satisfaction ( $F=25.68$ ,  $p<.001$ ). However, while overall older females improved more than middle-aged females in terms of body function satisfaction ( $\beta=0.27$ ,  $p=.073$ ), satisfaction improvements were more dependent on physical ability improvements in middle-aged than older women ( $\beta=-0.34$ ,  $p=.05$ ). Furthermore, again just for middle-aged women, increases in physical ability and function satisfaction both translated into decreases in depressive symptoms ( $\beta=0.52$ ,  $p=.003$ ;  $\beta=0.31$ ,  $p=.037$ , resp.).

**Conclusions:** The current walking intervention successfully increased participants' weekly steps, and particularly benefitted older women in terms of body function satisfaction increases. Interestingly, only for middle-aged women, however, changes in satisfaction appeared to be closely tied to increases in actual physical ability and both, in turn, were linked to improvements in depressive symptoms. The latter was again not true in older women. This may suggest that older women decouple mental health from physical functioning satisfaction and physical ability, which may be a beneficial strategy to compensate for present physical limitations. These findings provide insight into how the female aging process differentially affects physical activity benefits.

#### 87) Abstract 1267

##### **MARIJUANA AND SYNTHETIC MARIJUANA (SM) OVERDOSE/WITHDRAWAL SYMPTOMS IN YOUNG ADULTS: APPLYING AND IMPLEMENTING STRICTER REGULATIONS ON USE: A CASE-REPORT**

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**Case Presentation:** The patient is an 18 year old Hispanic Male who lives with his parents. Patient voluntarily presented to our Hospital on 9/10/2015 to due to symptoms of psychosis, panic attacks (w/o agoraphobia), and paranoid ideations. Per mother, patient was exhibiting symptoms of panic attacks - including palpitations, SOB, diaphoresis, tightness in chest, and numbness in his hands. Additionally, patient seemed impulsive, agitated, exhibiting slight delusionary behavior, and mild psychosis. He also stated that he had been exhibiting suicidal thoughts. In this regard, patient mentioned that he started experiencing these suicidal thoughts about 4-5 days prior, which was the same time that he last used synthetic marijuana. The patient did admit he used marijuana habitually, but recently also started to use synthetic marijuana (~3 months prior) due to peer pressure and curiosity stating, "I just wanted to try it." Other culprits to patient's synthetic marijuana use included his recent breakup with his girlfriend, and the emotional distress he had to deal with the divorce of his parents. A Urine Drug Screen in the ED, did show he was positive for THC.

**Conclusion:** This case, as many others nationwide, exemplifies the impact of synthetic cannabinoid use and abuse in adolescents. Side effects and adverse health consequences of synthetic cannabinoid use warrants stricter regulations and policies in order to decrease psychiatric hospital admissions and associated healthcare costs. A table is attached below which points out the similarities & differences between the characteristics of synthetic cannabis and cannabis.

**Table 1 : Cannabis Characteristic vs. Synthetic Marijuana (SM)**  
**Characteristics : Similarities and Differences**

		<ul style="list-style-type: none"> <li>Cyclohexylphenols (e.g. CP 47,497 and homologues of CP 47,497)</li> <li>Classical cannabinoids (e.g. HU-210).</li> </ul>
Availability	<ul style="list-style-type: none"> <li>Remains illegal in most parts of the United States. State laws determine the legality of marijuana. (5)</li> <li>Available illegally in most US states.</li> </ul>	<ul style="list-style-type: none"> <li>Readily available in the United States because manufacturers are able to bypass the law by changing chemical compounds that have been outlawed thus creating various cannabinoid-like substances which have not been studied for side effects (6).</li> <li>In most countries around the world, including the United States, synthetic cannabis is illegal.</li> <li>Cannabinoids are becoming more readily available in the United States due to articles and documentaries showing its benefits in regulating mood and also control of epileptiform activities (4).</li> </ul>
Screening & Detection	<ul style="list-style-type: none"> <li>THC compound can be detected consistently by simple serum, urine or oral swab tests (7)</li> <li>Compound can be detected for up to 5-7 days depending on body fluid obtained and quantity of cannabis exposure (7)</li> </ul>	<ul style="list-style-type: none"> <li>Newly developed laboratory tests are able to successfully detect up to 20 synthetic cannabinoid substances. Due to the constant changes made to the compounds, it is difficult to have a single test determining the presence of synthetic cannabinoids in body fluids (7).</li> <li>New advances have shown that liquid chromatography/ tandem mass spectrometry (LC-MS/MS) and gas chromatography/mass spectrometry (GC/MS) can detect several metabolites of synthetic cannabinoid substances in the urine: JWH-018 and JWH-073, along with other various metabolites (7).</li> <li>Compounds can be detected for up to 2-3 days based on immunoassay utilized and quantity of synthetic cannabinoid exposure (7).</li> </ul>

**Table 1 : Cannabis Characteristic vs. Synthetic Marijuana (SM)**  
**Characteristics : Similarities and Differences**

Topic of concern	Cannabis Characteristics	Synthetic Marijuana (SM) Characteristics
Adverse side effects	<p>According Karant (2004) the following effects occur with cannabis use - (1)</p> <ul style="list-style-type: none"> <li>Elevated Mood</li> <li>Relaxation</li> <li>Altered Perception of surrounding conditions</li> <li>Symptoms of Psychosis (Delusions, disorganized thinking and detached from reality)</li> <li>Cognitive deficits during acute intoxication</li> <li>Precipitation of onset or relapse of schizophrenia</li> <li>Cannabis dependence</li> </ul>	<p>According to Freeman et al 2013 ( 2), the following side effects could occur with SM use:</p> <ul style="list-style-type: none"> <li>Ischemic stroke</li> <li>Elevated mood</li> <li>Relaxation</li> <li>Altered Perception of surrounding conditions</li> <li>Extreme Psychosis (Delusions, disorganized thinking and detached from reality to a great extent)</li> <li>Violent behavior and suicidal thoughts</li> <li>Tachycardia</li> <li>Severe abdominal pain, nausea, vomiting that occurs over several months and resolves when SM use has been discontinued ( known as synthetic cannabinoid hyperemesis syndrome)</li> </ul>
Mechanism of action	<ul style="list-style-type: none"> <li>Binds to cannabinoid receptors in the brains and other organs as the endogenous ligand - anandamide. (3)</li> </ul>	<ul style="list-style-type: none"> <li>Binds to cannabinoid-like receptors in the brains and other organs as the endogenous ligand - anandamide (3)</li> <li>Synthetic cannabinoids and other identical products seem to have a similar mode of action as marijuana, in which these substances have affinity to various cannabinoid receptors (e.g. CB 1, CB2). (3)</li></ul> <p>Synthetic cannabinoids ('Spice') fall into seven major structural groups :</p> <p>Note that spice has high potency and high affinity for cannabinoid receptors this making it very efficacious (6).</p> <ul style="list-style-type: none"> <li>Naphthoylindoles (e.g. JWH-018, JWH-073 and JWH-398)</li> <li>Naphthylmethylindoles</li> <li>Naphthoylpyrroles</li> <li>Naphthylmethylindenes</li> <li>Phenylacetylindoles (i.e. benzoylindoles, e.g. JWH-250)</li> </ul>

**Table 1 : Cannabis Characteristic vs. Synthetic Marijuana (SM)**  
**Characteristics : Similarities and Differences**

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**Poster 88) WILL NOT BE PRESENTED**

## 89) Abstract 1560

### TOWARD A BIOPSYCHOSOCIAL ECOLOGY OF THE HUMAN MICROBIOME AND HEALTH: CHARTING A DIRECTION FOR PSYCHOSOMATIC MEDICINE

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Forty years ago, George Engel's (1977) advocacy for a new biopsychosocial (BPS) model initiated the evolution in Western medicine from a largely reductionist paradigm toward wide acceptance of biological, psychological, and social influences on health. Today, the rapidly growing literature on the human microbiome, and the gut microbiota in particular with its vast implications for health, suggests that medicine is again poised for significant evolution, or perhaps revolution. The development of applicable knowledge within this new area will likewise require a broad and inclusive paradigm, given the apparent sensitivity of the microbiota to perturbations across a cascade of BPS influences.

We propose a BPS ecological framework of the human microbiome and health that characterizes environmental and human factors as members of a global, dynamic set of interacting systems spanning BPS domains, levels of scale, and time - from the most immediate-level molecular, genetic, and neural processes to the most distal ecosystems. For example, in recent decades, shifts in biodiversity of the human gut and the rise of inflammatory and related diseases in industrialized societies parallel the proliferation of antibiotic use and resistance, as well as critical shifts in biodiversity observed at various scales globally. This likely reflects a dynamic interplay of biological, psychological/behavioral, and social systems at all levels of scale that ultimately interact with the gut microbiota, host systems, and their synergies. In turn, the host is integral to determining these systems.

The BPS ecological framework is aspirational, as was Engel's original BPS model, to more fully embody the reach of psychosomatic medicine through better reflecting the totality of interacting systems that determine health. Accordingly, it encourages replicable, generalizable research and practices through its broad consideration of the complex and dynamic systems that may otherwise be overlooked, studied within disciplinary silos, or understood out of context. A BPS ecological approach also bridges basic laboratory and clinical science, and transcends disciplines in ways that facilitate discovery. From a public health perspective, this paradigm may ultimately promote sustainable psychological, social, and bio-environmental systems that broadly support microbial-human health.

## 90) Abstract 1073

### INFLUENCES OF LIFESTYLE FACTORS ON CARDIAC AUTONOMIC NERVOUS SYSTEM ACTIVITY OVER TIME

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Physical activity, alcohol use and smoking might affect cardiovascular disease through modifying autonomic nervous system (ANS) activity. We investigated: 1) whether there are consistent relationships between lifestyle factors and cardiac ANS activity over time, and 2) whether 2-year changes in lifestyle factors relate to 2-year changes in cardiac activity. Baseline (n=2618) and 2-year follow-up (n=2010) data of the Netherlands Study of Depression and Anxiety was combined. Lifestyle factors were habitual physical activity, frequency of sport activities, alcohol use, and smoking. Indicators of cardiac activity were heart rate (HR), respiratory sinus arrhythmia (RSA) and pre-ejection period (PEP) (100 minutes recorded with the 'Vrije Universiteit Ambulatory Monitoring System'). The results showed that high physical activity (-1.8beats/min compared to low activity), high frequency of sport

activities ('couple of times/week':-2.5beats/min compared to 'almost never') and mild/moderate alcohol use (-1.2beats/min compared to non-drinking) were related to low HR. Heavy smoking was related to high HR (>30cigarettes/day:+5.1beats/min compared to non-smoking). High frequency of sport activities was associated with high RSA ('couple of times/week':+1.7ms compared to 'almost never') and moderate smoking with longer PEP (11-20cigarettes/day:+2.8ms compared to non-smoking). Associations were consistent across waves. Furthermore, 2-year change in frequency of sport activities and number of smoked cigarettes/day was accompanied by 2-year change in HR ( $\beta=-.076$  and  $\beta=.101$ , respectively) and RSA ( $\beta=.046$  and  $\beta=-.040$ , respectively). Our findings support consistent effects of lifestyle on HR and parasympathetic activity in the expected direction. Cardiac autonomic dysregulation may be partly mediating the relationship between lifestyle and subsequent cardiovascular health.

## 91) Abstract 1499

### PERSONALIZED INTERNET-BASED SELF-HELP FOR PATIENTS WITH MEDICALLY UNEXPLAINED SYMPTOMS: DESIGN OF AN INTERVENTION AND RANDOMIZED CONTROLLED TRIAL

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**BACKGROUND:** Medically unexplained symptoms (MUS) constitute a major health problem because of their high prevalence, the suffering and disability they cause, and the increased use of healthcare resources that is associated. Internet-based interventions might provide an accessible and convenient tool for managing MUS. We developed a personalized internet-based self-help intervention for MUS in primary care. This intervention is part of a stepped-care program ('Master Your Symptoms') aiming to improve diagnosis, treatment, and referral of patients with MUS with the help of online tools. The design of the intervention and the randomized controlled trial assessing its effectiveness are discussed.

**METHODS:** The intervention starts with a number of online questionnaires concerning physical complaints, and possible triggers, consequences, and maintaining factors. Based on the results of these questionnaires, participants receive an automatically generated report and are offered a choice of personalized self-help advice exercises. These exercises are based on medical guidelines, self help books, and input of patients and health care providers.

200 adult patients with MUS will be recruited through primary care centers in the Netherlands. After eligibility assessment, participants will be randomly allocated to the intervention or control group. The control group will receive care as usual. Primary outcome will be quality of life (RAND-36). Secondary outcomes include physical symptoms, distress, depression, and anxiety (4DSQ), medical consumption and costs (iMCQ and iPCQ). Assessments will take place at baseline and at 3 and 6 months follow-up.

**DISCUSSION:** To our knowledge, this is the first study to combine the concepts of e-health, self-help, and personalized medicine in the treatment of MUS. This intervention has the potential to improve the quality of life of patients with MUS, reduce social and economical costs, and conserve scarce healthcare resources.

## 92) Abstract 1514

### EARLY MATERNAL SENSITIVITY, ADULT ATTACHMENT SECURITY, AND CARDIOMETABOLIC RISK: A PROSPECTIVE LONGITUDINAL STUDY

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Studies find that receiving high quality parenting is associated with better physical health in childhood, but do these effects remain into adulthood? The few studies that have tested these links have primarily relied on potentially biased retrospective reports. The mechanisms behind these effects are also unclear: Attachment security could be a key mechanism, as it stems from receiving high quality care and promotes less hypervigilance and better coping, but it has not been empirically tested. Using data from a 37-year prospective longitudinal study, we tested whether receiving sensitive maternal care in early childhood (as coded by trained observers at four timepoints) predicts cardiometabolic risk (assessed using CRP, BMI, MAP, and waist-to-hip ratio) in adulthood. Furthermore, we tested whether attachment orientations in adulthood (as assessed by the adult attachment interview) mediated the link between parenting and health. We find that receiving sensitive maternal care is associated with lower cardiometabolic risk in adulthood. Adult attachment partially mediated the link between early maternal sensitivity and adult cardiometabolic risk. These findings suggest that early parenting has enduring effects on health through pathways including (but not limited to) attachment.

## 93) Abstract 1485

### CARDIOVASCULAR MARKERS PREDICT PSYCHIATRIC MORBIDITY AND NEURODEVELOPMENTAL FEATURES IN A LARGE COHORT STUDY OF CHILDREN AND ADOLESCENTS IN THE UK

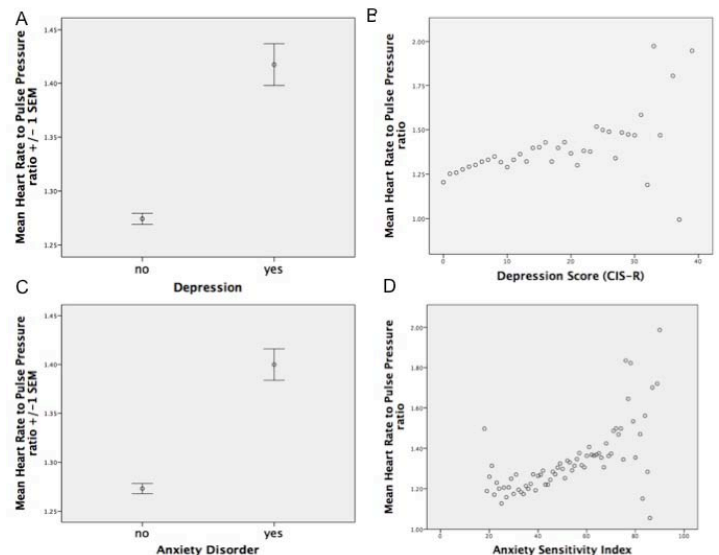
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**Background:** The Avon Longitudinal study of parents and children (ALSPAC) is a large population study of a birth cohort in the UK. There is growing interest in predictors of psychiatric morbidity in this population. To date the role of cardiovascular physiology in psychiatric morbidity in this large group has not been explored. In adults heart rate (HR) to blood pressure (BP) ratios can predict vulnerability to syncope, itself associated with psychiatric disorder

**Method:** The ALSPAC birth cohort was used. At Teen Focus 3 (TF3) (mean age 15.5 yrs) participants and their parents completed the Development and Well-being Assessment (DAWBA) which generates ICD-10 psychiatric diagnoses. HR and BP were recorded (n=4,254). At mean age 17.7 years (F17), they underwent psychiatric assessment (Clinical Interview Schedule (CIS-R)) and Anxiety Sensitivity Index; allowing identification of ICD-10 diagnoses of depression, and anxiety disorders as well as symptom quantification. HR and BP were recorded (n=4,236). The presence of neurodevelopmental disorders (e.g. autism spectrum, dyslexia) was determined from parent-completed questionnaires at child age 9 years. Linear regression models were independently used to explore relationships between cardiovascular physiology (HR, systolic BP, diastolic BP, HR to systolic BP ratio, HR to diastolic BP ratio and HR to pulse pressure ratio) and psychiatric diagnoses and rating scales, controlled for BMI and gender.

**Results:** Age 17, many aspects of HR and BP measurements predicted current depression and degree, presence of anxiety disorder and degree of anxiety. The strongest predictor was heart rate to pulse pressure ratio (all  $p < 0.001$ ) (FIG 1); HR to pulse pressure ratio age 15, predicted presence of Hyperkinesia at 15 and historical presence of any neurodevelopmental disorder aged 9 ( $p = 0.043$ ,  $p = 0.025$ )

**Discussion:** This is the first study to directly explore the relationship between cardiovascular markers and psychiatric symptomatology in a large group of children and adolescents, demonstrating that resting cardiovascular parameters can predict presence and degree of psychopathology. There is a substantial body of interest in the relationship between autonomic dysfunction and psychiatric disease and this study highlights the need for further evaluation of this link in children and adolescents.



## 94) Abstract 1343

### PERSISTENTLY HIGH LIFE EVENT SEVERITY RATINGS ARE ASSOCIATED WITH PHYSICAL AND PSYCHOLOGICAL WELL-BEING ACROSS THE LIFESPAN

Hannah M. Schreier, PhD, Joshua M. Smyth, PhD, Jillian A. Johnson, PhD, Biobehavioral Health, Martin J. Sliwinski, PhD, Human Development and Family Studies, The Pennsylvania State University, University Park, PA

Exposure to negative life events has been linked to lower physical and psychological well-being. It is less clear whether the continued perception (following occurrence) of life events as highly negative influences well-being, and whether effects of perceived event severity differ across the life course.

A gender and age stratified community sample of 317 adults (mean age=49, range=19-83 years; 50% male; 37% Black) completed assessments of their cortisol awakening response (CAR), metabolic health (based on body mass index, body fat percentage, waist circumference, mean arterial pressure, and glycated hemoglobin), and self-reported health and well-being (Center for Epidemiological Studies-Depression Scale, SF-36v2 Health Survey). Participants indicated whether they had experienced each of 37 life events over the past 12 months; each endorsed event was rated for its negative impact at the time of occurrence and also at present. Analyses controlled for sex and race; only negative life events were included. We examined whether negative impact ratings at event occurrence, at present, and their interaction predicted outcomes, and whether age moderated the effect of perceived life event severity on well-being.

The interaction between life event severity at event occurrence and at present broadly predicted physical and psychological well-being beyond covariates and main effects. Specifically, persistently high ratings of life event severity were associated with worse metabolic



health ( $p=.041$ ), worse self-rated global health ( $p=.004$ ), worse overall mental health ( $p=.0001$ ), greater depressive symptoms ( $p=.0002$ ), and lower vitality ( $p=.003$ ). There was no association with CAR, functional limitations, body pain, or social functioning. These associations did not vary by participant age, except that greater event severity was associated with lower vitality ( $p=.033$ ) among older adults.

Although these associations are cross-sectional, they suggest that the continued perception of life events as highly negative is uniquely and adversely associated with physical and psychological well-being across a wide range of self-reported and metabolic health outcomes. Notably, these patterns appear to be largely similar across the adult lifespan.

#### 95) Abstract 1454

##### TIME DISCOUNTING PREDICTS INFLAMMATION IN LATER LIFE

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Prominent economic and psychological models suggest that impatient individuals with high discount rates invest less in their health leading to adverse physiological consequences (Grossman, 1972; Hall & Fong, 2007). We examine the link between experimentally elicited discount rates and inflammation using a sample drawn from the population-based English Longitudinal Study of Ageing. Those who completed a preference module and provided blood plasma samples at two time-points for analysis were included in the study ( $n=389$ ; Age=63.7 (SD=5.7); 52% Female). Discount rates were calculated from a set of 12 choices between smaller sooner and larger later rewards (e.g. £25 in two weeks or £30 in one month) where the participant won the value of a randomly selected choice (median reward £28). Our results indicate a substantial relationship between high discount rates and high levels of inflammation two years later as gauged by CRP ( $B=.16$ ;  $p<.005$ ) and fibrinogen ( $B=.13$ ;  $p<.005$ ) in analyses which adjusted for age, gender, race marital status, education, income, wealth and importantly prior inflammation levels. This pattern was robust to the inclusion of controls for BMI, cardiovascular disease, arthritis, other long-term illnesses, smoking, physical activity, and alcohol consumption. Further adjustment for cognitive functioning and the Big Five personality traits did not affect the associations observed. This study provides strong evidence that incentivised elicited discount rates robustly predict longitudinal changes in inflammation in a national sample.

#### 96) Abstract 1590

##### LEPTIN AND ADIPONECTIN AS PREDICTOR OF HEART RATE VARIABILITY CHANGE OVER TWO YEARS IN CHILDREN

*Nathalie Michels, PhD, Roos Van De Wielle, MSc, Stefaan De Henauw, PhD, Public Health, Ghent University, Gent, OV, Belgium*

**Background:** For early prevention of cardiovascular disease, early detection and risk factor insights are necessary. The autonomic balance reflects cardiovascular risk and can be measured by heart rate variability (HRV). Therefore, our purpose is to examine associations between HRV and the energy-related biomarkers leptin and adiponectin in children.

**Methods:** Participants of this study were Belgian children recruited for the longitudinal ChiBS study (year 2010-2012). HRV was measured and fasting blood samples were taken in 270 children at baseline (4.4-11.0y) and 230 children at follow-up (6.7-12.2y). Cross-sectional and longitudinal linear regression analyses were separated by sex and adjusted for age, socio-economic status, body fat%, negative emotions, puberty and mean heart rate.

**Results:** Leptin was a negative cross-sectional and longitudinal predictor of parasympathetic activity in boys; while leptin in girls was cross-sectionally associated with higher LF and LF/HF suggesting sympathetic predominance. Adiponectin was a negative cross-sectional and longitudinal predictor of parasympathetic activity in boys; but

when adjusting for mean heart rate, this effect disappeared and adiponectin was a positive cross-sectional and longitudinal predictor of parasympathetic activity in girls. The other direction, HRV as predictor of leptin and adiponectin was not significant.

**Conclusion:** Results stress the importance of considering sex differences and adjustment for heart rate in testing HRV predictors. Leptin seemed disadvantageous for the autonomic balance (less parasympathetic in boys, more sympathetic in girls), while adiponectin seemed advantageous for the autonomic balance in girls only (more parasympathetic activity). More research is needed to see whether leptin and adiponectin are interesting in cardiovascular screening/prevention or in determining the cardiovascular gain during weight loss follow-up.

#### 97) Abstract 1110

##### EXPOSURE THERAPY IN PHOBIA - EFFECTS OF CARDIAC TIMING AND INTEROCEPTIVE ABILITY

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Spider phobia is a specific phobia expressed as marked uncontrolled psychological and physiological fear reactions to spiders. Exposure therapy is an effective first line treatment which focuses on modifying the evoked fear response to the phobic stimulus. Fear is accompanied by bodily changes, notably cardiovascular arousal, which can intensify negative emotional experience. Arterial baroreceptors communicate centrally the state of cardiovascular arousal by signalling the timing and strength of individual heartbeats. Using heartbeat timing, a specific influence of baroreceptor afferent signalling on the processing of fear and threat stimuli has been identified. Further this influence appears to be mediated by an individual's interoceptive sensitivity which can be quantified from performance accuracy on heartbeat detection tasks.

We studied 58 people with spider phobia (53 completed) in a computerised exposure protocol to see if heart timing/baroreceptor signalling could augment therapy benefits. Each participant underwent four sessions. In each session, 140 random spider images were shown (100 msec). Participants were assigned to one of three timing groups: Systole (shown during baroreceptor firing); Diastole (during baroreceptor quiescent interval); Random (not locked to cycle). Each participant was scored on measures of interoceptive accuracy. The Spider Phobia Questionnaire (SPQ) and Behavioural Avoidance Task (BAT) were used to assess the effects of exposure therapy. Behavioural and physiological (electrodermal activity, EDA) data was collected. Spider phobia decreased with therapy, as measured using the SPQ ( $t=-5.808$ ,  $p<0.001$ ) and BAT ( $t=6.460$ ,  $p<0.001$ ). On the SPQ measure, Systole showed least overall benefit ( $F(2,44)=5.252$ ,  $p=0.009$ ) and an interaction with interoceptive ability ( $F(3,44)=4.158$ ,  $p=0.011$ ), where higher interoceptive accuracy was associated with the poorest outcome. EDA data closely paralleled these findings. Interestingly, in the BAT, the Random group remained most avoidant ( $F(2,44)=5.156$ ,  $p=0.010$ ), particularly individuals with higher interoceptive accuracy ( $F(3,44)=3.182$ ,  $p=0.033$ ).

Our findings demonstrate that interoception influences outcomes of exposure therapy. Understanding these mechanisms may help personalise approaches to anxiety treatment and reveal novel biobehavioural and psychopharmacological targets for intervention.

**98) Abstract 1212****ASSESSING COPING AND ADJUSTMENT IN CAREGIVERS: A SYSTEMATIC REVIEW**

*Tamsyn Hawken, MSc Health Psychology, Psychology, University of Bath, Bath, Somerset, United Kingdom, Julie Turner-Cobb, PhD, Psychology, Bournemouth University, Poole, Dorset, United Kingdom, Julie Barnett, PhD, Psychology, University of Bath, Bath, Somerset, United Kingdom*

Increased awareness of the prevalence of informal caregiving has given rise to substantial growth in caregiver coping literature during recent decades. However, a synthesis of findings surrounding coping and adjustment is lacking. This systematic review assessed these factors in caregivers of all ages, in the context of methodological approaches taken and underlying theory. Three online databases were searched and reference lists and experts were consulted. Twenty-five empirical studies (13 quantitative; 12 qualitative) met inclusion criteria for the review. Results raised methodological issues including a wide variation of psychosocial measures, a range of theory and relative lack of research on young carers. Factors associated with adjustment and coping were identified. These included use of problem-focussed versus emotion-focussed coping, cognitive reappraisal strategies (acceptance, reframing and social comparison) and indicators of psychological adjustment (social support and resources). Caregivers predominantly utilised emotion-focussed coping but when problem-focussed coping was used it promoted positive adjustment. Finally, psychosocial predictors of physiological adaptation were identified, including trait anxiety, coping style and social support. Future work is called for that includes greater focus on young carers and employs more substantial use of theory driven approaches and physiological assessment in a mixed methods context. Findings inform future caregiver research and interventions.

**99) Abstract 1372****DIFFERENTIAL EFFICACY OF PSYCHOLOGICAL THERAPIES ON REDUCING DEMENTIA FAMILY CAREGIVERS' BLOOD PRESSURE**

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Caring for a relative with dementia is associated with negative consequences on caregivers' emotional and cardiovascular health. Even though the number of studies focused on psychological interventions for dementia family caregivers is growing in recent years, the effects of these interventions on caregivers' blood pressure is understudied. Participants in this study are 37 dementia family caregivers that were randomly allocated to four treatment conditions: control group (CG), Acceptance and Commitment therapy (ACT), cognitive behavioral therapy (CBT) and modular intervention guided by functional analysis (MIFA). In addition to mean arterial pressure (MAP), depressive and anxious symptoms were assessed through individual interviews. Results: Significant effects were observed for ACT in depression ( $p < .01$ ;  $d = 1.14$ ) and anxiety ( $p < .01$ ;  $d = 1.29$ ) but not for MAP ( $d = .12$ ). Significant effects were found for CBT in depression ( $p < .01$ ;  $d = 1.46$ ), anxiety ( $p < .01$ ;  $d = .79$ ) and MAP ( $p < .05$ ;  $d = 1.05$ ). Similar findings were observed for MIFA in depression ( $p < .01$ ;  $d = 1.24$ ), anxiety ( $p < .05$ ;  $d = .89$ ) and MAP ( $p < .05$ ;  $d = .70$ ). No significant changes were found for CG. These findings suggest that psychological therapies are useful for reducing caregivers' blood pressure, especially those interventions focused on modification of caregivers' thoughts and behaviors.

**100) Abstract 1342****A SMARTPHONE-BASED ECOLOGICAL MOMENTARY ASSESSMENT APPROACH WITH OLDER AFRICAN-AMERICANS**

*Heather Fritz, PhD, Health Care Sciences and Institute of Gerontology, Malcolm P. Cutchin, PhD, Health Care Sciences, Wassim Tarraf, PhD, Health Care Sciences and Institute of Gerontology, Wayne State University, Detroit, Michigan*

Smartphone-based Ecological Momentary Assessment (EMA) offers a relatively low-cost approach to collect data real time using participant self-reports about behaviors and psychosocial phenomena related to health and health behaviors in various contexts. The usefulness of an EMA approach depends primarily on a research participant's ability to appropriately use the technology involved and adhere to the data collection protocol. Little is known, however, about the feasibility of smartphone-based EMA with older populations. An EMA protocol can be challenging to employ with older adult samples, especially those who may have less formal education and less experience with smartphone technology. We present a study that used a smartphone-based EMA approach among a sample of older African-Americans living in Detroit, MI. One hundred older African-Americans ( $M = 72$  years old) used an Android smartphone loaded with the Movisens XS application to provide data about their ongoing activities and perceived stress four times per day (representing current time and two hours prior) for seven consecutive days. Adherence to the EMA protocol was demonstrated with response completion rates of 92-98% on EMA measures, and no participant attrition was based on the EMA protocol. Although slightly less variable than might be expected, the average daily pattern of EMA stress reports was similar to the diurnal cortisol curve found in this and other samples. While a problem was encountered with obtaining global positioning system coordinates, our findings suggest using a smartphone-based EMA approach for data collection is feasible and acceptable among a sample of older African-Americans. Testing, training, monitoring, and adaptation of the EMA protocol most likely enhanced adherence, and input from older users was important. We discuss specific techniques in design and implementation that can help with the quality of data collection and adherence with smartphone-based EMA in similar populations.

**101) Abstract 1370****DO PLEASANT EVENTS AND ACTIVITY RESTRICTION MODIFY THE INFLUENCE OF CAREGIVING STRESS ON BLOOD PRESSURE?**

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Objective: Dementia caregiving has been described as a chronic stressful situation with adverse cardiovascular effects. Several variables may buffer the negative effect of caregivers' stress on cardiovascular health. Following the stress and coping and PEAR models, the objective of this study is to analyze the role of pleasant events and activity restriction in the explanation of caregivers' blood pressure. Method: Participants were 96 dementia family caregivers caring for a spouse or a parent. In addition to systolic and diastolic BP, caregivers' age, body mass index (BMI), physical exercise, frequency and distress associated with behavioral and psychological symptoms of dementia (BPSD), depressive symptoms, activity restriction and frequency of pleasant events were measured. Results: Two path analyses were analyzed with systolic and diastolic BP as dependent variables, respectively. Even though both models showed good fit indexes (Diastolic:  $\chi^2 = 31.59$ ;  $p = .17$ ;  $\chi^2/df = 1.26$ ; IFI = .963; CFI = .985; RMSEA = .049; Systolic:  $\chi^2 = 35.07$ ;  $p = .09$ ;  $\chi^2/df = 1.40$ ; IFI = .946;



CFI = .940; RMSEA = .061), the findings suggest that pleasant events and activity restriction play a significant role in the explanation of diastolic BP, acting as mediators in the relationship between BPSD and BP. The final model explains a 22% of the variance of diastolic BP. Conclusions: The results suggest that BPSD impact on caregivers' blood pressure by increasing their activity restriction and reducing their levels of pleasant activities. These effects also contribute to caregivers' depressive symptomatology. Future studies should analyze the psychological mechanisms involved in the association between BPSD and these changes in the pattern of pleasant activities.

#### 102) Abstract 1408

##### HIGHER LOCAL AND SYSTEMIC INFLAMMATION IN PERIODONTAL DISEASE DOES NOT ALTER HEALING RATES OR INFLAMMATORY RESPONSES TO ACUTE INJURY

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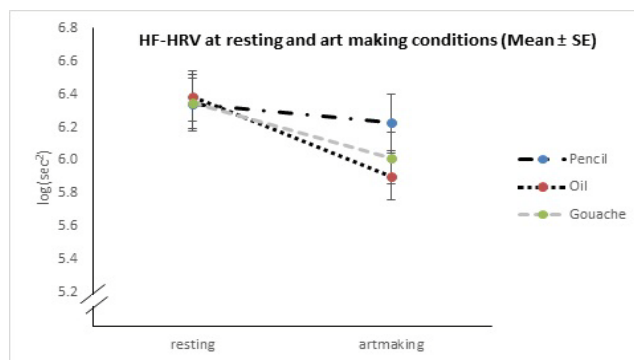
Past studies have linked higher inflammatory responses to both the pathogenesis of periodontal disease (periodontitis) and impaired healing of oral mucosal tissues. The relationship between these factors has not been investigated. Using a standardized model of wound healing, this study objectively examined differences in oral mucosal healing rates and local tissue inflammation in response to wounding between individuals with periodontitis and healthy controls. This study involved 20 systemically healthy, non-smoking, adult men (24-45 years); 10 individuals with untreated periodontitis and 10 healthy age-matched controls. Three excisional wounds were placed on the hard palate (roof of the mouth) under local anesthesia, and were standardized for size, location, depth, and time of placement. Importantly, wounds were placed in uninflamed tissues (unaffected by periodontitis). Oral mucosal healing rates were determined from the first wound using daily videographs. Tissue from the other wounds was biopsied at 6h or 24h post-wounding, from which inflammatory responses to injury were quantified using real-time PCR. Blood and saliva collected just prior to wounding were also analyzed. Inflammation was quantified based on pro-inflammatory cytokine levels. It was found that wounds healed at the same rates in systemically healthy men with and without periodontitis. Local tissue inflammation at baseline (0h) and after wounding (6h and 24h) did not differ between groups. Five men had more severe periodontitis and this subgroup exhibited higher inflammation in both blood and saliva compared to controls. However, both their healing rates and levels of inflammation in wounded tissue were comparable to controls, despite having higher levels of both local and systemic inflammation. These results suggest that periodontal disease and its associated inflammation does not affect acute inflammatory responses or healing in healthy oral tissues. These results have direct clinical implications on the timing and management of surgical procedures in patients with untreated periodontitis. Further, inflammatory responses and healing rates to acute oral injury do not appear affected by levels of either local or systemic inflammation. This has broader clinical implications regarding what constitutes risk factors for delayed healing in mucosal tissues.

#### 103) Abstract 1136

##### HIGH FREQUENCY HEART RATE VARIABILITY AND ART MAKING: WHAT DOES EMOTION HAVE TO DO WITH IT?

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**Background:** Art Therapy involves the use of visual art-making within a therapeutic relationship. Different materials are used in Art Therapy to facilitate self-expression, and are posited to differentially affect the emotional response of the user, based on the material's level of fluidity. Cardiac vagal regulation, estimated by measures of Respiratory Sinus Arrhythmia (RSA), and specifically high frequency Heart Rate Variability (HF-HRV), has been theoretically and empirically related to emotion engagement and regulation. **Aim:** To examine the emotional self-reported and HF-HRV responses to art making with art materials characterized by differential levels of fluidity. We hypothesized that art making will elicit an emotional and HF-HRV response and the strength of the response will be affected by the fluidity of the materials. **Methods:** 50 adults (24 women) participated in a repeated measure experimental study. Each participant engaged in three art making sessions (Pencil, Oil pastels and Gouache paint). The order of art materials was randomized and balanced throughout the sample. Emotional response was measured using the Self-assessment manikin (SAM). HF-HRV measures were calculated based on ECG during art making and precipitating resting periods and recorded using a small wearable sensor (BioPatch™). **Results:** ANOVA indicated an interaction between art making and material, as well as a main effect for artmaking on HF-HRV which decreased during art making, compared to baseline ( $\eta_p^2=0.348$ ). Artmaking with Pencil was associated with negative valence while Gouache was associated with positive valence. No differences were found in emotional arousal or control. HF-HRV and self-reported emotional responses were not found to be correlated. **Conclusions:** As theorized, art making differentially affects emotional response and HF-HRV. This has implications for the potential influence of art making on health and the application of art therapy in health care settings. Further research is required to examine the longitudinal effect of artmaking on health and the relationship between art making, emotions, HF-HRV and health.



#### 104) Abstract 1149

##### SLEEP, PHYSICAL ACTIVITY, AND DIETARY INTAKE: ASSOCIATIONS WITH MOOD IN THIRD TRIMESTER WOMEN

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**Background:** Despite the common portrait of joy and happiness, mood disturbances are common during pregnancy, with a range of contributing factors. These include modifiable lifestyle factors – sleep, physical activity, and dietary intake. In non-pregnant and postpartum populations, poor sleep, low levels of physical activity, and excessively

fatty diets are associated with poorer mood. In pregnant populations however, these associations are less understood. The current study aims to address this gap in literature, by investigating how these three factors are associated with maternal depressive and anxiety symptoms.

**Methods:** A community sample of 91 healthy, third-trimester (~29 weeks gestation) first-time mothers ( $M_{age}=33.22$ ,  $SD_{age}=3.19$ ) completed self-report measures. Sleep duration and efficiency were assessed using the consensus sleep diary (modified), and daytime sleep-related impairments with the PROMIS Sleep-related Impairment–Short Form. Level of physical activity was measured using the Physical Activity Questionnaire, and dietary intake (energy intake and energy from fat) using the Australian Eating Survey. Depressive and anxiety symptoms were assessed with the PROMIS Depression and Anxiety–Short Form respectively. Hierarchical multiple regression analyses were undertaken, controlling for maternal age, mental health history, and pre-pregnancy Body Mass Index.

**Results:** In separate regression models, higher daytime sleep-related impairments uniquely contributed to significantly higher depressive and anxiety symptoms, while lower sleep efficiency uniquely contributed to higher anxiety symptoms. Sleep duration, level of physical activity and dietary intake were not significantly associated with either mood outcomes. When all three factors were examined collectively in one model, both higher daytime sleep-related impairment and lower level of physical activity made significant contributions to higher depressive symptoms, beyond the effects of covariates.

**Conclusion:** These results highlight the importance of perceived daytime consequences of poor sleep on new mothers' psychological wellbeing, and support sleep as a modifiable lifestyle factor for maternal mood disturbances. There is some evidence linking lower physical activity and higher depressive symptoms, and the associations between physical activity, dietary intake and mood require further investigation.

#### 105) Abstract 1457

##### **DIFFERENTIAL STRESS EFFECTS ON SEXUAL EXPERIENCES IN MEN AND WOMEN**

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**Background:** Chronic stress and acute stress in everyday life are thought to influence the frequency and quality of sexual experiences. This notion, however, is not supported by empirical evidence. This study examines influences of both chronic and acute stress on sexual activity, sexual desire, and sexual arousal in everyday life. The study uses a combination of frequent time-based measurements as well as event-based measurements to maximize ecological validity.

**Methods:** The sample consisted of 60 young and healthy subjects (50% women) living in a romantic relationship for at least one year. Subjects reported the presence (yes, no) of sexual desire and sexual arousal at several fixed time points per day for fourteen consecutive days using iPods. Further they completed pre-programmed event-based brief surveys regarding sexual desire and arousal after having engaged in a sexual activity. Acute stress was measured on a 5-point Likert scale at the time-based measurements. Chronic stress was assessed using the TICS.

**Results:** Mean frequency of sexual activity was 6.10 ( $SD=3.16$ ; range: 1–19). Men reported higher frequencies of masturbation than women ( $p<.001$ ), whereas frequency of sexual intercourse and frequency of sexual desire or sexual arousal was equal. Correlations between chronic stress and frequency of sexual activity were not significant. Chronic stress negatively correlated with frequency of sexual arousal in women's everyday life ( $r=-.36$ ;  $p<.05$ ), but not in men. For men, higher levels of acute stress reduced the chance of experiencing sexual arousal in everyday life ( $OR=0.66$ ;  $p<.001$ ), whereas chronic stress was not a significant predictor. Sexual desire was not affected by either acute or chronic stress in men. In women, higher levels of chronic stress reduced the chance of experiencing sexual desire ( $OR=0.95$ ;  $p<.05$ ), whereas higher levels of acute stress ( $OR=0.86$ ;  $p<.05$ ) and chronic

stress ( $OR=0.94$ ;  $p<.01$ ) reduced the chance of experiencing sexual arousal in everyday life. During sexual activity, neither men's or women's sexual desire or arousal was affected by stress.

**Discussion:** The results indicate that stress differentially affects sexual experiences in men and women. Future research should examine how stress affects the sexual experience in chronically stressed subjects and subjects experiencing sexual problems.

#### 106) Abstract 1545

##### **BODY SHAME AND SEXUAL SATISFACTION: A TEST OF MEDIATING FACTORS BASED ON OBJECTIFICATION THEORY**

*Suzanne L. Osman, PhD, Carolyn P. Merwin, Psychology, Salisbury University, Salisbury, MD*

Objectification theory suggests that women objectify their own bodies from an observer's perspective as a result of cultural exposure to sexual objectification (Fredrickson & Roberts, 1997). This can result in body shame - felt when a woman believes her body does not conform to a set of internalized cultural standards for the ideal body - and diminished attention to somatic states that are important for sexual satisfaction. Accordingly, body shame has been associated with lower sexual satisfaction (Calogero & Thompson, 2009; Claudat & Warren, 2014).

During sexual activity with a partner, objectification theory involves a woman's focus on how her partner may enjoy viewing her body. However, studies examining a woman's perceptions of her partner's attraction to and sexual satisfaction with her as explanatory factors are lacking. Theoretically, given the interpersonal nature of sexual activity and desire to be appealing, these perceptions should help explain the link between body shame and personal sexual satisfaction. College women in a relationship ( $n = 428$ ; mean age 19.3,  $SD = 1.4$ ; 79% European American) responded to the Body Shame Scale (BSS) (McKinley & Hyde, 1996), the Global Measure of Sexual Satisfaction (GMSEX) (Lawrance, Byers, & Cohen, 2011), and measures of perceptions of a partner's sexual satisfaction (PPSS) and attraction to oneself (PPA). As predicted, BSS was negatively related to GMSEX ( $r=-.12$ ,  $p=.014$ ), PPSS ( $r=-.13$ ,  $p=.009$ ), and PPA ( $r=-.13$ ,  $p=.009$ ). GMSEX was positively correlated with PPSS ( $r=.81$ ,  $p<.0001$ ) and PPA ( $r=.30$ ,  $p<.0001$ ). Tests of simple mediation using linear regression provide support for perceived partner sexual satisfaction and perceived partner attraction as mediators of the association between body shame and sexual satisfaction: The association between BSS and GMSEX ( $R^2=.02$ ,  $B=-.13$ ,  $p=.008$ ) was attenuated after including PPSS in the model ( $B=-.02$ ,  $p=.58$ ), and after including PPA in the model ( $B=-.09$ ,  $p=.047$ ).

A woman's body shame may influence perceptions of how her partner experiences her body, which in turn may impact her own sexual satisfaction. Perceptions of how others view one's body may be important to consider in future research on objectification theory and satisfaction. Future research may include men and non-college populations, and examine other theoretically related body constructs and mental health outcomes.

#### 107) Abstract 1243

##### **MID-RANGE TRAIT CONSCIENTIOUSNESS IS ASSOCIATED WITH OPTIMAL CARDIOVASCULAR FUNCTIONING DURING ACUTE STRESS EXPOSURE**

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Conscientiousness (C), a stable personality trait across the lifespan, is associated with positive health behaviours. Socio-behavioural mechanisms mediating this relationship have been proposed, but it is unclear whether direct psychosomatic mechanisms also contribute to the relationship between C and health. Little research includes

measurements of mid-range C, which may be more adaptive than high or low C during stress. This study examines whether mid-range C exhibits healthy, systematic associations with cardiovascular stress reactivity, and whether it should be considered in psychosomatic models of disease risk. Eighty-one female students underwent haemodynamic monitoring during a series of stress exposures and rest periods. C was assessed using self-report and analysed using ANOVA. Results indicated period  $\times$  C interactions for systolic blood pressure ( $F[2, 78] = 4.73, p = .011$ ) and diastolic blood pressure ( $F[2, 78] = 3.303, p = .042$ ). High and low C displayed exaggerated reactivity and failed to adapt to stress across multiples exposures, while mid-range C showed lower reactivity overall. Mid-range C may be the most adaptive profile for coping with acute stress with long-term implications for future cardiovascular disease outcomes.

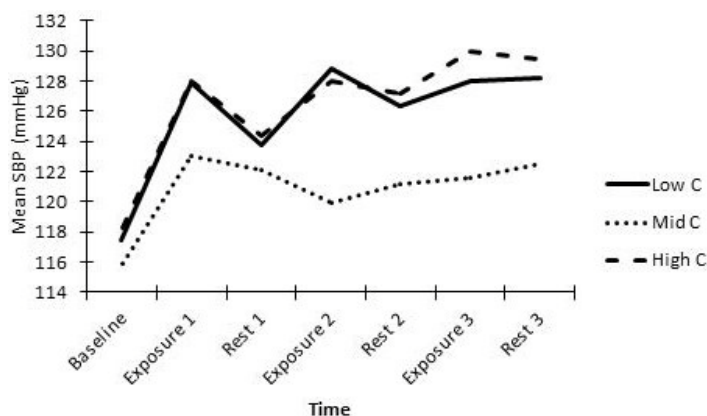


Figure 1. Illustration of SBP across phases for low ( $n = 29$ ), mid ( $n = 25$ ), and high ( $n = 27$ ) conscientiousness.

#### 108) Abstract 1132

##### SYMPTOM SEVERITY AND PSYCHOLOGICAL STRESS ARE INDEPENDENT FROM LOW-GRADE INFLAMMATION IN IRRITABLE BOWEL SYNDROME

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**Objective.** The role of underlying biological processes in Irritable Bowel Syndrome (IBS) is subject of ongoing discussion. Especially patients with post-infectious onset (PI-IBS) are supposed to have intestinal low-grade inflammation and possibly represent a subgroup with distinct pathophysiology.

**Aims of the study:** to investigate intestinal inflammation in IBS, with special regard to differences between IBS and PI-IBS, and to examine correlations with psychological variables and symptom burden.

**Methods.**  $N = 44$  IBS patients with a mean age of  $43.8 \pm 15.3$  years, 33 (75%) female, were examined in psychological variables (Perceived Stress PSQ, Resilience CD-RISC, Quality of life VAS, and Psychological Distress HADS), symptom severity (IBS-SSS), and faecal Calprotectin (fCal) as marker of intestinal inflammation. Obtained fCal values were classified into four categories of gastrointestinal inflammation: negative ( $<50 \mu\text{g/g}$ ), marginal ( $50-100 \mu\text{g/g}$ ), positive ( $100-250 \mu\text{g/g}$ ), and severe ( $>250$ , to be excluded from further analysis).

**Results.** Two patients were exceeding the fCal threshold of  $250 \mu\text{g/g}$  and excluded from further analysis. In the remaining  $n=42$  disease onset was  $9.6 \pm 9.1$  years ago, with 9 (21%) cases to be classified as PI-IBS. IBS was classified severe in 25 (60%), moderate in 14 (33%) and mild in 3 (7%) cases. 29 (69 %) showed negative, 9 (21 %) marginal, and 4 (10 %) positive signs of intestinal inflammation. In PI-IBS, distribution of fCal values was highly similar: 6 (67 %) negative, 2 (22

%) marginal, and 1 (11%) positive. Correlations between psychological variables and fCal were small and nonsignificant (PSQ: .012; CD-RISC: -.204; HADS: .018;), except VAS ( $-.311, p < .05$ ). Equally, IBS-SSS and fCal prove to be almost uncorrelated (.055).

**Conclusion.** Low-grade inflammation was present in about one third of patients, with no difference between PI-IBS and regular IBS. Psychological wellbeing and symptom severity seem to be largely independent from inflammation.

#### 109) Abstract 1510

##### PRELIMINARY EVIDENCE OF A POSITIVE RELATIONSHIP BETWEEN RESTING HEART RATE VARIABILITY AND TRAIT WORRY IN A SAMPLE OF WOMEN

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Resting high frequency heart rate variability (HF-HRV) is widely recognized as a psychophysiological index of emotion regulation and overall health. Lower resting HF-HRV is typically associated with both poorer emotion regulation and overall health, in addition to maladaptive psychological states including trait worry. Worry can be defined as the repetitive negative thinking of possible future outcomes or events. Interestingly, research has found that in women, the relationship between resting HF-HRV and negative psychological states can be positive. For example, one study found greater HF-HRV in depressed compared to non-depressed women, and found the opposite and more intuitive pattern in men. Another study found a similar pattern in women, such that anxious women showed greater higher HF-HRV compared to non-anxious women. However, studies have not yet examined the relationship between resting HF-HRV and worry in women. We sought to examine this relationship in a healthy college-aged sample of women ( $n = 56$ ). Using an electrocardiogram (ECG), continuous heart rate data were measured as participants first completed a 5-minute resting period. HF-HRV was calculated in accordance with Task Force (1996) guidelines. Participants then completed several questionnaires, including the Penn State Worry Questionnaire (PSWQ), which measures an individual's self-reported everyday tendency to worry. Controlling for body mass index, age, and respiration, results showed a significant positive relationship between resting HF-HRV and PSWQ scores and ( $r = .311, p < .05$ ), such that women with higher resting HF-HRV reported more trait worry. These data are counterintuitive, but are in line with findings regarding negative affect and resting HRV in women. Overall, the results highlight the importance of considering gender as a moderating factor in psychophysiological research. Future research will include a comparison group of men.

#### 110) Abstract 1133

##### EXAMINATION OF THE ROLE OF HYPERVENTILATION IN VASOVAGAL SYMPTOMS AMONG VOLUNTARY BLOOD DONORS

Johanna M. Harrison, MSc., Psychology, McGill University, Montreal, Quebec, Canada, Christopher R. France, PhD, Psychology, Ohio University, Athens, Ohio, Pierre M. Robillard, MD, Medical Affairs, Hema-Quebec, Montreal, Quebec, Canada, Thomas Ritz, PhD, Psychology, Southern Methodist University, Dallas, Texas, Blaine Ditto, PhD, Psychology, McGill University, Montreal, Quebec, Canada Many studies have found that blood donors who experience unpleasant vasovagal reactions are less likely to donate again. While some

behavioral techniques such as applied muscle tension have been shown to be helpful in reducing vasovagal reactions in the blood donation environment, the decrease in symptoms is often not clearly associated with exercise-related changes in blood pressure and heart rate. Recent research focusing on the contribution of hyperventilation-induced hypocapnia to vasovagal reactions suggests an additional possible mechanism in blood donation symptoms. The aim of the present study was to investigate the role of hyperventilation in vasovagal symptoms in the voluntary blood donation context.

**Method:** 304 generally inexperienced ( $X = 2.6$  previous donations) blood donors were recruited at university and college clinics run by the provincial blood supply organization. Portable capnometers were used to monitor participant respiration rate and end-tidal carbon dioxide ( $\text{ETCO}_2$ ), as a measure of hyperventilation, throughout the donation process, with mean values calculated for pre-donation (before arrival at the chair), donation (in the chair), and post-donation (recovery area). Heart rate and blood pressure were also measured pre- and post-donation. Vasovagal symptoms were assessed using the self-report Blood Donation Reaction Inventory (BDRI) and the presence or absence of nurse initiated treatment for vasovagal symptoms.

**Results:** Controlling for age, sex, and donation experience, donors who experienced symptoms generally displayed lower HR and DBP though the effects were due to baseline (pre-donation) influences. By contrast, consistent with the hyperventilation hypothesis, donors who were treated for symptoms had significantly greater decreases in  $\text{ETCO}_2$  from pre-donation to the donation and post-donation periods. Similarly, participants who reported more symptoms on the BDRI experienced significantly greater drops in  $\text{ETCO}_2$  during the donation and post-donation periods. Furthermore, of the physiological variables, only decrease in  $\text{ETCO}_2$  level during the donation period predicted significant variance in rating of intention to donate again. **Conclusions:** Results suggest that hyperventilation-induced hypocapnia influences vasovagal symptoms in the blood donation context and may be associated with donor return rate.

#### 111) Abstract 1579

##### RELATIONSHIP AMONG DEPRESSION SYMPTOMS, FACETS OF MINDFULNESS, AND PARASYMPATHETIC ACTIVITY IN PATIENTS WITH HF

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Heart failure (HF) is a growing concern, with over 5.1 million cases in the United States alone and a 5-year mortality rate. Research shows that elevated depression symptoms are related to worse prognosis in patients with HF. Reduced parasympathetic activity is associated with elevated depression symptoms, as well as increased morbidity and mortality in HF, suggesting a potential mechanism affecting HF prognosis. In contrast, trait mindfulness is associated with increased parasympathetic activity. By discovering the relationships among depression symptoms, trait mindfulness, and autonomic activity, more focused treatments may be developed for HF patients. **Methods:** 115 Stage C heart failure patients (mean age =  $65.69 \pm 8.23$  and left ventricular ejection fraction ( $\text{LVEF}\%$ ) =  $45.07\% \pm 11.48\%$ ) were examined for depression symptoms using the Beck Depression Inventory (BDI), facets of mindfulness using the Five Facets of Mindfulness Scale (FFMS), and parasympathetic activity by examining heart rate recovery after bicycle ergometry. **Results:** Regression analyses adjusting for age,  $\text{LVEF}\%$ , education, and antidepressant status revealed an association between lower heart rate at recovery from bicycle ergometry (signifying higher parasympathetic activity) and mindfulness facet, Nonreactivity to Inner Experience (change  $R^2 = .11$ ,  $p < .01$ ). Whereas, increased heart rate at recovery was found in patients with elevated depression symptoms (change  $R^2 = .046$ ,  $p = .017$ ). Finally, Nonreactivity to Inner Experience was negatively related to depression symptoms (change  $R^2 = .10$ ,  $p < .001$ ). **Conclusions:**

Aspects of mindfulness that may promote increased parasympathetic activity in HF patients, in contrast to lower parasympathetic activity in HF patients with elevated depression symptoms. Through the understanding of the various facets of mindfulness, interventions may be developed that may improve physiological responses in patients with HF who have elevated depression symptoms, which may improve HF prognosis.

#### 112) Abstract 1345

##### TEST-RETEST RELIABILITY OF PARAMETERS INDEXING CIRCADIAN VARIATION IN VAGAL ACTIVITY

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**Background:** Vagal activity fluctuates in a pattern of diurnal variation with a maximum in the early morning. The diurnal variation in vagal activity can be expressed using methods of cosine estimation. The circadian variation patterns (CVP) are quantified by three parameters: MESOR – the rhythm adjusted 24h mean; Amplitude – the distance between MESOR and the maximum value of the cosine curve; and acrophase – the phase shift of the amplitude. While the MESOR indices of vagally mediated heart rate variability (HRV) parameters are thought to index overall vagal activity, the amplitude indices are thought to index day to night differences. However, no study has yet investigated the short- or long-term reproducibility of CVP parameters. We expected that differences in everyday life have greater impact on the amplitude, resulting in a lower short-term reliability compared to MESOR.

**Method:** Seventy-four men (age  $41 \pm 7$ ) had repeated 24h measures available (one day between measures). The holter monitor VarioPort (Becker Meditec, Karlsruhe, Germany) sampling at 512Hz was used. Vagal activity was indicated using estimates of HRV (RMSSD, pNN50, SDNN) as well as heart rate (HR). Between day associations were calculated using Pearson's correlation (PC). Short-term reliability was assessed using intra-class correlation (ICC) and Bland-Altman analysis (bias  $\pm$  limits of agreement).

**Results:** The results demonstrate an excellent ICC (all  $> .82$ ) and PC (all  $> .83$ ) for the MESOR. Amplitude measures were good (ICC & PC  $> .71$ ) for RMSSD and pNN50, but fair (ICC & PC  $< .60$ ) for SDNN & BPM. Acrophase measures were fair (ICC & PC all  $< .60$ ). Bland-Altman plots show no systematic bias between measurement days.

**Discussion:** This study demonstrates high reliability for the rhythm adjusted 24h mean in primarily vagally mediated and mixed measures as well as heart rate in men. As hypothesized, lower but still good reliability was demonstrated for the amplitude but only in vagally mediated HRV measures and not in the mixed measure or HR. This indicates a higher day to day variability of the vagally mediated HRV amplitude parameters and more trait-like MESOR parameters. Future studies should expand to female samples, collect potential (time lagged) determinates of the diurnal variation using ecological momentary assessments and investigate the long term test-retest reliability.

### 113) Abstract 1452

#### RELATING LIFE-TIME TRAUMATIC EVENTS AND POST-TRAUMATIC STRESS SYMPTOMS TO RESTING STATE CARDIAC VAGAL ACTIVITY IN YOUNG ADULTS

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The present study sought to investigate how lifetime experience of trauma in a student population might relate to heart rate variability (HRV), while also assessing potential correlates of both post-traumatic stress disorder (PTSD) and HRV, such as emotion regulation and anxiety. Previous research has associated PTSD with reduced HRV, however, there is question as to the effect of trauma on HRV in individuals who report traumatic experiences, but do not develop PTSD. Relatedly, the association of PTSD and HRV has been primarily assessed in clinical populations; research in non-clinical populations is limited. In the present study resting state baseline measures of HRV were taken in undergraduate student volunteers ( $n=101$ ), as well as an assessment of trauma history and relevant mood and anxiety disorder symptoms. As expected, individuals who reported a lifetime traumatic event also reported greater anxiety, worry, and difficulties in emotion regulation, compared to individuals who did not report a lifetime traumatic event. In addition, vagal activity indexed by HRV in traumatized individuals was inversely related to greater scores on the Trauma Screening Questionnaire ( $r = -.325$ ,  $p = .041$ ). Unexpectedly, individuals reporting a lifetime traumatic event showed greater resting state vagal activity compared to those not reporting a lifetime traumatic event ( $t_{(86)} = 7.082$ ,  $p = .009$ ). These differences were robust even after controlling for a host of covariates that are known to decrease HRV. Our findings suggest that trauma-exposure itself may have different implications than trauma exposure paired with a PTSD diagnosis. One interpretation is that these findings may indicate a critical, perhaps pre-existing difference between individuals who have experienced trauma, and the subset of those who then go on to develop PTSD. In accordance with research showing that active emotion regulation is associated with increase in HRV, our results suggest that the experience of a traumatic event might be associated with an up-regulation of vagal activity, needed to encounter everyday difficulties.

### 114) Abstract 1125

#### THE HEMODYNAMIC PATTERN OF VASOVAGAL SYNCOPE MAY BE DEFINED BY THE INITIAL CARDIOVASCULAR RESPONSE TO HEAD-UP TILT

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Vasovagal syncope (VVS), a transient loss of consciousness provoked by emotive or orthostatic stress, is due to cerebral hypoperfusion caused by an abrupt decline in blood pressure (BP). In a related study, VVS was shown to be due to either an abrupt stroke volume (SV) or heart rate (HR) mediated decline in cardiac output (CO) or to an abrupt decline in total peripheral resistance (TPR). Specific patterns of hemodynamic response were related in part to the clinical triggers for VVS as well as to age and gender. Many have postulated that VVS is a simple reflex caused by "paradoxical" activation of cardiac afferents leading to cardioinhibitory or vasodepressor responses. Our data suggest that VVS is considerably more complex and subject specific. The goal of the present study was to examine whether the ultimate physiological strategy (decline in CO or TPR) underlying VVS could already be determined by the initial hemodynamic response to the simulated orthostatic stress of head-up tilt (HUT).

Beat-to-beat finger BP and EKG were continuously recorded from 58 healthy medication-free adults aged 17-61 (mean =  $31 \pm 11$  years, 23 male), undergoing HUT testing for VVS. CO and TPR were derived from BP using Modelflo software. Data were divided into three periods: baseline, initial transition to HUT and end HUT (excluding presyncope). Nine 20-second averaged data segments comprised each period. Three-way Period (3) X Time (9) X Hemodynamic group (2) repeated-measures ANOVAs were performed on physiological data, controlling for the effects of Age and Sex. The two hemodynamic groups were CO and TPR fainters. The Period X Time X Hemodynamic group interaction effect was not significant for BP, but the profiles of the TPR and CO groups were significantly different for HR ( $p=.036$ ), SV ( $p=.008$ ), CO ( $p<.001$ ) and TPR ( $p<.001$ ). For example, in contrast to CO fainters, TPR fainters displayed a large increase in TPR initially following HUT that was maintained until presyncope. These findings remained significant even when the final period was excluded and only data from the initial two periods were analyzed. These results suggest that the strategy by which one initially maintains blood pressure during the orthostatic stress may define the strategy by which blood pressure is abruptly lost at VVS. Further work is needed to determine the underlying mechanisms defining this strategy.

### 115) Abstract 1205

#### SOCIAL SUPPORT IN REAL LIFE IS ASSOCIATED WITH CARDIOVASCULAR RECOVERY FOLLOWING ACUTE STRESS EXPOSURE

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**Objective:** Recent experimental work examining the stress buffering role of social support has concentrated mainly on cardiovascular reactivity with less attention paid to cardiovascular recovery. Further, the quality of our social relationships, both positive and negative, on recovery indices still remain unclear.

**Methods:** Eighty-seven healthy young adults completed psychometric measures positive (e.g. friendship, emotional and tangible) social support and negative (e.g., hostile and rejection) support) in real life and participated in a standardised cardiovascular stress-testing protocol. Cardiovascular functioning as indexed by blood pressure (SBP, DBP), heart rate (HR), cardiac output (CO) and total peripheral resistance (TPR) was assessed before, during and after acute stress exposure.

**Results:** Social support, both positive and negative, was not associated with cardiovascular reactivity to stress. However, positive social support, in particular friendship ( $B = .26$ ,  $p = .01$ ) and emotional ( $B = .25$ ,  $p = .02$ ), was associated with SBP recovery, such that those reporting better social support had slower recovery from stress. A similar pattern was observed for friendship support for DBP ( $B = .23$ ,  $p = .03$ ). In contrast, hostile support was associated with faster DBP recovery DBP ( $B = -.21$ ,  $p = .04$ ). These associations withstood adjustment for a range of potential confounds (e.g. body mass index, age and sex).

**Conclusion:** The present study found positive social support in real life to be have an adverse impact on cardiovascular recovery from stress following stress exposure, whereas negative social support to have a positive impact on recovery. Our findings are at odds with some of the existing studies in the field but may be explained by contextual comparison, i.e. support not readily available at stress exposure.

### 116) Abstract 1368

#### DISEASE CONTROL ASSOCIATED WITH CENTRAL NERVOUS SYSTEM AND AIRWAY INFLAMMATORY MARKERS IN ASTHMA PATIENTS

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**Background:** Asthma impacts an estimated 300 million individuals worldwide (GINA, 2016). While prevalence rates continue to increase by nearly 15% in the US over the past decade, there is no cure for asthma (CDC, 2011). As such, the primary goal for the successful treatment patients is asthma control, which is frequently assessed with peripheral airway inflammation measured by the fraction of exhaled nitric oxide (FeNO). Central nervous system (CNS) pathways associated with airway inflammation are largely unknown; however, recent research indicates increased likelihood of mild cognitive impairments in older asthma patients compared to older healthy individuals.

**Methods:** We therefore tested, in twenty individuals with asthma, associations among left hippocampal metabolites with Magnetic Resonance Spectroscopy (MRS) and 1) asthma control with the Asthma Control Questionnaire (ACQ), Asthma Control Test (ACT) and 2) fraction of nitric oxide in exhaled breath (FeNO) with an electrochemical analyzer. After measurements of asthma control and airway inflammation, participants underwent a 3T MRS scan with volumes of interest placed in the left hippocampus. Total N-acetylaspartate (NAA), Myo-Inositol (MI), and Glutamate (Glu) concentrations were calculated in reference to Creatine (Cr) and water.

**Results:** Airway inflammation (FeNO) was negatively correlated with asthma control by ACT,  $r=-.72$ ,  $p<.01$  and ACQ,  $r=.68$ ,  $p=.02$ , controlling for age and gender. The ratio of MI, a putative marker of glial inflammation, standardized to Cr, was positively correlated with FeNO,  $r=.56$ ,  $p=.05$ , controlling for age and gender.

**Discussion:** These preliminary findings suggest that patients with lower asthma control have elevated levels of airway inflammation, which is associated with putative markers of hippocampal glial inflammation. Associations among both self-report and physiological markers of asthma control with hippocampal glial inflammation may indicate CNS consequences of poor asthma control. As hippocampal glial inflammation measured by MI is associated with mild cognitive impairment in other chronic diseases, future research is warranted to examine associations among asthma control, hippocampal MI, and cognitive function.

### 117) Abstract 1357

#### ASSOCIATION OF TRAIT NEGATIVE AFFECT AND ASTHMA MORBIDITY IS MEDIATED BY SYMPTOM ATTRIBUTION AND TRIGGER IDENTIFICATION.

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The episodic nature of asthma symptoms such as wheeze, dyspnea, and cough can cause individuals to perceive their symptoms as unpredictable, and to be uncertain about the causes or triggers of their asthma symptoms. This may contribute to experiencing these symptoms as threatening, particularly in individuals scoring high on Trait Negative Affect (NA), a trait that is associated with excessive (overgeneral) identification of danger and deficient safety learning.

In asthma and other conditions, Trait Negative Affect (NA) is associated with morbidity and elevated symptom self-report. Furthermore, in asthma, NA is associated with increased attribution of symptoms to asthma (illness identity) or to attribution of symptoms to asthma medication. The aim of this study was to replicate and extend the relationship between NA and causal attribution by testing the association between NA and illness identity, and NA and asthma

trigger identification. Furthermore, we aimed to and test the role of these overgeneral attributions in explaining the relationship between NA and asthma morbidity.

We recruited individuals with asthma ( $n=186$ ) from the community and secondary care clinics. Participants filled out an online survey, consisting of questions on asthma morbidity (asthma control test (ACT), asthma related-quality of life (AQLQ)), as well as questions on trait positive and negative affect (PANAS), illness identity (IPQ-R), and asthma trigger identification (ATI). We fitted different mediation models exploring the role of symptom attribution and trigger identification in explaining the association between NA, and ACT and AQLQ scores.

Higher levels of NA were associated with worse ACT ( $r=-.32$ ,  $p<.001$ ) and AQLQ ( $r=-.22$ ,  $p=.004$ ). Mediation models showed that associations between NA and asthma morbidity (ACT and AQLQ) were mediated by illness identity (IPQ-R), and asthma trigger Identification (ATI), showing no significant direct effects of NA in models that included these indirect effects.

Effects of NA on asthma control and quality of life are mediated by overgeneral causal attributions, which manifest both in increased illness identity, as well as increased asthma trigger identification. Further research into the development of these causal attributions as well as methods to prevent their occurrence may help to improve disease burden for individuals with asthma.

### 118) Abstract 1472

#### INSOMNIA WITH OBJECTIVE SHORT SLEEP DURATION: IMPACT ON HYPERTENSION RISK AND INSOMNIA TREATMENT RESPONSE

*Jack Edinger, Ph.D., Medicine, National Jewish Health, Denver, CO*

**Introduction:** It has been proposed that insomnia with objective short sleep duration ( $< 6$  hours/night) represent a severely ill phenotype with increased risk for cardio-metabolic morbidity and poor treatment response. The current series of studies was conducted to test these assumptions.

**Method:** Study 1 comprised a secondary analysis of data obtained from larger study testing the reliability/validity of insomnia diagnoses. The study sample consisted of 255 adult volunteers ( $n = 165$  women; 64.7%) meeting current diagnostic criteria for insomnia disorder ( $M_{Age} = 46.2$  years,  $SD_{Age} = 13.7$  years). Logistic regressions assessed the odds ratios of having current hypertension among those insomnia patients with short sleep duration  $>6$  h as determined by two nights of in lab polysomnography. Study 2 compared the responses of insomnia patients with actigraphically-determined short ( $<6$  hours/night) or longer ( $\geq 6$  hours/night) sleep to a course of cognitive-behavioral insomnia therapy -CBTI. The study sample consisted of 60 (53% female;  $M_{AGE}=56.1\pm 10.0$  yrs.) who completed 1 to 8 therapist-guided, CBT sessions. Outcome measures included an insomnia symptom questionnaire, nightly actigraphy and sleep diaries completed before, during and 6 months after treatment.

**Results:** The logistic regression analyses conducted with participants in Study 1 showed that insomnia with short sleep duration  $>6$  h was associated with a 3.59 increased risk of current hypertension compared insomnia with sleep duration  $\geq 6$  h. In Study 2, mixed-effects models controlling for age, sex, number of CBT-I sessions offered, and treatment provider showed individuals with insomnia and normal sleep duration had significantly higher insomnia remission [ $ISQ<36.5$ ;  $X^2(1, N=60) = 44.72$ ,  $P<.0001$ ], and were more likely to have a normative sleep efficiency on actigraphy [ $SE>80\%$ ;  $X^2(1, N=60) = 21$ ,  $P<.0001$ ], a normal level of MWASO 2(1,  $N=60$ ) = 37.85,  $P<.0001$ ], and a  $>50\%$  decline in MWASO [ $X^2(1, N=60) = 60$ ,  $P<.0001$ ] by the study endpoint than were individuals with insomnia and short sleep duration.

**Conclusion:** Findings support the hypothesis that objective short sleep duration may be an important biomarker for a severe insomnia phenotype with enhanced risk for medical comorbidities and poor insomnia treatment response. Studies to reduce the comorbidity risk and enhance the treatment outcomes for such patients are needed.



#### 119) Abstract 1109

##### SLEEP DISTURBANCE OF DEPRESSIVE MEN WITH AND WITHOUT OBSTRUCTIVE SLEEP APNEA

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**Introduction:** Depression and obstructive sleep apnea (OSA) are known to be co-morbid. Patients with depression often visit sleep clinics for suspected OSA. The purpose of this study was to clarify clinical differences among male depressive patients with and without OSA.

**Methods:** The subjects were 127 male patients suffering from depression who were suspected to have OSA due to complaints of snoring, excessive daytime sleepiness and non-restorative sleep. They completed a semi-structured interview, including the Hamilton Depression Rating Scale polysomnography (PSG). Characteristics of the patients were analyzed as a function of the severity of OSA.

**Results:** Based on the apnea-hypopnea index (AHI) in the 127 male patients with depression, 49 patients (39%) were categorized as non-OSA ( $AHI < 5$ ), 51 patients (40%) as mild to moderate OSA ( $5 \leq AHI < 30$ ), and 27 patients (21%) as severe OSA ( $30 \leq AHI$ ). Male patients with depression with severe OSA were more obese than those without OSA. Patients with mild to moderate OSA were older than patients without OSA. There were significantly more smokers among those with severe OSA and more ex-smokers among those with mild to moderate OSA. Dunnett's test adjusted for age, body mass index, and smoking showed that male depressive patients with severe OSA had less difficulty falling asleep at bedtime than those without OSA (non-OSA  $0.5 \pm 0.1$ , mild to moderate OSA  $0.5 \pm 0.1$ , severe OSA  $0.1 \pm 0.1$ ). There was no significant difference in ESS score or HAM-D score across OSA severity groups.

**Conclusion:** Except for obese, less difficulty falling asleep at bedtime was a characteristic of male depressive patients with severe OSA.

#### 120) Abstract 1474

##### SLEEP ARCHITECTURE PROFILES IN INSOMNIA PATIENTS

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**Introduction:** In the past few years interest in insomnia phenotypes has grown. However, little is known about the phenotypic presentation of sleep architecture in those with insomnia. Some investigators have used PSG as a method to identify those who complain of insomnia and also have objectively verified short sleep. Sleep stages have not been considered in this characterization. The objective of this study was to determine if unique sleep architecture profiles could be identified in those who complain of insomnia.

**Methods:** Data were obtained from a dual-site study testing the interrater reliability of the DSM-IV and ICSD-2 insomnia nosologies. As part of the study, all subjects had two consecutive nights of PSG recorded. This sample was comprised of 189 adults (69.2% women;  $M_{Age} = 45.6 \pm 13.7$  yrs.) who met research diagnostic criteria for insomnia. Participants were not excluded if they had sleep apnea. Latent profiles were extracted from the PSG data using Mplus with mixture modeling. Variables in the model included percent of stages N1, N2 and N3 and REM sleep. Covariates, also from PSG data, were the apnea-hypopnea index (AHI), average heart rate during sleep (AHR), and sleep efficiency (SE).

**Results:** A three class solution was the best fitting model. Sleep architecture Profile 1 (52% prevalence) had the following distribution: N1 (10%), N2 (62%), N3 (12%), and REM (16%). Profile 2 (42% prevalence) had an architecture distribution of: N1 (9%), N2 (47%), N3 (22%), and REM (22%) and Profile 3 (6% prevalence) had a distribution of: N1 (29%), N2 (42%), N3 (21%), and REM (8%). The first two profiles were distinguished from the final profile by a both a

higher sleep efficiency and higher average heart rate during sleep. There was a trend for a higher AHI to distinguish the final profile from the first two.

**Discussion:** Three sleep architecture profiles were extracted from this group of individuals with insomnia. The first profile had relatively more N2 and less N3 sleep than the other profiles. The second profile seemed to have a typical distribution of sleep stages. Profiles 1 and 2 were associated with a higher AHR rate and higher SE than Profile 3. The third profile had a higher percentage of light sleep (N1) and seemed to be associated with more severe sleep apnea.

#### 121) Abstract 1438

##### SOCIAL MEDIA TOOLS IN HEALTH CARE: ARE THEY EFFECTIVE?

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Despite their rapid growth in notoriety among patients and health care providers alike, little is known about the opportunities, mechanisms of actions and the pitfalls of using social media tools (SMTs) in health promotion. We conducted a systematic "review of reviews" comprising 11 existing meta-analyses and reviews of interventions, observational, qualitative and mixed methods studies that used SMTs (Facebook, Twitter, patients' websites and communities etc.) for various healthcare issues. The analyses revealed that there are certain advantages of using SMTs like: patient involvement, general positive perception of SMTs by patients, sharing of health-related content and patient empowerment. The disadvantages were more numerous and referred to insufficient evidence of added effectiveness in interventions using SMTs, opportunity for fraud, doctor defamation and reduced health providers' control over information flow. While acknowledging the opportunities of SMTs use in health care, almost all reviews were moderated in showing enthusiasm for such an approach and point to a persistent need of rigorous studies and of a set of procedures to appropriately include SMTs in health care interventions.

#### 122) Abstract 1172

##### EFFECTS OF SOCIAL-EVALUATIVE THREAT AND COGNITIVE LOAD ON THE CORTISOL STRESS RESPONSE

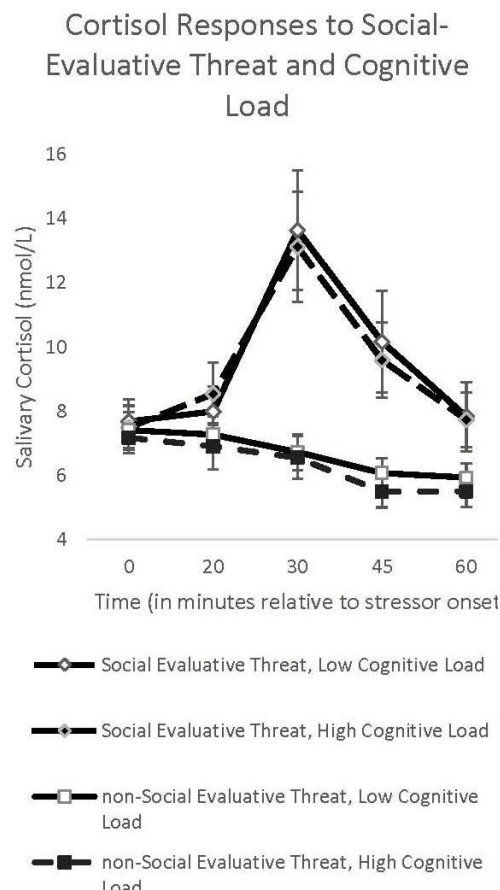
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Current evidence suggests that exposure to social-evaluative threat (SET) can elicit a physiological stress response, especially in cortisol, which is an important regulatory hormone. However, an alternative explanation of these findings is that socially-evaluative laboratory tasks are more difficult, or confer greater cognitive load, than non-evaluative tasks. Thus, the current experiment tested if SET, rather than CL, is truly an "active ingredient" in eliciting a cortisol responses to stressors. Healthy undergraduate students ( $n = 142$ , 65% female) were randomly assigned to one of four speech stressor conditions in a fully-crossed 2(SET: non-SET vs SET) by 2 (CL: low vs high) stressor manipulation. SET was manipulated by the presence (SET) or absence (non-SET) of two evaluators while CL was manipulated by the presence (high) or absence (low) of a tone-counting task during the speech stressor. After the stressor, participants rested in the laboratory. Salivary cortisol was collected at +0, +20, +30, +45, and +60 min relative to stressor onset and log-transformed for analyses.

Multi-level linear modeling, with within-person cortisol at level 1 and between-person participant at level 2, was used. As would be predicted if SET was the "active ingredient" in eliciting the cortisol stress response, there was a significant interaction between SET and time ( $\gamma = .02$ ,  $t(141) = 7.48$ ,  $p < .001$ ) and SET and time-squared ( $\gamma = -0.0002$ ,  $t(141) = -6.78$ ,  $p < .001$ ). Follow-up analyses indicated that the

two SET conditions elicited the typical cortisol increase and decrease in cortisol following the stressor while two non-SET conditions did not elicit any changes in cortisol levels (see figure). CL did not have any main effects ( $p=.58$ ) or interact with time ( $p=.55$ ), nor did it interact with SET ( $p=.55$ ). Results were not altered by the inclusion of gender, BMI, start time, race, and ethnicity in the model.

These findings suggest that SET is a central aspect of stressors that elicit a cortisol stress response, and additional difficulty or cognitive load is not. This finding has implications for understanding the qualities of stressful experiences in day-to-day life that may activate the cortisol stress response and ultimately result in altered or dysfunctional stress responding, with its concomitant risks of disease.



#### 123) Abstract 1381

##### **A FRIEND A DAY COULD KEEP POOR HEALTH AT BAY: SOCIAL ENGAGEMENT AND ILLNESS SEVERITY AMONG PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE**

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**Objective:** Although much research has examined the role of familial support on health outcomes, less is known about the impact of non-familial support on indicators of illness severity and physical functioning. The purpose of the current study of patients with chronic obstructive pulmonary disease (COPD) was to test whether social engagement with family and friends predicted lower illness severity, breathlessness and functional impairment. We also explored whether the combined effect of engagement with family and friends would have additive beneficial effects on these health outcomes.

**Methods:** Data were collected as part of a multi-site, multi-cohort study of adults with COPD and their caregivers. The 89 patients who reported having an informal caregiver were used for cross-sectional analyses. Caregivers were spouses/partners (49%), adult children (26%), other family members (19%) or close friends (7%). Participants completed measures of illness severity (e.g., COPD severity scale), pulmonary symptoms (MRC breathlessness) and functional impairment (ADLs), and social engagement (Lubben Social Network Scale). A series of multiple regression analyses tested the research questions.

**Results:** We found that support from friends significantly predicted lower illness severity and breathlessness (standardized beta weights ranged from  $-.32$  to  $-.38$ ,  $P$ s  $< .01$ ), but not functional impairment. Interestingly, engagement with family members had no significant effects on these health indicators. There were no additive effects of engagement with family and friends, indicating that engagement with friends uniquely contributed to positive health outcomes.

**Conclusions:** Our findings suggest that having a family caregiver or feeling socially engaged with family members may not be enough to maintain optimal health when living with COPD. Isolation from friends or one's broader social network could be a potential risk factor for greater illness severity and poorer lung functioning.

#### 124) Abstract 1465

##### **HUMAN RELATIONS OF TELEMARKETERS IN PORTUGUESE CALL CENTERS**

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The current human relations of the so-called "relationship agents with clients", are characterized by job strain, loneliness and fear in call centers, the decrease of loving and family relationships and the non-participation in groups. This exploratory qualitative study was conducted among 12 telemarketers who work on average 10+ hours per day, in different companies, with a precarious bond system, and no established career. Three clinical interviews each were conducted. In verbal interactions with customers, telemarketers continuously answer messages and respond with timed and recorded scripts without intersubjective expression. They identify themselves with impersonal models, and reduce they're personal identity to outdoor images (Andy Wharol). The performance is evaluated individually, using quantitative methods. The climate is of maximum competition and minimal cooperation, including moral and sexual harassment, leaving each individual worker isolated. Two thirds of the interviewed isolate themselves outside work, living at they're parents, without romantic relationships or parenting projects. They do not participate in social organizations. Exhausted, angry, and most of them with physiological symptoms. When dominates the blame, they are depressed or with persecutory reactions. They suffer from sleep disorders, hearing impairment, visual, spine, skin, respiratory, cardiovascular, obesity, without medical or psychological care.

**Conclusion:** We hypothesized that this organization of work favors the surface identity pathology, leaving a part of the 60,000 portuguese telemarketers vulnerable to mental and somatic pathologies. Objectives: - Conduct a mixed study concurrent on the results, with a significant quantitative sample to test specific hypotheses, based on the following techniques: -The first interview about relationships and work organization, (Mendes-Pedro et Alls), bullying questionnaires (Gasparo and Pêze), sexual harassment questionnaire (Amassou et alls), validated questionnaire about attachment relationships (from M- Main AAI), Karolinska Exhaustion Disorder Scale, Beck questionnaire and Somatic Symptom Disorder SS-D-12. - To promote the opening of a network of consultations on mental and somatic health in Portugal.

### 125) Abstract 1639

#### OVERLAP OF ELECTRONIC AGGRESSION AND SCHOOL BULLYING IN NEW DELHI, INDIA

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**Background:** Violence has far reaching effects on mental and physical health of adolescents. With the changing milieu of social interaction, Internet has become the new arena for bullying. In this study we explore the self-reported acts of in-person bullying and fighting as well as the experience of bullying through electronic media. We also looked at the gender differences in bullying and victimization behavior.

**Methods:** A cross-sectional survey of eighth graders of two public schools in Delhi was conducted in July –September 2013. Self-reported bullying behavior of 174 students (13-15 years old) was measured using pretested questionnaire. We measured socio-demographic features, peer mediated acts of in-person bullying, fighting, victimization, experience of cyber harassment and its emotional and behavioral impact.

**Findings:** Out of the 174 students studied, two-thirds had heard about cyber harassment. Knowledge among girls was better than boys (85% vs 64%). Of total participants, 8% indulged in acts of aggression online and 17% report being victimized by them. Prevalence of in-person bullying, fighting and victimization by either was 16%, 12% and 17% respectively. Males were more likely to bully and fight in-person than females. They were also more likely to be the victims of both online and offline aggression. Though, the genders were comparable in case of cyber-bullying. School bullying and electronic forms of aggression were closely correlated. Also, it had an emotional and behavioral impact on children.

**Implications for Research and Policy:** The problem is complex with different type of bullying behavior being closely interwoven. Researchers, teachers, parents and administrators should gain better understanding of electronic aggression to ensure safe and appropriate applications of technology.

### 126) Abstract 1495

#### PARTNER SUPPORT AS A MODERATOR OF THE RELATIONSHIP BETWEEN NEUROTICISM AND HPA AXIS FUNCTIONING

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**Introduction:** Neuroticism has been shown to predict acute stress reactivity, including activation of the Hypothalamic-Pituitary-Adrenal axis and secretion of its end product cortisol, in both naturalistic and laboratory settings. Research findings to date on the relationship between neuroticism and elevated cortisol secretion across the Trier Social Stress Test (TSST: Kirschbaum et al., 1993) have been mixed (Oswald et al., 2006; Kirschbaum et al., 1992; Tyrka et al., 2007). Partner support may significantly reduce cortisol secretion across the TSST (Kirschbaum et al., 1995; Ditzen et al., 2008). In order to examine whether partner support would moderate the effects of neuroticism on acute stress reactivity, we compared two conditions, the standard TSST protocol, and a partner support modification of the TSST (PSTSST).

**Methods:** Condition 1 participants were 43 undergraduates (67.4% female), age 17 to 56 ( $M = 22.9$ ,  $SD = 7.9$ ). Condition 2 participants were 18 undergraduates (66.7% female), and their partners age 19 to 46

( $M = 26.2$ ,  $SD = 8.79$ ). Cortisol was collected five times over 65 minutes during and after the stress tests. Cortisol outcome variables included Area Under the Curve with respect to ground and increase (AUCg and AUCi), and slope of rise and recovery. Neuroticism and its 6 facets (anxiety, anger, depression, self-consciousness, immoderation and vulnerability) were assessed using the IPIP-NEO (Goldberg et al., 2006; http). Total Neuroticism (TN) and study condition were regressed on the cortisol outcome variables.

**Results:** The interaction of TN and condition significantly predicted AUCg ( $B = -6.73$ ,  $t(60) = -2.02$ ,  $p = 0.048$ ); TN explained 12.2% of the variance ( $p = 0.057$ ). A similar pattern was found for recovery slope ( $p = 0.044$ ). Anxiety and Depression interacted with condition to predict AUCg and rise (all  $p < .05$ ). Depression and condition interacted to predict recovery ( $p = 0.010$ ). Across all analyses, higher TN, Anxiety and Depression significantly predicted greater cortisol secretion across the TSST, but not across the PSTSST.

**Conclusion:** It is possible that partner support may moderate the impact of neuroticism on acute stress reactivity. Interventions targeting partner support may work to reduce the impact of neuroticism on stress reactivity.

### 127) Abstract 1076

#### SMILE WHILE YOUR HEART IS BREAKING? THE PROTECTIVE CARDIOVASCULAR EFFECTS OF SMILING DURING SOCIAL EXCLUSION.

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Smiling has been connected to numerous behaviors ranging from higher quality social interactions to better mental health. While little research has applied smiling to physical health, there is evidence that smiling alters physiological responses to stress and physical pain. Thus, this study sought to extend these findings by testing whether experimentally and covertly manipulated smiling would buffer the negative physiological effects of social pain, that is, the experience of rejection. Participants ( $N=334$ , 64.7% female,  $Mage=20.63$ ) were randomized to hold chopsticks in their mouths in different orientations to manipulate their face into either a Duchenne smile (i.e., a “sincere” smile with both eye and cheek activation) or a neutral facial expression. A cover story obscured study hypotheses from participants by informing them that the study was focused on multitasking behavior. Participants were connected to Mindware physiological equipment to monitor heart rate throughout the study every minute and self-reports of felt rejection were taken immediately following the stressor. To manipulate rejection, half of the participants were randomized to be socially included or excluded while playing Cyberball, an online ball-tossing game reliably used for manipulation of exclusion. Results revealed that participants excluded during Cyberball reported feeling significantly more excluded, rejected, and disconnected ( $ps < .001$ ) than included participants. Multi-level modeling revealed significantly different heart rate trajectories between groups ( $p < .001$ ). Specifically, the rejected/neutral facial expression group had a steeper increase in heart rate following exclusion as compared to the rejected/Duchenne smiling group. These results suggest that Duchenne smiling during a painful social rejection dampens its negative physiological consequences. Future research should continue to investigate the mechanisms and reliability of this association.

### 128) Abstract 1484

#### DETERMINANTS OF THE QUALITY OF ROMANTIC PARTNER INTERACTION - THE ROLE OF PERCEIVED RESPECT, RELATIONSHIP DURATION, AND RELATIONSHIP HAPPINESS

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**Objective:** Positive interactions between romantic partners in everyday life provide a valuable source for social support. It is conceivable that relationship characteristics such as relationship duration and overall relationship quality determine the quality of partner interaction. Perceived respect between partners, which is an understudied concept, may constitute another possible determinant of partner interaction as the lack of perceived respect may elicit stress and other negative emotional states. The aim of this study was to investigate determinants of the quality of romantic partner interaction in everyday life.

**Methods:** Using an ambulatory assessment design, 57 healthy participants (47% women) were investigated over a 14-day period. Participants completed a brief survey at 6 time points throughout the day (morning, 11 am, 2 pm, 5 pm, 8 pm, bedtime) using a pre-programmed electronic diary device. Participants were asked to evaluate the quality of partner interaction (VAS 0-100; negative – positive) and perceived respect (VAS 0-100) given by the partner whenever the partner was present at the time of the momentary assessment. In addition, participants provided information about relationship duration ( $M = 3\text{yrs}$ ,  $SD = 2.9\text{yrs}$ , range: 1-18yrs), how happy they are in their relationship (single item from Marital Quality Questionnaire), and general perceived respect given by their partner (VAS 0-100).

**Results:** The partner was present at 26% of all measurement time points throughout the assessment period. Momentary positive partner interaction was positively predicted by momentary perceived respect as well as by relationship duration and relationship happiness. Interestingly, momentary perceived respect was unrelated to general perceived respect.

**Discussion:** These findings indicate that perceived respect may constitute an important component of the quality of romantic partner interaction in everyday life. Future research may further investigate the role of respect in interpersonal interactions and its role in social support.

#### 129) Abstract 1143

##### THE ASSOCIATIONS BETWEEN PSYCHOSOCIAL STRESSORS AND PERCEIVED POOR HEALTH DAYS IN SEXUAL MINORITIES LIVING IN AN UNDER-RESOURCED REGION OF THE SOUTHERN UNITED STATES

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Lesbian, gay, and bisexual (LGB) men and women continue to share a disproportionate burden of physical and mental health conditions in the United States. In small, southern metropolitan areas of the US, there are greater perceived identity-related stressors and health disparities coupled with a general lack of resources to meet the health needs of the LGB community. Perception of health is a good indicator of such biomarkers as blood pressure, body mass index, metabolic and immune markers in underserved populations (Dowd & Zajacova, 2010) and predictive of disability and morbidity (Idler & Kasl, 1995). The present study assesses the associations between critical psychosocial stressors and self-perceptions of physical health. The current sample consists of 241 LGB individuals (74% White, 55% men) between the ages of 18 and 76 ( $M_{\text{age}} = 36$ ) from a larger sexual minority health needs assessment conducted in the Central Savannah River Area (CSRA) of Georgia and South Carolina. Participants completed a series of questions regarding discrimination, perceptions of safety, intimate partner violence, financial situation, and perceived health in the past 30 days. While each of the psychosocial stressors were related to perceived health in bivariate analyses, multiple regression (Adjusted  $R^2 = .084$ ) indicated that perceived safety ( $\beta = -.140, p < .05$ ), partner violence ( $\beta = -.127, p < .05$ ), and financial situation ( $\beta = -.173, p < .05$ ) were the significant independent predictors of perceived “bad health” days. These findings suggest that, while perceived

discrimination continues to be an important factor to address, physical safety and economic assurances may be more proximal stressors for the LGB community in under-resourced areas, such as the CSRA. These stressors impact perceptions of poor health, with the potential for detrimental health effects and increased healthcare costs. The fundamental needs of sexual minorities in under-resourced areas should be prioritized by health providers and advocates, while continuing to address systemic sources of sexual minority stress.

#### 130) Abstract 1177

##### PSYCHOSOCIAL AND HEALTH NEEDS OF LESBIAN WOMEN: AN ANALYSIS OF WITHIN GROUP DIFFERENCES AMONG SEXUAL MINORITIES

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Women's health research has not routinely considered sexual orientation despite evidence that lesbian women (LW) may experience higher risk of health concerns, like obesity, compared to heterosexual women. The minority stress theory posits that minority group members face unique stressors related to stigma, which may contribute to higher rates of psychological distress, impacting overall health. Although discerning differences between heterosexuals and sexual minorities is useful, examining within-group differences among sexual minorities can shed light on unique risk factors for LW. The present study aimed to explore differences in health, psychological, and psychosocial factors between LW and gay men (GM), with a focus on LW.

This study uses data collected in 2016 as part of health assessment study of LGBT adults in the Central Savannah River Area of Georgia and South Carolina using a self-administered online survey ( $N = 436$ ). The current study ( $n = 276$ ) utilized a range of variables, including demographics, mental and physical health, healthcare utilization, and psychosocial constructs.

This study consisted of 109 LW (mean age = 38; 63% Caucasian) and 167 GM (mean age = 37; 66% Caucasian). Compared to GM, LW reported worse levels of overall general health,  $t(240) = -2.75, p = .01$ , more days of poor physical health over the past 30 days,  $t(151) = -2.59, p = .01$ , and higher BMI levels,  $t(140) = -4.29, p < .01$ . LW also reported experiencing higher rates of suicidal thoughts than GM,  $t(154) = 2.37, p = .02$ . LW more frequently endorsed not seeing a mental health provider,  $t(164) = 2.38, p = .02$ , and not filling prescriptions,  $t(175) = 1.94, p = .05$ , despite need. LW reported significantly more concern about lack of LGBT employment opportunities,  $t(237) = 2.24, p = .03$ , and higher levels of discomfort disclosing sexual orientation to family,  $t(100) = 1.93, p = .05$ , and healthcare providers,  $t(179) = 2.38, p = .02$ .

Results indicate that LW may experience unique health concerns compared to GM. Higher levels of BMI reported by LW may help explain the reported worse physical health and more days of poor health of LW. LW also experience higher rates of suicidality and unique stressors related to employment, disclosure, and health care access. More research focus is warranted to better understand the unique risk factors impacting LW.

#### 131) Abstract 1048

##### TECHNOLOGY-ASSISTED COGNITIVE-BEHAVIORAL THERAPY INTERVENTION FOR END-STAGE KIDNEY DISEASE

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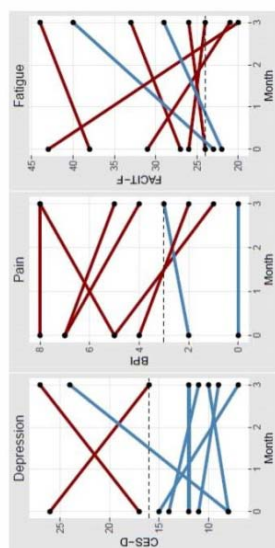
**Methods:** Participants were receiving dialysis at a local HD facility for end-stage kidney disease. Patients were screened for clinically-elevated

levels of depressive symptoms, pain and/or fatigue (i.e.,  $\geq 3$  on the PHQ-2 or  $\geq 4$  on the BPI or  $\geq 24$  on the FACIT-F). For 8-10 weeks, patients met with a therapist for approximately one hour a week during regularly scheduled HD sessions via a secure, HIPAA compliant, video-conferencing platform (Vidyo). Patients used a study tablet equipped with headphones and microphone. The intervention included CBT modules that have been empirically tested to treat depression, fatigue, and pain, such as identifying and changing maladaptive thought patterns and coping. Participants completed psychosocial and health questionnaires before starting the intervention (baseline) and at 3 months follow-up. Data will also be collected at 6- and 12-months.

**Results:** Out of 11 patients initially enrolled, 3 dropped out (1 moved to a different HD unit, 1 withdrew consent, 1 was found to be ineligible after enrollment due to cognitive impairment). The resulting sample included 8 adults (mean age=58.7; 50% female; 50% African American). At baseline, frequency of elevated symptoms was as follows: (1) 25% of patients had elevated depressive symptoms (CES-D $\geq 16$ ); (2) 75% had elevated pain (BPI average pain $\geq 3$ ); (3) 75% had high levels of fatigue (FACIT-F $\geq 24$ ); and (4) 10% had elevations in all three symptoms. Patient acceptability, satisfaction, and adherence with the video-conferencing sessions was high; more than 95% completed all 8 prescribed sessions. The intervention was also well received by renal providers. No significant changes in depression, fatigue, or pain were observed at 3 months (Figure 1), although there was small improvement in SF-36 Physical Component Summary score [mean change=3 $\pm$ 3,  $p=0.04$ ]. Relevant lessons were learned from this pilot study, including how to improve screening, technology, and facilitation of the intervention.

**Conclusion:** Our technology-assisted CBT intervention for end-stage kidney disease patients was feasible, well-accepted and required minimal additional resources in the outpatient HD setting. Although our study was not powered to examine effectiveness of the intervention, we observed improvements in some patient-reported outcomes, which warrants further evaluation in larger clinical trials.

Figure 1. Individual change in depression, pain, and fatigue symptoms from baseline to 3-month follow-up (N=8).



Note. Month 0=baseline (data collected before patients started the intervention). For each panel, the horizontal dashed line indicates elevated levels of symptoms: (1) CES-D $\geq 16$ ; (2) BPI average pain $\geq 3$ ; and (3) FACIT-F $\geq 24$ .

### 132) Abstract 1286

#### RACE DIFFERENCES IN RESTING AND STRESS-RELATED HEART RATE VARIABILITY IN PATIENTS WITH HEART FAILURE

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African Americans experience a significantly greater incidence of heart failure (HF), with an earlier age of onset, greater rates of cardiovascular co-morbidities and a higher prevalence of left ventricular dysfunction, compared to Whites. Autonomic nervous system impairment, characterized by low heart rate variability (HRV), has been associated with increased mortality risk in patients with HF. Intriguingly, studies in healthy populations have noted that African Americans tend to exhibit *higher* resting HRV, which is putatively cardio-protective. In contrast, other work has suggested that African Americans show attenuated task-related changes in HRV, or HRV reactivity, which may reflect diminished autonomic flexibility. Despite these indications, the clinical significance of racial differences in HRV and HRV reactivity remains unknown. The goals of the present study were to examine whether ethnic differences in HRV, 1) persist in the context of significant cardiac impairment, and 2) extend beyond resting conditions to periods of psychological stress. The study sample was comprised of 154 patients (49% African American) recruited from the heart failure programs of two academic medical centers in the Southeast US. Heart rate was assessed continuously via ECG during a 10 minute resting baseline period and during the completion of three mental stress tasks (i.e. Mirror Trace, a speech preparation period, and a public speaking task). A global HRV reactivity score was obtained by averaging change (i.e. task – baseline) scores across all stressor tasks. Separate general linear models revealed a significant main effect for ethnicity on both baseline HRV and HRV reactivity. African Americans exhibited significantly higher resting HRV ( $p < .01$ ), and greater HRV reactivity ( $p < .05$ ) compared to Whites. These effects remained robust even after accounting for established adverse predictors of HF disease severity and low HRV (i.e. left ventricular ejection fraction, N-terminal pro b-type natriuretic peptide, hypertension, diabetes, depressive symptoms). These data are the first to demonstrate that the paradox of higher HRV in African Americans remains evident in the context of HF and persists beyond resting conditions.

### 133) Abstract 1099

#### EMA-ASSESSED MOMENTARY POSITIVE RACIAL IDENTIFICATION AND AMBULATORY BLOOD PRESSURE IN AFRICAN AMERICAN YOUNG ADULTS

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**Background:** Ecological momentary assessment (EMA) has been shown to capture psychosocial factors in a way that strongly relates to cardiovascular outcomes. Global reports of racial identity (specifically, positive identification with one's racial group) have shown mixed associations with health-related outcomes. EMA might have utility here given that there is evidence that one's identification with a group and the extent to which one feels positively about this group identity might fluctuate. Whether EMA-assessed racial identity is associated with ambulatory blood pressure (AmBP) in African-American young adults has not yet been examined. **Objective:** The purpose of the study was to determine whether EMA-assessed racial identity is associated with AmBP. **Methods:** 55 healthy, African American young adults with valid data were included in analyses (mean age 23 years, range 18-30 years; 75% female). Racial identity was assessed using hourly EMA for 2 consecutive days during waking hours using 2 items adapted for EMA from the Multidimensional Inventory of Black Identity (Sellers, 1997), i.e., "Right now, I am proud to be Black" (positive private regard) and "Right now, being Black is an important part of my self-image" (racial centrality). AmBP was assessed using Oscar2 monitors worn for 2 consecutive days and nights and automatically inflated



hourly. **Results:** An interclass correlation (ICC) indicated that within-participant variation accounted for approximately 36% of the total variation in momentary racial identity scores. In a mixed model adjusted for age, sex, income, body mass index (BMI), and momentary biobehavioral and psychosocial covariates (momentary smoking, physical activity, body temperature, talking, and posture), higher momentary positive private regard for one's race was significantly associated with lower diastolic AmBP,  $F(1,904) = 4.32, p < .05, b = -1.58$ . **Conclusions:** EMA-assessed positive identification with one's racial group (positive private regard) fluctuated within individuals and was associated with AmBP. Potential mechanisms, such as positive emotions and social connections, need to be explored. Findings extend the literature that suggests that positive racial identification has health implications as well as the literature suggesting that EMA has utility for examining connections between psychosocial factors and cardiovascular health.

134) Abstract 1606  
**LIFE EVENT VALENCE AND BREAST CANCER RISK: THE PROMOTING EFFECT OF NEGATIVE VALENCE LIFE EVENTS**

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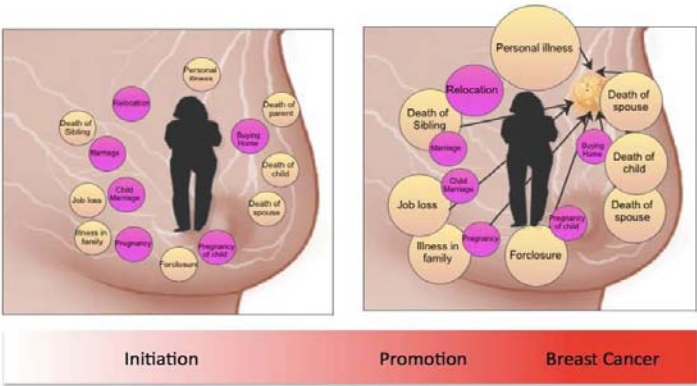
**Background:** The influence of stress on breast cancer risk remains unknown. The goal of this study was to determine the effect of stress in the form of salient positive and negative valence (+/-) life events (LEs) on primary invasive breast cancer risk. We hypothesized that salient (-) LEs increase breast cancer risk, while salient (+) LEs attenuate this increased risk. **Methods:** A case-control design including 664 cases identified through the Cancer Surveillance Program of Orange County (CSPOC) and 203 population-based controls was used. Participants completed a risk factor questionnaire, which included a life event section. Fourteen salient LEs of positive or negative valence were used to quantify stress exposure. A baseline model was constructed and odds ratios (ORs) calculated using multivariate unconditional logistic regression. **Results:** (-) LEs were associated with increased breast cancer risk. The OR for 4 (-) LEs showed a 2.81 fold increase in breast cancer risk (OR=2.81, 95% CI=1.47-5.36). A significant dose-response relationship between lifetime (-) valence LEs and breast cancer risk was found. Previous personal illness increased breast cancer risk by 3.6 fold (OR=3.60, 95% CI=2.50-5.20). Conversely, abortion was associated with a 45% decrease in breast cancer risk (OR=0.55, 95% CI=0.34-0.89). Salient (+) LEs did not have a significant effect on breast cancer risk. However, they seemed to buffer the adverse effect of salient (-) LEs on breast cancer risk. **Conclusion:** This study supports the role of salient (-) LEs in promoting breast cancer development with a possible buffering effect of salient (+) life events.

Table 4: Univariate and multivariate odds ratios for lifetime negative valence life event sum

	Cases (N=664)		Controls (N=203)		OR	95% CI		Adj OR*	95% CI	
	N	%	N	%						
0 events	25	12.32	38	5.72	1			1		
1 event	30	14.78	108	16.27	2.37	1.24	4.52	2.26	1.11	4.59
2 events	44	21.67	103	15.51	1.54	0.83	2.85	1.74	0.88	3.44
3 events	39	19.21	125	18.83	2.11	1.14	3.92	2.20	1.11	4.35
4+ events	65	32.02	290	43.67	2.94	1.66	5.20	2.81	1.47	5.36
P trend**						P=0.0065		P=0.0334		

\* Adjusted for reference age, age at first full term pregnancy, menopausal

status, family history of breast cancer, HRT use, smoking history, education level, race/ethnicity and physical activity  
 \*\* P trend computed by incorporating negative valence LE sum in the logistic regression model as a continuous variable



135) Abstract 1046  
**DAILY STRESS DURING CHEMOTHERAPY: ASSOCIATIONS WITH CHANGES IN QUALITY OF LIFE, DEPRESSION, AND INFLAMMATION**

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**Background:** Adjuvant cancer treatment can be a time of significant psychological stress, but little is known about implications of daily stressors during chemotherapy for mental and physical health. **Methods:** Patients undergoing chemotherapy for gastrointestinal cancer used a smartphone application to complete end-of-day diaries describing each day's most stressful situation and rating it from 1 (not at all stressful) to 4 (extremely stressful). Participants also completed standardized questionnaires to assess depressive symptoms (CES-D) and quality of life (FACT) prior to and at the end of the four-week smartphone data collection and provided blood samples for complete blood counts as part of their routine clinical care. Neutrophil-to-lymphocyte ratio (NLR), a marker of systemic inflammation, was computed by dividing absolute neutrophils by absolute lymphocytes (M = 3.87, SD = 2.71). **Results:** 14 patients (M = 59.7 years old, range 40-74, 43% female) provided data for 15 to 36 days, and daily stressor ratings were averaged for each participant (M = 2.03, SD = .74; M = 13.35 ratings, range 1-29 ratings). Mean daily stressor rating was significantly correlated with mean neutrophil-to-lymphocyte ratio (NLR) during study participation ( $r(14) = 0.55, p = .044$ ), indicating higher levels of inflammation in patients reporting greater stress. Mean daily stressor rating also predicted significant decreases in FACT quality of life ( $\beta = -.25, \Delta R^2 = .04, p = .045$ ) and significant increases in CES-D depressive symptom scores ( $\beta = .43, \Delta R^2 = .16, p = .009$ ) at the end of the study, adjusting for baseline values of self-report measures. **Conclusions:** Higher daily stressor ratings during chemotherapy were associated with higher levels of systemic inflammation and predicted decreases in quality of life and increases in depressive symptoms over time. These preliminary data are consistent with the hypothesis that reducing daily stress during cancer treatment may have implications for both psychological and biological outcomes. Future analyses of these data will also examine whether passively sensed data such as location,



activity, and heart rate permit real-time detection of daily stress during chemotherapy, which could enable just-in-time adaptive stress management interventions.

### 136) Abstract 1045

#### **FITBIT STEP COUNTS AS A PREDICTOR OF POSTOPERATIVE RECOVERY: LINKS TO READMISSION AND PATIENT-REPORTED FUNCTION AFTER CANCER SURGERY**

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**Background:** Mobility is encouraged after surgery but is rarely monitored systematically or linked to clinical or subjective outcomes. Commercial activity trackers such as Fitbit devices permit passive quantification of mobility and may identify patients at risk for poor postoperative outcomes.

**Methods:** Patients diagnosed with metastatic peritoneal cancer and scheduled for curative surgical resection with intraperitoneal chemotherapy were enrolled at their preoperative clinic visit. Quality of life was assessed using the FACT before surgery and at three-month follow-up. Fitbit devices were placed on patients' wrists upon transfer from the ICU and worn for the duration of the inpatient stay. Information about readmission to any hospital within 30 and 60 days of discharge was extracted from electronic medical records.

**Results:** Fifty patients provided Fitbit data for analyses (mean age = 57.97, range = 31-81 years; 46% female; 47% with pseudomyxoma peritonei and 35% with colorectal cancer). Means steps per inpatient recovery day were computed for each patient (mean = 984 steps/day, range = 0-3186 steps/day). 42% of patients were readmitted within 30 days, and 46% were readmitted within 60 days. QOL decreased from baseline to 3 month follow-up, with the largest declines seen for Functional Well-Being (FWB; M reduced from 18.85 to 17.62). Older patients were more likely to be readmitted within 30 and 60 days of discharge and also took fewer steps during inpatient recovery. In unadjusted analyses, taking more steps was significantly associated with lower risk of 30-day ( $t(40) = 2.10, p = .042$ ) and 60-day readmission ( $t(40) = 2.53, p = .015$ ) and predicted improved FWB from baseline to 3 months after surgery ( $\beta = .26, p = .054$ ). After adjusting for age, neither age nor steps was significantly associated with readmission risk, while steps continued to predict improved FWB ( $\beta = .32, p = .031$ ).

**Conclusions:** Passively sensed step counts during inpatient recovery predicted risk of 30- and 60-day readmission and functional quality of life 3 months after cancer surgery. Older age confounded the association between steps and readmission, but steps predicted improved functional well-being even after adjustment for age. Although preliminary, results suggest that passively monitoring perioperative activity may identify patients at risk for poor postoperative outcomes.

### 137) Abstract 1489

#### **RELATIONSHIPS AMONG SLEEP, ADVERSE DRUG REACTION, AND QUALITY OF LIFE IN NON-METASTATIC BREAST CANCER PATIENTS RECEIVING POSTOPERATIVE ADJUVANT CHEMOTHERAPY**

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Many patients with cancer experience a range of side effects while receiving chemotherapy. Among them, chemotherapy-induced nausea and vomiting are a significant burden. Cancer patients are known to

experience psychological difficulties such as sleep and mood from cancer diagnosis itself.

We collected data from 198 patients who received highly emetogenic chemotherapy after surgery for breast cancer. We used questionnaires to measure morningness, sleep quality, insomnia, daytime sleepiness, anxiety, depression, cancer-related symptoms, and quality of life prior to the administration of chemotherapy, after the first cycle of chemotherapy, and one year later. Significant nausea and vomiting were defined according to a numeric rating scale (0 to 10) as follows:  $\geq 3$ , nausea;  $\geq 1$ , vomiting. To evaluate the adverse effects of chemotherapy, we compared the severity of cancer-related symptoms after the first cycle to that at the baseline. We evaluated the changes in quality of life to assess the long-term quality of life. We performed paired t-tests for the changes in time, logistic regression analysis for the risk factors of chemotherapy-induced nausea and vomiting, and multiple linear regression for the predictive factors related to the quality of life.

The symptoms showing the greatest change following initiation of chemotherapy were nausea and vomiting. The occurrence of chemotherapy-induced nausea was associated with poor sleep quality (odds ratio [OR] = 2.48, 95% confidence interval [CI] 1.13–5.46;  $P = 0.024$ ) and pre-treatment nausea (OR = 4.81, 95 % CI 1.84–12.62;  $P = 0.015$ ). Likewise, chemotherapy-induced vomiting was associated with poor sleep quality and pre-treatment nausea. The menopausal transition was found to be a risk factor in the secondary analysis based on hormonal change. After the initiation of chemotherapy, insomnia exacerbated significantly and maintained through one year. Insomnia and daytime sleepiness were significant predictors of the quality of life after one year of treatment.

Poor sleep quality before the initiation of chemotherapy was found to be associated with chemotherapy-induced nausea and vomiting. Menopausal transition, which is related to the change in sleep and mood, was also found to be a risk factor. Insomnia and sleepiness found in the post 1-year period of chemotherapy were significant predictors of quality of life.

### 138) Abstract 1122

#### **SCIENTIFIC BASED CONSTRUCTION OF A PSYCHO-EDUCATIONAL GROUP FOR CANCER PATIENTS**

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**Introduction:** It's well established that psychoeducational groups (PEG) in cancer patients enhance self-management and quality of life. Currently, these groups cover a myriad of topics and are becoming an integral part of service delivery, but although it's proven effectiveness literature is scarce relatively to construction methodology.

**Methods:** The model of Fur and Fulkerson (1982) entails two phases of development of a PEG: conceptual (purpose, goals and objectives) and operational (selection of content, exercises and evaluation).

The purpose was defined as enhance management of cancer and chemotherapy (CT). For selection of content, it was constructed questionnaires, according to a Likert scale, based on educational site "American Cancer Society".

This study was conducted in Portugal, a catholic caucasian population, and it was used a convenience sample.

**Results:** The sample was composed by 20 patients (mean age 59,95 years; 60% female), 14 doctors (43,5 years; 50% male) and 21 nurses (37,43 years; 95% female).

All were consensual in giving more importance to manage side effects and how CT works. Only doctors gave more importance to the role of the patient in their treatment and only nurses to explanation of cancer treatments. Patients had their own concerns as survival rates and medical exams.

**Conclusions:** The primary concern is CT side effects, but differences emerged: doctors believe that patients should have a more active role and patients need more technical information.

### 139) Abstract 1630

#### **MODERATING ROLE OF MINDFULNESS ON DAILY AFFECT AND CORTISOL IN LUNG CANCER PATIENTS**

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The physical and emotional complexities of the lung cancer journey may be met with daily fluctuations in positive (PA) and negative affect (NA), which may impact stress biology (e.g., HPA axis). However, mindfulness may ameliorate associations between affect and stress responses. We explored the between-subjects effect of mindfulness on cortisol regulation among lung cancer patients. We then examined the role of mindfulness in moderating within-subjects relationship between daily PA, NA and cortisol.

Lung cancer patients (N=40) completed a mindfulness questionnaire (FFMQ) and provided daily assessments of mood (PANAS) and salivary cortisol (waking, bedtime) over 10 days. Multi-level models were explored, with participants at Level 2 (between-subjects) and days at Level 1 (within-subjects) for three outcomes: waking log cortisol, bedtime log cortisol, diurnal cortisol slope. Waking cortisol was predicted from Level 1 variables assessed on the previous day; bedtime and diurnal cortisol slope were predicted from Level 1 variables on the same day. PA was tested as a mean across days (Level 2) and daily deviation from mean (Level 1). NA was tested as mean across all days (Level 2) and presence vs. absence of NA (Level 1). Main effects of mindfulness and interactions between mindfulness and between-person (Level 2) and within-person (Level 1) PA and NA predictors were tested. Models adjusted for age, gender, and early/late stage.

Between-subjects tests showed that mindfulness had no main effect on mean cortisol outcomes. A interaction between mindfulness and NA emerged as a trend: For days on which NA was not experienced, higher waking cortisol was observed on the following morning, and this effect was marginally stronger in patients with higher innate mindfulness ( $p=.08$ ). No significant findings with PA were observed.

In within-subjects tests, patients who endorsed no NA on a given day showed more rhythmic (i.e., higher) waking cortisol levels, and this effect was more pronounced in those who were more mindful. Innate mindfulness may play a protective role in the relationship between negative affect and stress biology. These data suggest plausible affective pathways by which mindfulness-based behavioral interventions may exert beneficial effects on physiological stress-response systems among lung cancer patients. Further examination in a larger sample is warranted.

### 140) Abstract 1126

#### **NOREPINEPHRINE INFLUENCES EARLY ATHEROSCLEROTIC EVENTS IN CULTURED HUMAN AORTIC ENDOTHELIAL CELLS AND THP-1 MONOCYTES**

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**Objective:** The progression of atherosclerosis may be exacerbated by exposure to emotional stress. These effects appear to be mediated by catecholamines, but mechanisms have not been elucidated.

Catecholamines have been linked to immune and inflammatory processes relevant to atherosclerosis, including leukocyte trafficking, chemotaxis, and adhesion molecule expression. However, it is not clear how catecholamines might affect these processes in atherosclerosis. The present study will investigate how the catecholamine, norepinephrine, influences the proximal atherosclerotic events of monocyte (MO) migration and MO adhesion to vascular endothelial cells (EC).

**Methods:** To evaluate cellular adhesion, cultured human aortic ECs (HAEC) and fluorescently labeled THP-1 monocytes (THP) were separately incubated with or without norepinephrine (NE, 10 nM – 1  $\mu$ M) for 6 hours. THP were added to HAEC monolayers for 30-60 minutes, and non-adherent cells removed by washing. Adhesion was quantified as the number of fluorescent THP cells bound/ $\text{mm}^2$  of HAEC area. The effect of NE (10 pM – 1  $\mu$ M) on THP migration was evaluated using a Transwell assay. After 2 or 4 hours, the number of migrated cells on the basal side of the membrane was quantified by light microscopy.

**Results:** Pre-treatment of HAEC with NE increased adhesion of THP to HAEC cell surface. Pre-treatment of THP had no effect on adhesion. Moreover, similar doses of NE increased migration of THP into the Transwell membrane.

**Conclusions:** Exposure of HAEC, but not THP, to physiological levels of NE increased adhesion of THP to HAEC in an *in vitro* assay. These results indicate that catecholamines may increase adhesion of MO through their action on EC, promoting the infiltration of MO into the vessel wall. Furthermore, similar concentrations of NE stimulated migration of THP *in vitro*, indicating that catecholamines may act on MO through a different mechanism to promote recruitment of these cells to developing atherosclerotic lesions. These findings suggest two mechanisms by which emotional stress, mediated by catecholamines, may influence proximal atherosclerotic events, and could explain why adrenergic antagonism is an effective treatment for early cardiovascular disease. Future experiments will assess the adrenergic receptor subtypes responsible for effects on adhesion and migration.

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### 141) Abstract 1218

#### **PREVALENCE AND PREDICTORS OF SLEEP PROBLEMS IN PATIENTS WITH IMPLANTABLE CARDIOVERTER DEFIBRILLATORS (ICDS)**

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**Background:** Although sleep disturbances are highly prevalent and associated with poor health outcomes in the cardiac population, to date little research has focused on their assessment and management. Therefore, the current study focuses on the prevalence and predictors of sleep problems in patients with an Implantable Cardioverter Defibrillator (ICD). In addition, we examined the impact of sleep disturbance on health related quality of life.

**Methods:** Data were collected as part of the WEB-based distress program for ICD patients (WEBCARE) trial. ICD patients completed questionnaires at time of implantation, 3-, 6-, and 12 months afterwards. Sleep problems were assessed with the corresponding item #3 of the Patient Health Questionnaire 9 (PHQ-9). A total of 195 patients was included in the analyses.

**Results:** Mean age of the sample was 60 years with majority of the patients being male (82%). The prevalence rates of sleep problems were 67%, 58%, 54%, and 57% at baseline, 3-, 6-, and 12 months post implant respectively. Multivariable logistic regression revealed that a younger age ( $OR=0.96$ , 95%CI 0.92-0.99;  $p=.012$ ) and high Negative

Affect (OR=4.47, 95%CI 1.52-13.17;  $p=.007$ ) were associated with more sleep problems. However, sleep problems were not associated with an impaired health related quality of life at 12 months.

**Conclusions:** Sleep problems are highly prevalent in ICD patients. Negative Affect and younger age predicted sleep problems one year after implantation independent of demographic, clinical, and psychological variables. Due to the negative effects of sleep disturbances on cardiac health, identifying patients who are at risk could contribute to better health outcomes.

#### 142) Abstract 1231

##### **SOCIAL INHIBITION AND NEGATIVE AFFECTIVITY ELICIT DIFFERENT EMOTIONAL AND PHYSIOLOGICAL RESPONSES TO SOCIAL STRESS IN CARDIAC PATIENTS - THE PSYCHE STUDY**

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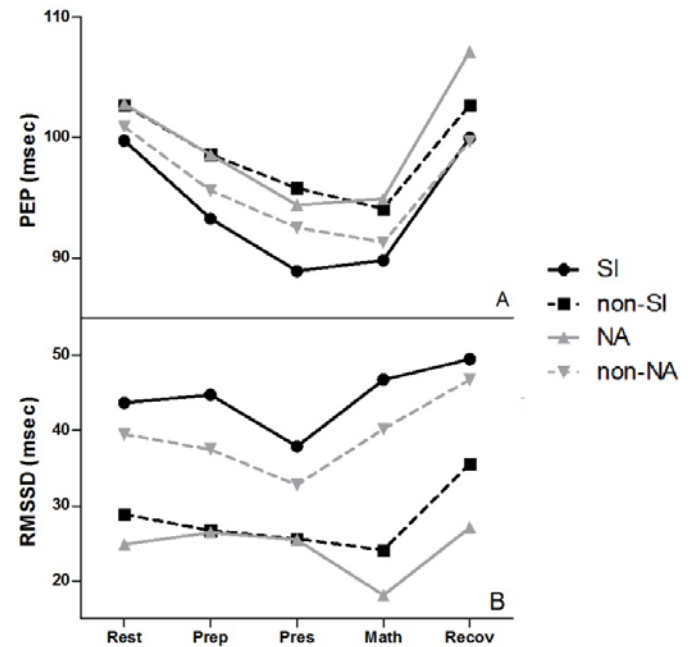
**Background:** Type D personality is related to poor cardiovascular prognosis. The interaction between the two Type D components, social inhibition (SI) and negative affectivity (NA) likely is responsible for these adverse effects. However, physiological and psychological mechanisms relating these two components to poorer cardiovascular outcomes are largely unknown. Therefore, we examined the associations of NA and SI with physiological and emotional responses to social stress in patients with coronary artery disease.

**Method:** From an ongoing study (PSYCHE) we used data from 44 participants (Mean age=66±12, 83% male) for this preliminary analysis. Participants underwent the Trier Social Stress Test (TSST) while an ECG and ICG were recorded to obtain RMSSD and the pre-ejection period (PEP) to gauge parasympathetic and sympathetic cardiac drive. Patients reported perceived negative emotional states pre and post stress. We analyzed negative emotions with high (e.g., tense) and low (e.g., sad) cortical arousal separately. SI and NA were assessed by the DS14.

**Results:** Opposite autonomic responses were observed for SI and NA. While SI was related to a hyperreactive sympathetic stress response, NA was associated with a blunted sympathetic response (see Figure 1a). NA was related to a less active and SI to a more active parasympathetic tone throughout. Parasympathetic reactivity was low, with a higher withdrawal response to the speech task for patients with high SI and a larger response to the math task in patients with high NA (see Figure 1b). Emotional and physiological responses correlated only minimally (RMSSD:  $r=-.05/r=.09$ ; PEP:  $r=-.12/r=.15$ ) with low and high cortical arousal emotions. Higher levels of NA were significantly associated with an increased response on both low and high cortical arousal negative emotions. In comparison, for SI, emotional reactivity was generally more dampened.

**Conclusion:** These preliminary findings suggest that SI and NA are characterized by different autonomic and emotional stress responses. This implies that the mechanisms connecting NA and SI to cardiovascular outcomes via stress reactivity may work through distinctly different pathways. While the increased sympathetic reactivity might play a mechanistic role towards cardiovascular prognosis for SI, for NA the low parasympathetic tone and response may serve as an intermediate risk marker.

Figure 1. PEP (A) and RMSSD (B) measurements



#### 143) Abstract 1111

##### **EFFECTS OF NT-PRO BNP ON ANXIETY IN DEPRESSED PATIENTS WITH CORONARY ARTERY DISEASE (CAD)**

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Patients with CAD have an increased prevalence for depression, anxiety and distress, which are most likely not only influenced by psychological adaptation, but also modulated by neurobiological processes. Natriuretic peptides may be involved in such mechanisms as they are increased in heart disease and seem to have an anxiolytic-like function. Negative correlations with anxiety were found for (pro-)ANP and recently also for (NT-pro)BNP. However, longitudinal associations of NT-proBNP and anxiety have yet to be assessed.

We therefore used data from the Stepwise Psychotherapy Intervention for Reducing Risk in Coronary Artery Disease (SPIRR-CAD) trial from baseline to 24 months follow-up to study the association of baseline NT-proBNP with anxiety. Linear regression was calculated to assess the correlation of NT-proBNP ( $N=506$ ) with baseline anxiety (HADS). In repeated-measures ANOVA ( $N=309$ ) baseline NT-proBNP was used to predict anxiety at baseline and 1, 6, 12, 18 and 24 months follow-up.

At baseline, higher NT-proBNP was associated with poor physical functioning, more severe heart failure but less anxiety. Higher NT-proBNP at baseline also significantly predicted lower levels of anxiety at all follow-up visits. When adjusted for age, this prediction remained significant for baseline, 1, 6 and 12 months. Repeated measures ANOVA comparing the lowest to the three highest NT-proBNP quartiles (i.e.  $\leq 86$  ng/l vs.  $> 86$  ng/l) further revealed a trend ( $p=.055$ ) for a time\*NT-proBNP interaction and a significant ( $p=.018$ ) interaction of time\*NT-proBNP\*sex. In subgroup analyses by sex, the time\*NT-proBNP interaction was significant ( $p=.023$ ) in women ( $N=59$ ), suggesting elevated baseline anxiety and poor improvement in patients with low baseline NT-proBNP, but not in men ( $N=250$ ).

Our results indicate that in CAD patients NT-proBNP is not only associated with more severe disease but also with less anxiety and that this effect is independent of age. It seems that patients who are not able to up-regulate (NT-pro)BNP despite their cardiac disease experience more enduring anxiety than patients with higher levels of (NT-pro)BNP. Subsequent research will need to determine why some of the effects were limited to women. In conclusion, BNP (like ANP) seems to not only play a role in the physiological regulation of blood pressure, but also in emotion regulation.

#### 144) Abstract 1398

##### ATTACHMENT, SOCIAL SUPPORT AND CARDIOVASCULAR HEALTH

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**Background:** The quality of our social relationships can impact both our physiological and psychological health through buffering against the negative effects of stress. In particular, literature suggests that the emotional and tangible support available to a person during times of stress (i.e., social support) operates through biobehavioural pathways including cardiovascular reactivity. However, despite inconsistent findings in the social support literature, to date, research has failed to incorporate attachment as an alternative framework in examining the association between social relationships and health.

**Methods:** Ninety healthy young adults completed psychometrically-validated measures of social support and attachment within a laboratory-based setting. Measures of cardiovascular reactivity, blood pressure, heart rate (HR), cardiac output (CO) and total peripheral resistance (TPR) were continuously monitored throughout a standardised stress testing protocol which included a baseline and an acute stress session.

**Results:** Correlational analyses demonstrated that there was no significant association between social support and cardiovascular reactivity. However, significant associations between attachment and cardiovascular reactivity were evident, specifically in terms of avoidant attachment styles. Results found that avoidant attachment was negatively associated with TPR ( $r = -.23, p=.029$ ) and positively associated with HR, ( $r = .21, p=.049$ ). These associations withstood adjustment for support and a range of potential confounds (e.g. age and sex).

**Conclusion:** These results suggest that perhaps one of the ways in which attachment may influence health is through cardiovascular reactivity to stress. Here we found that it was an insecure avoidance attachment and not secure attachment that was associated with stress reactivity.

#### 145) Abstract 1380

##### INDIVIDUAL DIFFERENCES IN EMOTION REGULATION: IMPLICATIONS FOR CARDIOVASCULAR REACTIVITY TO STRESS

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Previous research examining the influence of habitual emotion regulation on cardiovascular reactivity to stress has been somewhat mixed. Some studies report positive associations with physiological reactivity, while others found negative associations. This research reports on a laboratory-based study in a sample of 40 young adults. Participants completed two consecutive speech tasks, separated by a resting recovery period. The emotional dimension of the speech task was experimentally manipulated, with a neutral speech task and a negative emotion task completed by all participants; order of this was counter-balanced across the study. The Emotion Regulation Questionnaire (ERQ) was used to assess habitual emotional regulation. Blood pressure, heart rate, cardiac output and total peripheral resistance were measured using the Finometer; a continuous hemodynamic monitor. General linear model analysis found that individual differences in emotion regulation lead to distinct profiles of hemodynamic responding. This provides support for the hypothesis that emotion regulation is an important factor in stress reactivity and recovery.

#### 146) Abstract 1633

##### THE RELATIONSHIP BETWEEN HEART RATE VARIABILITY AND MARKERS OF INFLAMMATION: A META-ANALYSIS

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The inflammatory reflex is known as the body's primary defense against infection and has been implicated in a number of diseases. The magnitude of the inflammatory response is important, as an extreme or insufficient response can be differentially harmful to the individual. Converging evidence suggest that the autonomic nervous system (ANS) directly regulates the inflammatory reflex. Heart rate variability (HRV) can be separated into components that primarily reflect parasympathetic (PNS) or vagal activity (i.e., indices of vagally mediated HRV | vmHRV) and a combination of both SNS and PNS branches of the ANS. Given the physiological relation between the vagus and inflammatory processes, one would expect to find higher vmHRV (greater PNS or vagal activity) to be associated with lesser markers of inflammation markers via the cholinergic anti-inflammatory pathway. However, research on relationships between indices of HRV, especially vmHRV, and markers of inflammation are mixed and too often counterintuitive. Therefore, the present meta-analysis estimates the general direction and strength of the relationship between several indices of HRV and inflammatory markers, with an emphasis placed on indices of vmHRV. A systematic search of the literature yielded 2,283 studies that were screened for duplicates (removed) and inclusion eligibility (must include one index of both HRV and inflammation). Of the 177 studies eligible for inclusion, only 51 included a statistical index of the degree to which the HRV and inflammatory were related; additional data requests are being sent and will appear in a follow-up report. Multiple random-effects models showed that all significant associations between markers of HRV and markers of inflammation were negative. In this regard, associations between indices of vmHRV – such as high frequency (HF; 0.15-0.4 Hz) HRV – and inflammatory markers were particularly strong and consistent. In sum, the present meta-analysis highlights the importance of the ANS, specifically the PNS, in regulating inflammation. We propose that indices of HRV, specifically vmHRV, can be used to proxy the flexibility and integrity of the neurophysiological pathway responsible for adaptively regulating inflammatory processes.

**147) Abstract 1462****RESTING HRV IS ASSOCIATED WITH EX-GAUSSIAN METRICS OF INTRA-INDIVIDUAL REACTION TIME VARIABILITY**

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Intra-individual variability (IIV) in reaction time (RT) performance has been associated with executive and neural dysfunctions that are central to many cognitive disorders. Similarly, cognitive impairments have been negatively related to high-frequency heart rate variability (HRV; a metric of cardiac vagal control). Despite their conceptual overlap, only a few studies have examined associations between HRV and IIV. The aim of the current study was to investigate relations of HRV to IIV parameters derived from ex-Gaussian modeling and traditional whole-distribution approaches. Participants ( $N = 84$ ; 60 women; *Mean age* = 18.9, *SD* = 1.6) completed a 5-minute resting period while electrocardiography was collected. Resting HRV was calculated as the root mean square of successive differences (RMSSD) of interbeat intervals. RTs from a subsequent Stroop color-word task were used to estimate whole-distribution metrics and ex-Gaussian parameters of IIV (sigma: IIV due to fast responses; tau: IIV caused by slow responses). Results replicated an effect size from our previous study, in which RMSSD was negatively correlated with the standard deviations of RTs for men's incongruent trials,  $\rho(22) = -.273, p = .244$ . As indicated by regression analysis, RMSSD was negatively associated with tau for incongruent trials ( $\beta = -.278, p = .012$ ), and positively associated with tau for congruent trials ( $\beta = .222, p = .034$ ). Results suggest that high cardiac vagal control relates to effective regulation of attentional lapses and instability in response selection. These findings are consistent with theories of regulatory flexibility in which inhibitory control is modulated to fit environmental demands. Findings are discussed in reference to patterns of stress regulation and cognitive control that have implications for psychological and neurological health.

**148) Abstract 1322****EFFECTS OF NOREPINEPHRINE INFUSION WITHOUT AND WITH ALPHA-ADRENERGIC BLOCKADE ON COAGULATION PARAMETER LEVELS IN HEALTHY MEN**

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**Background:** Mental stress induces reliable increases in coagulation parameters including fibrinogen or D-dimer, but underlying mechanisms are not fully understood. While stress-induced D-dimer increases correlate with norepinephrine (NE) secretion, a potential role of noradrenergic mechanisms remains unclear. Here, we investigated in humans, whether a NE-stress-reactivity mimicking NE-infusion with and without alpha-adrenergic blockade by phentolamine would induce changes in different coagulation parameters.

**Methods:** In a single-blind placebo-controlled within-subjects design, 18 healthy men (33-64 years) took part in three different experimental trials varying in terms of substance infusion with a 1-min first infusion followed by a 15-min second infusion: saline-infusion (trial-1), NE infusion (5microg/min) without alpha-adrenergic blockade (trial-2), and with phentolamine-induced non-selective blockade of alpha1- and alpha2-adrenergic receptors (trial-3). Blood samples were collected immediately before, and several times after substance infusion to measure fibrinogen, FVIII:C, and D-dimer.

**Results:** As compared to placebo-infusion (trial-1), NE-infusion without alpha-adrenergic blockade (trial-2) induced higher fibrinogen, D-dimer, and FVIII:C reactivity ( $p$ 's  $< .032$ ). Alpha-adrenergic blockade (trial-3) reduced NE-infusion-induced increases in FVIII:C ( $p = .16$ ), while increases in D-dimer remained significant ( $p = .044$ ) and

increases in fibrinogen became of borderline significance ( $p = .06$ ). Trials 2 and 3 did not differ in any coagulation parameter ( $p$ 's  $> .31$ ).

**Conclusions:** We found that NE-infusion stimulates coagulation activity and that this stimulation was in part inhibited by non-selective alpha-adrenergic blockade by phentolamine. This suggests that the mechanisms underlying stress-induced coagulation activity increases may involve NE and alpha-adrenergic receptors.

**149) Abstract 1644****LONELINESS, CARDIOVASCULAR AND NEURO-ENDOCRINE REACTIVITY TO ACUTE PSYCHOLOGICAL STRESS: A SYSTEMATIC REVIEW**

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**Objective:** Loneliness has been linked to a higher risk of cardiovascular disease. One of the proposed mechanisms linking loneliness and cardiovascular disease is physiological reactions to acute stress. However, the findings of loneliness and acute stress induced physiological reactivity research (e.g., sympathetic nervous system and hypothalamic-pituitary-adrenal axis responses) are not universal, a likely consequence of methodological differences across studies. Therefore, to improve our understanding of the interaction between loneliness and stress reactivity, greater clarity is needed. The purpose of this review was to assess the current evidence linking loneliness to cardiovascular and endocrine reactivity to acute stress.

**Method:** The authors searched a series of electronic reference databases (PsycARTICLES, PsycINFO, Medline, CINAHL Plus, EBSCOhost (all databases except those previous), PubMed, SCOPUS, Web of Science and Science Direct), up to October 2016, for relevant studies using established guidelines.

**Results:** Following initial assessments, 13 studies were included in the review and of these, the majority (8) examined sympathetic nervous system responses. Overall, 7 studies found positive associations between loneliness and stress reactivity; that is higher loneliness was predictive of increased physiological responses. However, for 2 studies being lonely was associated with reduced reactivity, possibly indicating a blunted response. Furthermore, in 4 studies, there were no relationships observed. Analysis of stressors types and study design appear to underlie these divergent findings.

**Conclusions:** Most of the studies reported here provide evidence for the proposed mechanism linking loneliness to cardiovascular health via stress reactivity. The current review suggests that loneliness is associated with exaggerated responses, rather than blunted responses to acute stress. Based on the best available evidence, higher levels of loneliness predict increased cardiovascular reactivity to acute stress. However, the evidence for endocrine reactivity is more mixed.

**150) Abstract 1259****DESYNCHRONISATION OF THE AUTONOMIC NERVOUS SYSTEM IN MOTHER-CHILD-DYADS DURING SSP: INFLUENCE OF MALTREATMENT AND NEGLECT**

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**Introduction:** Stress caused by childhood maltreatment (CM+) may have broad effects on autonomic nervous system (ANS) regulation.

There is a higher risk for those individuals to maltreat their own children (transgenerational cycle of maltreatment). In the study, *Meine Kindheit – Deine Kindheit* (TRANS-GEN) we investigate stress reactivity of the ANS in mothers and their children depending on maltreatment of the mother (CM+) or absence of maternal maltreatment (CM-).

**Methods:** We used a method, that we established, to measure sympathetic and parasympathetic nervous system activity parallelly in mothers and their one-year-old children. Heart rate (HR), respiratory sinus arrhythmia (RSA) and pre-ejection-period (PEP) were measured by electrocardiogram (ECG) and impedance cardiogram (ICG) during a standardized stressful situation consisting of separation and reunion episodes: SSP (Strange Situation Paradigm, Ainsworth, 1970).

**Results:** In episode 7 – child alone in the room, strange person coming into the room – we observe differences between mother and child: mothers are reacting with a decreasing sympathetic ANS response. Children in contrast show an increase in stress response. Furthermore there are significant differences between (CM+) and (CM-) mothers in the parasympathetic branch. Moreover (CM+) mothers infants have significantly higher RSA data in this episode than (CM-) mothers infants.

**Discussion:** We find relevant effects of neglect and maltreatment during childhood on the ANS. We also observe for the first time a variation in infants ANS that suggests to be passed on into the next generation by (CM+) mothers. Further studies on children of (CM+) mothers, when growing up, can show, if these changes in ANS predict resilience or vulnerability with regard to physical or mental diseases of these infants.

#### 151) Abstract 1616

##### RELAXING MUSIC STABILIZES HEMODYNAMICS AND ELICITS OXYTOCIN SECRETION IN PREHYPERTENSION

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**Objectives:** Prehypertension increases the risk of developing cardiovascular disease (CVD). Relaxing music may lower blood pressure (BP) and heart rate (HR), and therefore, decrease the risk of CVD. We also examined whether music promotes secretion of oxytocin which regulates social behavior.

**Methods:** Participants were 14 prehypertensive individuals aged 20 to 50 years. The protocol consisted of 2 visits (experimental & control). Each visit consisted of 20 minutes baseline (subjects quietly watched movie during this time) and 10 minutes of a stressor exposure (e.g., mental arithmetic). Following baseline rest, subjects listened to music for 30 minutes during the experimental visit. Because some research shows the frequency to which instruments are tuned influences response to that music, the team used original music written specifically for this project and varied the pitch to which instruments were tuned. The instruments were tuned between 440 Hz and 432 Hz, and the frequencies changed every 10 minutes. Participants were randomly selected to be part of group A (432Hz-440Hz-432Hz) or group B (440Hz-432Hz-440Hz). During the control visit subjects watched a movie then participated in a mental arithmetic challenge. The visit order of experimental and control was changed for different study participants. Repeated-measures analysis of variance (ANOVA) with two repeated measures [Music vs. no music and phase (baseline, music, and mental stress)] was used to examine the effects of relaxing music on the physiological parameters. The PROCESS add-on module to SPSS was used to estimate the effect of music on oxytocin secretion.

**Results:** At experimental visit BP ( $128 \pm 11/77 \pm 7$  vs.  $127 \pm 10/75 \pm 8$  mmHg, respectively) and HR ( $71 \pm 7$  vs.  $70 \pm 7$  beats/min) were similar during baseline and music phases. Mental arithmetic significantly increased BP and HR (all  $p < 0.01$ ). No changes were observed in

relation to music schedule A or B. Blood levels of Oxytocin were similar between rest and stress ( $65 \pm 19$  pg/l vs.  $71 \pm 19$  pg/l, ns). Music elicited an increase of oxytocin ( $84 \pm 35$  pg/l) but did not reach statistical significance.

**Conclusion:** Listening to relaxing music stabilizes hemodynamics irrelevant of tuning systems. A trend toward oxytocin increase was shown, suggesting that music has a greater social effect than quietly resting.

#### 152) Abstract 1389

##### THE ASSOCIATION BETWEEN RESTING CARDIAC VAGAL TONE AND RUMINATION: GENDER AS A MODERATING FACTOR

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Resting vagally-mediated heart rate variability (vmHRV) is recognized as an index of emotion regulation (ER) abilities, such that those with lower resting vmHRV show more difficulties in ER compared to individuals with higher resting vmHRV. A recent study showed that gender moderated this association, such that women showed a stronger relationship between resting vmHRV and self-reported difficulties in ER compared to men. Importantly, poorer ER abilities are typically associated with more maladaptive ER strategies (e.g., rumination). As such, a recent report illustrated that resting vmHRV was associated with greater brooding (maladaptive – sulking) and depressive (maladaptive – sadness and despair) rumination, but not significantly associated with reflective (adaptive – analytical thinking) rumination. However, research has not yet investigated how gender may moderate this link between resting vmHRV and various forms of rumination. The current study sought to examine this in a sample of 289 participants' (168 women, 121 men, mean age of  $20 \pm 2$  years). While attached to an electrocardiogram, participants first completed a 5-minute resting-baseline period where resting vmHRV was assessed using root mean square of successive differences. Participants then completed the Ruminative Responses Scale, designed to assess total ruminative tendencies, in addition to three subscales to assess the aforementioned forms of rumination. Controlling for important covariates, gender did not significantly moderate the relationship between vmHRV and total rumination, depressive rumination, or brooding rumination (each  $p > .1$ ). However, gender significantly moderated the association between vmHRV and reflective rumination ( $\Delta R^2 = .01$ ,  $B = -1.63$  (.81), [-3.22, -.04],  $r_{\text{partial}} = -.120$ ,  $p = .044$ ). Conditional analyses showed a significant negative association between vmHRV and reflective rumination in women ( $B = -1.58$  (.51), [-2.57, -.58],  $p = .002$ ), but not men ( $B = .16$  (.61), [-1.05, 1.05],  $p = .79$ ). This pattern of data is similar to aforementioned gender differences in the association between resting vmHRV and ER abilities, and extends them to the domain of ER strategies (i.e., rumination). Overall, the current results suggest that the relationship between resting vmHRV and rumination, particularly when adaptive, may be more complex when considering gender as a moderating factor.

#### 153) Abstract 1455

##### THE RELATIONSHIP BETWEEN HEART RATE VARIABILITY AND THE NEED FOR AFFECT: A FOCUS ON GENDER DIFFERENCES

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Germany, Derek Spangler, Ph.D., Julian Thayer, Ph.D., Psychology, The Ohio State University, Columbus, OHIO

The need for affect (NA), defined as the motivation to approach, and not avoid, emotion inducing situations (both positive and negative). Interestingly, women report greater approaching of emotions while men report more avoiding of emotions compared to their respective counterparts. In our previous research, we showed a relationship between lower resting high frequency heart rate variability (HF-HRV), a marker of emotion regulation abilities, and the approaching, but not avoiding, of emotional experiences (via respective subscales). However, research has not yet examined how the relationship between resting HF-HRV and the need to approach and avoid emotions may differ between men and women given these aforementioned gender differences in ER and NA. The present study sought to investigate this in 82 participants (56 women, 26 ethnic minorities, mean age = 19.18, SD = 2.07) who first completed a 5-minute baseline-resting period, followed by the 26-item NA Scale designed to index overall motivation to approach emotions. Subscales include the need to approach (13 items) and avoiding (13 items) emotional experiences. Heart rate data were recorded via an electrocardiogram, and resting HF-HRV was assessed during a 5-minute baseline period, and calculated in accordance with Task Force (1996) Guidelines. Correlation results showed a significant negative relationship between resting HF-HRV and the approaching of negative emotions for women ( $r = .430$ ,  $p = .001$ ), but not for men ( $r = -.119$ ,  $p = .545$ ). In contrast, results showed a negative relationship between resting HF-HRV and avoiding of negative emotions for men ( $r = -.367$ ,  $p = .055$ ) but not for women ( $r = .090$ ,  $p = .526$ ). No significant relationships were found between resting HF-HRV and total NA. The current investigation provides a novel finding: the motivation to approach and avoid emotions are differentially related to resting HF-HRV between men and women. Given the current findings, it is possible that this gender-based differential relationship between resting HF-HRV and the approaching/avoiding of emotional experiences may be a motivation factor underlying gender differences in ER processing; however, future research is needed to these notions directly.

#### 154) Abstract 1448

##### THE RELATIONSHIP BETWEEN TRAUMA EXPERIENCE AND REDUCED AUTOBIOGRAPHICAL MEMORY AND THE MODERATING INFLUENCE OF HEART RATE VARIABILITY

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While reduced autobiographical memory specificity (AMS) – a memory bias in which autobiographical events are recalled in an over-general manner – is associated with Depression and Post Traumatic Stress Disorder (PTSD), its relationship to trauma experience in nonclinical samples has not been established. Disparate findings from previous research suggest that moderators might have a role in the relationship between trauma experience and AMS. Resting high frequency heart rate variability (HF-HRV) is negatively associated with PTSD and is positively associated with greater cognitive control. Prior research has indicated that when a nonclinical sample is placed under cognitive load, resting HF-HRV acts as a moderator in the relationship between depressive symptoms and AMS, such that their negative association is strongest at low HF-HRV. The present study investigated the impact of HF-HRV and cognitive load as moderators of the link between trauma experience and reduced AMS in a nonclinical student population. Participants ( $n=300$ ) completed an online questionnaire battery including the Life Events Checklist for DSM-5 (LEC), an inventory assessing experience of traumatic events. This was followed

by a lab session in which HF-HRV was collected via electrocardiogram during a 5-minute resting baseline condition, followed by the Autobiographical Memory Test (AMT), a measure of AMS. Participants were randomly assigned to cognitive load conditions. A three-way interaction analysis controlling for gender and depression scores showed a significant interaction between number of traumas reported on the LEC, resting HF-HRV, and load condition on number of categorical memories reported on the AMT ( $R^2\Delta = .021$ ,  $\beta = -1.22$ , (standard error = .49),  $p = .013$ ). Thus, in the higher load condition only, individuals with lower HF-HRV and greater trauma experience displayed lower AMS. These findings suggest that HRV and cognitive load impact the association between experience of trauma and reduced AMS in nonclinical populations. Individuals who have experienced trauma are most likely to display lower AMS when they have low HF-HRV and are additionally put under cognitive load. As individuals who've experienced trauma are also likely to be individuals experiencing stress and are likely to display low HRV, these findings are especially relevant to understanding reduced AMS in trauma samples.

#### 155) Abstract 1391

##### TYPE D PERSONALITY AND CARDIOVASCULAR REACTIVITY TO ACUTE STRESS: A META-ANALYTIC REVIEW OF STUDIES USING ACTIVE TASKS

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**Background:** Type D personality has been related to negative outcomes following cardiac events, with cardiovascular reactivity to stressors posed as a potential mechanism of effect. However, studies on Type D and cardiovascular reactivity have reported mixed findings. This meta-analysis examined if Type D personality is reliably associated with cardiovascular reactivity to stress in healthy individuals. We also aimed to determine the direction of any effects, and to examine both gender and social context of the stressor as potential moderators.

**Methods:** Electronic databases were searched for studies with non-clinical samples that employed a resting baseline period followed by a stress-task period. Comprehensive Meta-Analysis was used to calculate pooled effects sizes, with Hedges's  $g$  calculated for each measure.

**Results:** Type D personality was not associated with cardiovascular reactivity unless 1) social context of the stress task and 2) gender are considered. In fact, patterns of cardiovascular reactivity differed as a result of these moderating variables. Social stress tasks tended to be associated with lower systolic blood pressure reactivity in Type Ds (Hedges's  $g = -.36$ ), while asocial stress tasks were associated with lower heart rate (Hedges's  $g = -.33$ ) and total peripheral resistance (Hedges's  $g = -.40$ ) reactivity in Type Ds. When gender is considered, women showed lower diastolic blood pressure reactivity to asocial tasks (Hedges's  $g = -.92$ ) while men showed elevated heart rate (Hedges's  $g = .51$ ) and cardiac output (Hedges's  $g = .58$ ) reactivity. **Conclusions:** These findings highlight the importance of considering gender and social context of laboratory stressors in cardiovascular reactivity studies and Type D personality. Failure to consider these moderating factors in previous research may explain the reporting of mixed findings in relation to Type D personality and cardiovascular reactions to stress in healthy individuals.

**Funding:** This research was supported by an Irish Research Council New Horizons Award, REPRO/2015/39

156) Abstract 1434

EVALUATING THE IMPACT OF DELAYS IN SALIVA SAMPLING COMPLETION ON CORTISOL AWAKENING RESPONSE VALUE USING A NEW MOBILE TOOL

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**Background:** Delays in salivary cortisol (SC) sampling may yield misleading cortisol awakening response (CAR) data. Verifying the sampling times in the field, however, is challenging. Existing technologies such as sensor-equipped bottles provide estimates of time of initiation of sampling, but leave the timeliness of sampling completion unassessed. A mobile app, “ZEMI” was developed for SC collection in the field, enabling assessment of SC sampling completion.

**Methods:** 17 youth completed a 3-day field SC collection protocol both before and after a stress reduction intervention pilot study. Participants were given Salivette tubes, a bottle of cotton-plugs equipped with a sensor to detect when bottle was opened (MemsCap), and a smartphone with the ZEMI app installed. Participants were blinded to the MemsCap. Study staff personalized waking alarms on ZEMI for each participant so that ZEMI prompts participants to collect a saliva sample upon waking, 30 mins post-waking, and at around 8PM. At the sound of each alarm, they were asked to take 1 cotton-plug from the bottle, place it in their mouth for 2 mins, place the soaked cotton-plug in a labeled tube, upload a picture of the collected sample via ZEMI, and then answer 5 questions about their stress. Individual CAR slopes were calculated according to Almeida et al 2009. The effect of delays in sampling completion was assessed by comparing the mean CAR slopes for days when the time difference between MemsCaps open-time and time of picture taken was <5 mins vs ≥5 mins using analysis of variance (ANOVA).

**Results:** See Table 1 for participant characteristics. The average time difference between MemsCaps open-time and time of picture taken was 29.9±10.7 mins. There was a marginally significant difference in least-square mean CAR slopes between samples that were completed within 5 mins of MemsCap-opening time (slope=-0.004 ug/dL/minutes) vs. more than 5 mins (slope=0.055, p=0.084 ug/dL/mins).

**Conclusions:** Timeliness of SC sampling completion may impact the resulting CAR values, indicating the importance of assessing verified sampling completion time. ZEMI is the first mobile application to obtain verified timing of SC sample collection completion from participants and can improve the validity of ambulatory SC assessment.

Table 1: Participant Characteristics (n=17)

Age (years of age ±SD)	17.2±1.0
Gender	41.7
Ethnicity-Hispanic (%)	94.1
Ethnicity-Asian (%)	5.9
# of Saliva Samples Collected	19±3

157) Abstract 1144

THE INFLUENCE OF SAFETY AND SECURITY NEEDS ON SELF-PERCEPTION OF PHYSICAL HEALTH IN GENDER MINORITIES LIVING IN AN UNDER-RESOURCED REGION OF THE SOUTHERN UNITED STATES

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Gender minorities (e.g., transgender, genderqueer and gender nonconforming individuals) experience significant disparities related to physical and mental health conditions in the United States. Gender minorities often have unique health needs related to the use of hormone replacement therapy and gender affirming surgeries, yet there is limited health insurance coverage for these interventions and, even when coverage exists, the availability of culturally competent care is sparse outside of large urban centers. Additionally, the gender minority community is more likely to face financial stressors and violence compared to the general population, which in turn can lead to or worsen an array of health conditions. The present study assesses the contributions of critical psychosocial stressors experienced by gender minorities in the Central Savannah River Area (CSRA) of Georgia and South Carolina to self-perceptions of overall health. Perceived health is an adequate proxy for various health biomarkers (e.g., blood pressure, body mass index, metabolic and immune markers) in underserved populations (Dowd & Zajacova, 2010) and is predictive of future disability and morbidity (Idler & Kasl, 1995). Participants from a gender and sexual minority health needs assessment in the CSRA completed a questionnaire including questions assessing perceptions of safety, current financial situation, and perception of overall health. The subsample utilized in the current study included a total of 60 gender diverse individuals (34% female-to-male, 28% male-to-female, 27% genderqueer, 1% intersex, 10% other-identified) between the ages of 18 and 73 ( $M_{age} = 30$ ) were included in the current study. A multiple regression analysis (Adjusted  $R^2 = .303$ ) indicated that both perceived safety ( $\beta = -.197, p < .01$ ) and financial situation ( $\beta = -.224, p < .01$ ) were significant, independent predictors of low perceived health. These findings suggest that physical safety and economic assurances are critical sources of stress for gender minorities in under-resourced areas of the US, such as the CSRA, with the potential for devastating effects on health. The fundamental needs of gender minorities in under-resourced areas should be a high priority for health providers and advocates for these communities.

158) Abstract 1173

THE RELATIONSHIP BETWEEN ANGER, CARDIOVASCULAR DISEASE, AND LAW ENFORCEMENT OFFICERS

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Research has indicated relationships between law enforcement officers (LEOs), psychosocial factors, and cardiovascular disease (CVD) risk. LEO populations may be at increased risk for aggression and anger suppression, which has been linked to clinical and subclinical cardiac outcomes. Anger may help explain the increased risk in LEOs for CVD mortality and morbidity, as well as subclinical atherosclerosis. In this study, the relationship between occupational status, anger, and CVD markers was examined. The study utilized archival data from the Spokane Heart Study, which longitudinally measured CVD risk factors in initially healthy participants. Participants were categorized into two groups: LEO group (N = 105) and demographically matched non-LEO group (N = 65). Analyses performed included hierarchical regressions, basic mean testing, and structural equation modeling. Results indicated that LEOs and non-LEOs did not differ on measures of externalized anger,  $t = -.62, p = .54$ , or internalized anger,  $t = -.15, p = .88$ , nor did the groups significantly differ in coronary artery calcification (CAC),  $t = 1.15, p = .25$ , or C-reactive protein (CRP) levels,  $t = -1.63, p = .10$ .

However, LEO status was significantly associated with body mass index (BMI), with LEOs having higher BMIs than non-LEOs,  $r(170) = .26$ ,  $p = .001$ . Regardless of occupational status, the structural equation model revealed that higher levels of externalized anger predicted lower levels of CAC ( $\beta = -.17$ ,  $p < .05$ ). Conversely, higher levels of internalized anger were associated with higher levels of BMI,  $r(170) = .16$ ,  $p = 0.34$ , and low-density lipoprotein (LDL),  $r(162) = .19$ ,  $p = .01$ . While LEO status did not predict higher levels of anger in this sample, the non-significant results offer interesting implications given recent media coverage of aggressive police behaviors. Additionally, despite research suggesting that BMI tends to increase with age, findings from the current study suggest that LEO occupational status may present additional risk for increased BMI, even at younger ages. Furthermore, regardless of occupational group, results suggest that some properties of behaviorally expressed anger may be protective, while higher levels of internalized anger might be more detrimental to health.

#### 159) Abstract 1278

##### **NEGATIVE MOOD IMPACTS PHYSICAL ACTIVITY AND NUTRITION IN AN ADOLESCENT AND ADULT IMMIGRANT AND REFUGEE POPULATION**

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**Background:** Immigrants to the United States typically arrive healthier than the general population; however increased time in the US is associated with an escalation of negative health behaviors and health conditions. Negative mood is associated with poorer health behaviors in the general population; a relationship that is understudied in immigrant populations. The present study is an examination of baseline mood, physical activity (PA), and nutritional behaviors in a sample of immigrant and refugee families (recently published in Morrison et al., 2016), taken from a parent prospective interventional study (the Healthy Immigrant Families (HIF) study; Bronars et al, 2016) to improve health behaviors in this population. **Methods:** Adolescent ( $n=78$ ) and adult ( $n=65$ ) family members completed a health behavior survey using a community-based participatory research (CBPR) approach. Single-item measures assessed mood and physical well-being (poor to excellent); items from the Food Behavior Checklist assessed nutritional behaviors; the kinetic activity monitor (KAM) accelerometer provided an objective measure of PA; and the Patient-centered Assessment and Counseling for Exercise plus Nutrition (PACE+) assessed self-efficacy and social support for PA and nutritional behaviors. Group differences classified by high/low mood were compared using Wilcoxon tests for continuous variables and chi square tests for categorical variables. **Results:** Adolescent participants had a mean age of 13.5 years, were 51% female, and 53% were US-born; those who were foreign-born reported a mean of 6.8 years residing in the U.S. Adult participants had a mean age of 39.1 years and were 71% female. Those who were foreign-born (90%) reported a mean of 14.2 years residing in the U.S. Adolescents with positive mood (77%) consumed less regular soda, and demonstrated more total minutes, greater intensity, and greater social support for PA (all  $ps < .05$ ). Adults with positive mood (72%) reported more snacking on fruits/vegetables, greater self-efficacy for PA, and better physical well-being (all  $ps < .05$ ). **Discussion:** Negative mood was associated with low PA level and poor nutritional behaviors in adolescent and adult immigrants and refugees. Designing community-based programs offering strategies for mood

management and healthy lifestyle change may be efficacious for immigrant populations.

#### 160) Abstract 1255

##### **THE PREVALENCE OF SCHOOL DIFFICULTIES IN THE MENTAL HEALTH OF IMMIGRANT PORTUGUESE CHILDREN**

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Children with developmental disorders, sons of Portuguese immigrant parents in France, focus they're symptoms in school learning, unlike the children of French parents, in which prevail family relationship difficulties.

This study was conducted over 4 years at the Children's Psychiatric Center XIII district of Paris, with 248 children consultants, of which 62 sons of Portuguese parents, compared to 186 children of French parents, with average age of 9.26 and 8.73 years respectively. For this we analyzed the Portuguese immigrants children dossiers, compared to triple the French children, and matched for age and sex. Two initial evaluation questionnaires were used, one on psychiatric history of the child and the family, the other on population demographic data. Consulting teams realized from the first consultation, that the children of Portuguese parents, significantly differed from the French, by the severity of academic failure and language disorders. Most of them suffer from language problems, including mutism, delayed speech, articulation disorders and difficulties related to bilingualism. In this context, academic failure is most common in children born in Portugal and immigrated with his parents, coming to develop later specific developmental disorders related to the acquisition of the French language. The language disorders are diagnosed more often in children already born in France.

##### **Conclusion**

The learning difficulties of immigrant Portuguese children, are a characteristic of the migratory experience of families, as opposed to the control group whose symptoms lie more in the parent-child relationship. These results confirm other studies on Portuguese immigrant children (Nunes, F. 2014 INYI Journal). This study confirms that Portuguese immigrants children in France are not bilingual, but practice semi linguism. Teaching in the mother tongue presents itself as a preventive measure for the development of these children, in the context of bilingual school learning.

The professionals of mental health services should access the mother tongue of these children. Collected data of clinical experiences reports allow us to place the hypothesis that children of immigrants suffer not only from difficulties related to languages but that these symptoms equate to a childhood depression.

#### 161) Abstract 1312

##### **PROSPECTIVE EFFECTS OF IQ ON INTERLEUKIN-6 AMONG OLDER ADULTS**

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**Background:** Previous research suggests that cognitive ability is negatively correlated with the proinflammatory cytokine interleukin (IL)-6 among older adults. However, interpretation of such findings has been limited by contemporaneous measurement of cognitive function that can itself be affected by ill health or inflammation (e.g., executive function, processing speed). Therefore, interpretations in which cognitive ability reduces systemic inflammation and vice versa are equally viable.

**Objective:** The current study investigated the relationship between cognitive ability and IL-6 in older adults using a measure that captures "premorbid" IQ, that is, estimated full-scale IQ that is resistant to any age- or inflammation-related changes.

**Method:** Community-dwelling, healthy, nonsmoking older adults (N=120, M age=74) were assessed for estimated IQ at baseline using the North American Adult Reading Test and had blood drawn up to 10 times semiannually (n=799). Multilevel models were used to test the prospective effect of IQ on subsequent IL-6 (measured on an ELISA platform and log10-transformed for analysis). Extreme values associated with acute infection (n=12) were dropped from analysis.

**Results:** In a model including only IQ, each 15 points higher IQ was associated with 0.2 SDs lower log IL-6 ( $p = .092$ ). When age, BMI, statin medication, and a time effect that accounted for relationships between IL-6 and likelihood of drop-out were included, each 15 points higher IQ was associated with 0.23 SDs lower log IL-6 ( $p = .045$ ).

**Conclusion:** Inflammation and cognitive function can affect each other. In the present analysis, effects of cognitive function on inflammation were isolated by using a measure of “premorbid” cognitive function. IQ may reduce inflammation through its relationship with better problem-solving, better health behavior, higher socioeconomic position, or better general physiological makeup

## 162) Abstract 1114

### RESILIENCE, WORK ENGAGEMENT AND STRESS REACTIVITY IN A MIDDLE-AGED MANUAL WORKER POPULATION.

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Work stress is a growing problem in Europe. Together, the negative physiological effect of stress on health, and increasing age doubles the risk of developing cardiovascular disease. Therefore, identifying older workers who may be at risk of work-related stress, and its physiological effects, is key to promoting their health and wellbeing in the workforce. The present study examined the relationship between perceived psychological resilience and work-related factors (work engagement and sickness presenteeism) and the physiological response to acute psychological stress in older manual workers in the UK. Thirty participants, mean (SD) age 54.9 (3.78) years reported perceived levels of resilience, work engagement, and presenteeism using standardized questionnaires. Cardiovascular measurements (heart rate (HR) and blood pressure (BP)) and salivary cortisol were used to assess their physiological response to an acute psychological stress task. Resilience was not correlated with work-related factors. However, workers with high HR reactivity reported higher levels of presenteeism ( $p = .03$ ) and lower levels of work engagement ( $p = .001$ ) than those with lower HR reactivity. Participants with lower resilience displayed somewhat higher HR reactivity compared to those with higher resilience ( $p = .07$ ). This suggests a potential pathway by which poorer resilience and higher work stress might contribute to the risk of future cardiovascular disease.

## 163) Abstract 1539

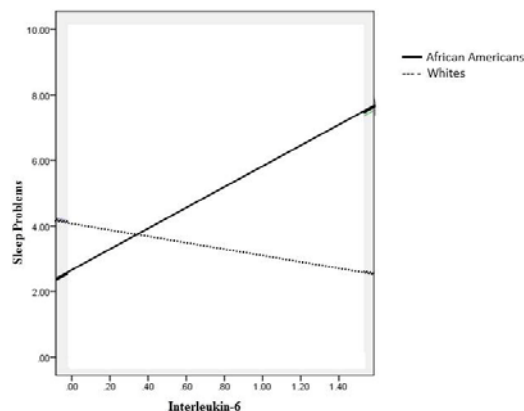
### DIFFERENTIAL RELATIONS AMONG INFLAMMATION AND SLEEP, MEMORY AND MOOD IN HEALTHY AFRICAN AMERICANS AND WHITE YOUNG ADULTS

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Increased levels of Interleukin-6 have been linked to cardiovascular disease, type 2 diabetes and functional decline (Harris, Ferrucci, Tracy, Corti, Wacholder, Ettinger et al., 1999). Research examining ethnic health disparities has suggested the possibility that stigmatized minorities groups may be more susceptible to the consequences of biological dysregulation due to differential exposure to adversity (Hogue, 2002). A few studies have investigated the *Weathering Hypothesis* (Geronimus, Hicken, Keen & Bound, 2006), by examining

associations among inflammatory biomarkers and a range of psychological and health factors with finding relations between inflammatory biomarkers and worst outcomes in AAs, but not EAs (Blair, Porter, Lebleiciglu, & Christian, 2015; Gruenewald, Mujahid, Ryff, Albert & Williams, 2010; Christian, Glaser, Porter and Iams, 2013). To date however, no study has investigated these associations in a relatively young and healthy sample and simultaneously investigated the associations across a spectrum of variables. In studying young, healthy participants, associations between inflammatory biomarkers and health outcomes may be nonexistent, because levels of physiological dysregulation may be too low to reach a critical threshold. On the other hand, if we were to find that the effects were present for one group rather than the other, even during a relatively healthy developmental period, the data would support the *Weathering Hypothesis*. The sample included 133 students (Mage = 18.8 yrs., SD = 0.9; 41% AA, 57% female). IL-6 was assessed by enzyme linked immunosorbent assay with a detection range of 0.16 to 10.0 pg/ml. Working memory was behaviorally assessed and participants reported on sleep and depression using standardized measures (Pittsburg Sleep and Beck Depression Inventories). Results for two of the three outcomes were consistent with our hypothesis that IL-6 would be associated with worse outcomes for AA than for Whites. Specifically, using bootstrapping to test for moderation, we found that for AAs, IL-6 was associated with more sleep problems ( $B = -2.56$ ,  $SE = .67$ ,  $p = .001$ ,  $CI [1.3, 3.8]$ , see Figure 1), and worst working memory for AA ( $B = -1.90$ ,  $SE = .60$ ,  $p = .002$ ,  $CI [-3.04, -.73]$ , but not Whites. The substantive finding held even after controlling for a range of demographic variables and health behaviors.

Figure 1: Race moderates the relations between IL-6 and Sleep Problems



## 164) Abstract 1080

### PRE-EXISTING SMALLER DLPFC VOLUME CONTRIBUTES TO POST-TRAUMATIC GROWTH AFTER A DISASTER IN CHILDREN

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Regional gray matter volume (rGMV) changes due to a stressful event were observed in children, suggesting no hippocampal volume

reduction (McCrory 2011), cerebellum volume reduction (De Bellis 2006; Bauer 2009), and mixed patterns of prefrontal cortex (PFC) volume (Carrion 2009; Carrion 2010; De Brito 2013). On the other hand, despite a psychological distress, positive psychological changes could occur after experiencing a stressful event, which were defined as posttraumatic growth (PTG) (Tedeschi 1996; Cryder 2006). Although the neurological characteristics related to posttraumatic stress in children have been well investigated, those associated with PTG remained unclear. We aimed to identify the rGMV changes as a pre-existing factor of PTG after the 2011 Japanese earthquake in children. We hypothesized that rGMV in the right DLPFC have a significant association with PTG, based on the previous findings in young adults (Nakagawa 2016)

Of the MRI database in our institute (Taki 2013), we analyzed data from 66 normal children (age =  $12.0 \pm 2.3$  yrs, 34 males). A written informed consent was obtained from each child and their parent. We used T1-weighted images to assess their gray matter volumes obtained before the earthquake. Also, we assessed degree of their posttraumatic growth after the earthquake using Japanese version of posttraumatic growth inventory (PTGI-J). To find the rGMV alterations as a pre-existing factor of PTG, we applied a voxel-based morphometry analysis on SPM8 employing rGMVs before the earthquake as target variables, and PTGI-J scores after the earthquake as explanatory variables, treating sex, age, total gray matter volume, and intervals between acquisition of brain imaging data and that of PTG scores as covariates. Statistical threshold was set at  $p < 0.05$  for the ROI of the right DLPFC (small volume correction; svc).

We found a significant negative correlation between PTGI-J scores and rGMV in the right DLPFC ( $p < 0.05$ , svc). We found no significant positive correlation between PTGI-J scores and rGMV in the DLPFC. The findings demonstrate that the smaller DLPFC volumes are pre-existing factors for the posttraumatic growth after a stressful event in normal children. The results indicate that an early maturation of the right DLPFC play an important role in the psychological developments after a stressful event.

#### 165) Abstract 1544

##### ASSOCIATION BETWEEN MINDFULNESS TENDENCY ASSESSED BY FIVE FACET MINDFULNESS QUESTIONNAIRE AND REGIONAL GRAY MATTER VOLUME IN A JAPANESE POPULATION

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Mindfulness is the practice of focusing complete attention on experiences occurring in the present moment with a nonjudgmental and accepting attitude. Mindfulness is considered the third wave of cognitive behavior therapy and is accepted as being effective for improving emotional regulation. Research on mindfulness tendency to date has investigated brain structures and their effects on mindfulness, which has suggested that particular brain areas, the anterior insular being foremost, are related to mindfulness tendency and its effects. Only a few studies on mindfulness have been conducted in Eastern countries although the concept was originally developed in the East. Our previous studies in Japan have also elucidated an association between mindfulness tendency and the anterior insula, although the sample size of 19 participants was too small to ensure definite conclusions. Therefore, in the current study, we investigated associations between mindfulness tendency assessed by the Japanese version of the Five Facet Mindfulness Questionnaire (FFMQ) and regional gray matter volume in 48 Japanese participants by utilizing

optimized voxel-based morphometry. Results corroborated previous studies by confirming the association between right ( $Z=3.16$ ) and left ( $Z=3.07$ ) anterior insula with mindfulness tendency.

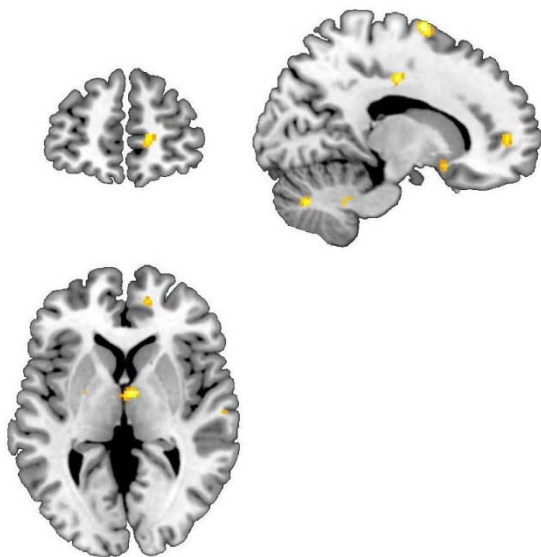
#### 166) Abstract 1507

##### EFFECTS OF MINDFULNESS-BASED STRESS REDUCTION (MBSR) ON PTSD SYMPTOMS AND BRAIN RESPONSE TO TRAUMATIC REMINDERS OF COMBAT IN OPERATION ENDURING FREEDOM/OPERATION IRAQI FREEDOM (OEF/OIF) COMBAT VETERANS WITH POSTTRAUMATIC STRESS DISORDER (PTSD)

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Mindfulness-Based Stress Reduction (MBSR) is an effective intervention for a number of mental conditions. The purpose of this pilot study was to assess the effects of MBSR on PTSD and brain correlates of combat stress in returning veterans of Operation Enduring Freedom/Operation Iraqi Freedom (OEF/OIF). Twenty-six veterans with combat-related PTSD were randomized to receive either eight weeks of once a week MBSR session or a Present Centered Group Therapy (PCGT) control condition. Nine subjects finished MBSR and 8 SGCT. Subjects underwent assessment of PTSD symptoms with the Clinician Administered PTSD Scale (CAPS) and positron emission tomography (PET) imaging of the brain with a High-Resolution Research Tomograph (HRRT) during exposure to Iraq combat-related and neutral slides and sounds before and after the intervention. There were significant reductions in PTSD symptoms as measured by the CAPS in the MBSR (CAPS score 56 (29 SD) pre- and 28 (20 SD) post-intervention,  $p < 0.05$ ) but not in the PCGT group (CAPS score 51 (14 SD) pre- and 43 (14 SD) post-intervention ( $p=NS$ )). These effects persisted at six months. MBSR treated patients had increased anterior cingulate and inferior parietal lobule and decreased insula and precuneus function in response to traumatic reminders compared to the PCGT group. This study shows that MBSR is a safe and effective treatment for PTSD. Furthermore, MBSR treatment is associated with changes in brain regions that have been implicated in PTSD and are involved in extinction of fear responses to traumatic memories as well as regulation of the stress response.





Areas of increased activation when viewing traumatic pictures and sounds vs. neutral pictures and sounds, MBSR > Traditional Supportive Therapy. Increased activations in Anterior Cingulate and Subcallosal Gyrus.

#### 167) Abstract 1174

##### BRAIN FUNCTION PREDICTS PROGRESSION OF BLOOD PRESSURE

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At midlife 40 percent of Americans have hypertension and higher blood pressure (BP) relates to lower cognitive function. Research to date has not shown that lowering BP reverses or prevents early cognitive decrements or later dementia suggesting that BP per se may not directly impair cognitive function. We hypothesized that cognitive function and brain blood flow responses to laboratory challenges would predict progression of BP.

Midlife adults ( $n=154$ , mean age=49, 45% male) with pre-hypertensive levels of BP (systolic  $\geq 120$  mmHg and  $<140$  or diastolic  $\geq 80$  and  $<90$ ) received neuropsychological testing and assessment of regional cerebral blood flow (rCBF) response to mental challenges before and after a 2 year period.

Neuropsychological factors were extracted for verbal and logical memory (Memory), Executive Function, Working Memory, Mental Efficiency, and Attention. A pseudo-continuous arterial spin labelled perfusion magnetic resonance imaging sequence was employed to compare processing related to control and active phases of 2 Back Memory and Multi Source Interference Tests. Based on principal components analysis, rCBF areas previously associated with BP were grouped into composites for frontoparietal, frontostriatal, and insular-subcortical areas. Multiple regression models assessed BP after two years as a function of initial BP, initial cognitive scores, and initial rCBF responses (as well as sex, race, education, and body mass).

Working memory performance (standardized  $\beta = -.280$ ,  $se = .114$ ,  $p = .02$ ) and the frontostriatal rCBF response (standardized  $\beta = .252$ ,  $se = .105$ ,  $p = .02$ ) significantly predicted follow-up BP. Initial BP failed to significantly predict subsequent cognitive performance or rCBF. These results provide initial support for the hypothesis that changes in brain function precede or are concomitant with the progression of BP toward hypertensive levels in midlife.

#### 168) Abstract 1622

##### BODY MASS INDEX AND FUNCTIONAL IMPAIRMENT AMONG TREATMENT-SEEKING SMOKERS: THE EXPLANATORY ROLE OF ANXIETY SENSITIVITY

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Obesity is a common public health concern in the United States. Data indicate that obesity is associated with impairment of functioning in a number of life areas. However, there is limited understanding of how an individual's body mass index (BMI) may influence an individual's functional impairment as captured by social, occupational, and family life. The current study sought to test whether anxiety sensitivity mediated the relation between BMI and functional impairment among treatment seeking smokers. Participants were 420 (46.9% females;  $M_{age} = 38$  years,  $SD = 13.42$ ) treatment-seeking, adult smokers recruited as part of a larger study designed to evaluate the efficacy of a transdiagnostic panic-smoking cessation treatment relative to a standard smoking cessation treatment. The current study was conducted within a structural equation modeling allowing for the test of both the direct association of BMI with functional impairment, as well as the indirect association through anxiety sensitivity. Anxiety sensitivity and functional impairment were represented as latent constructs with three indicators each, while BMI was represented as a manifest variable. Results indicated that BMI was not directly associated with functional impairment. However, higher BMI was associated with greater levels of anxiety sensitivity, greater anxiety sensitivity, in turn, was associated with greater functional impairment ( $b = 0.01$ ,  $SE = .00$ , 95 % CI = [.001, .018]). This finding remained significant after adjusting for participant sex, negative affectivity, tobacco dependence, psychopathology, and medical conditions. Such results provide novel empirical evidence that, among smokers, BMI may be a risk factor for functional impairment indirectly through anxiety sensitivity. Overall, such findings could potentially inform the development of personalized interventions among this particularly vulnerable segment of the smoking population.

#### 169) Abstract 1055

##### CHANGE IN ADIPOSITY FOLLOWING LONG-TERM TREATMENT WITH SELECTIVE SEROTONIN REUPTAKE INHIBITORS IN ADOLESCENTS AND YOUNG ADULTS.

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**Background:** Major depressive disorder (MDD) is associated, prospectively, with obesity. To what extent this may be accounted for by antidepressant treatment has not been well investigated.

**Methods:** Fifteen to 20 year-old participants who were unmedicated or within one month of starting a selective serotonin reuptake inhibitor (SSRI) were enrolled in a longitudinal study examining the skeletal effects of SSRIs. Medication adherence was assessed using pharmacy records and self-report. Every four months, anthropometric measures were obtained following standard procedures. Every eight months, dual-energy x-ray absorptiometry was used to measure visceral adipose tissue (VAT). Sex-age-ethnicity-adjusted body mass index (BMI) Z-scores were generated. Mixed regression analysis examined predictors of longitudinal change in BMI z score and VAT.

**Results:** A total of 264 participants (60% female, mean age:  $18.9 \pm 1.6$  years) contributed 805 DXA scans over an average  $1.5 \pm 0.8$  years of follow up. The mean duration of exposure to SSRIs was  $0.16 \pm 0.31$  years, during the study. After adjusting for baseline age, sex, physical



activity, and time in the study, the score on the inventory for depressive symptomatology and on the Beck Anxiety Inventory, but not a diagnosis of MDD or the score on the Beck Depression Inventory, were inversely associated with change in BMI z score ( $p=0.0003$  and  $p<0.04$ , respectively). In contrast, the duration of exposure to SSRIs as well as the cumulative dose during the interim period between DXA scans were both positively associated with change in BMI z score ( $p$ ).

**Conclusions:** In this longitudinal study, exposure to SSRIs but not depressive morbidity was associated with increased adiposity in adolescents. Interventions are needed to attenuate this adverse event in order to reduce long-term cardiovascular risk.

#### 170) Abstract 1213

##### **WHICH BIOPSYCHOSOCIAL VARIABLES CONTRIBUTE TO THE INCREASED RISK OF SUBSEQUENT WEIGHT CHANGE IN DEPRESSION?**

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Depression appears to be longitudinally associated with both subsequent weight gain and loss. However, little is known about the biopsychosocial variables that contribute to these increased risks. This study aims to investigate which explanatory variables contribute to the relationship of major depressive disorder and depressive symptom severity with weight change over a period of 4 years.

Data of 1858 adults between 18-65y who participated in the Netherlands Study of Depression and Anxiety was used. At baseline, depression was measured with a DSM-based psychiatric interview as well as with a depressive symptom measure. 4-year weight change was classified as weight loss ( $>5\%$  loss), weight stable and weight gain ( $>5\%$  gain). Nineteen baseline psychological (personality, cognitive vulnerability), lifestyle (activity, smoking, alcohol use) and biological (autonomic nervous system, inflammation, leptin) variables as well as psychiatric medication and course were considered as possible explanatory variables in statistical mediation analysis.

In sociodemographic adjusted models, major depressive disorder and depressive symptoms were associated with subsequent weight gain but not weight loss over a period of 4 years. None of the psychological, lifestyle and biological variables or psychiatric course could - even partly - explain the increased weight gain risk in depression.

Our results did confirm a larger 4-year weight gain in depression, but surprisingly none of the various hypothesized psychological, lifestyle and biological explanatory variables, nor psychiatric course, did explain part of this link. Future research should explore other potential factors that may be responsible for the increased risk for subsequent weight gain in depression, e.g. factors like an unhealthy dietary pattern or eating style, or underlying intrinsic factors such as genetics.

#### 171) Abstract 1446

##### **PREDICTORS OF TREATMENT OUTCOME IN PATIENTS WITH EATING DISORDERS**

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Patients with severe eating disorders are offered a multimodal in-patient/day clinic treatment. We assessed the treatment outcome and explored possible predictors of treatment outcome.

From 6/2006 until 8/2016 436 patients (mean age  $24.5$ ,  $25.4 \pm 9.5$ ; 95.1% female) were treated as in-patients and/or in the day clinic of the Department of Psychosomatic and Psychotherapeutic Medicine of a

non-profit private hospital for an eating disorder. Outcome data were available at the end of treatment for 293 (66.9%) of the patients.

All patients were assessed at the beginning and at the end of treatment with the SF36 (Short Form 36 Quality of Life Questionnaire), BSCL (Brief Symptom Checklist), HADS (Hospital Anxiety and Depression Scale), and EDI-2 (Eating Disorder Inventory). The assessment at the beginning included also the IIP-D (Inventory of interpersonal difficulties), PSSI (Inventory of personality style and disorders), FAPK (German Questionnaire for the Assessment of Psychosomatic Disease Processes).

46.08% reached a good treatment outcome defined as a Total score of the EDI at the end of treatment below the 70<sup>th</sup> percentile of an unselected female population. 16% had a poor outcome with a Total EDI Score at the end being higher than at the beginning. 38% of the patients showed an improvement of the Total EDI score, however the value of the score continued to be over the 70<sup>th</sup> percentile at the end of treatment.

The following factors were significant ( $p<.05$ ) positive predictors of a good outcome:

Living in more urban area, having high scores in the "Emotional Role Functioning" scale of the SF36 and in the "Relation to Reality" scale of the FAPK,

The following factors were significant ( $p<.05$ ) negative predictors of a good outcome:

Having high scores in the "Drive for Thinness", "Ineffectiveness" and "Impulse Regulation" scales of the EDI-2, high scores in the "Anxiety" scale of the HADS, high score in the "Depression" scale of the BSCL, high Total Score of the IIP-D and high scores in the "Spontaneous - Borderline" trait of the PSSI.

Patients with eating disorders tended to have a better outcome if they showed less psychopathology at the beginning. The data supports the strategy to initiate an intensive treatment early in the course of an eating disorder and not to wait until the psychopathology gets worse.

#### 172) Abstract 1395

##### **USING A WEARABLE CAMERA TO EXAMINE THE OBESOGENIC QUALITY OF THE HOME ENVIRONMENT IN EARLY CHILDHOOD**

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**Objective:** To examine whether a wearable camera called 'SenseCam' can be used to examine the 'obesogenic' home environment (comprising food, physical activity, and media-related influences) in early childhood, and whether it is a useful tool for validation of self-report measures.

**Methods:** Participants were 15 primary caregivers of young children (mean age 4 years) who completed the Home Environment Interview (HEI) by telephone. One to two weeks after completing the HEI, participants wore the SenseCam during waking hours while at home for an average of 4 days. A semi-structured interview was carried out after the wearing period to assess participants' experience of wearing the camera. The SenseCam images were visually inspected and coded using The Oxford and CLARITY-DCU SenseCam browser. Intraclass correlation coefficients (ICCs) (for continuous variables) and percent agreement, kappa statistics, and proportion of positive and negative agreement (ppos, pneg) (for categorical variables) were used to compare the SenseCam images and HEI responses.

**Results:** SenseCam captured almost all features assessed in the HEI, but with varying level of detail. Features that were rarely or never captured included availability of tinned and frozen foods, and the presence of satellite TV. It was not possible to fully capture mealtime frequency and child eating while watching TV, due to there being a single wearer

and limited wear period. Validity estimates were varied (ICCs = 0.00 – 0.97; percent agreement = 33 – 100; kappa = -0.19 – 0.76; ppos and pneg = 0.00 – 1.00), but generally moderate to high. Lower agreement was reported for food variety, except for fresh vegetables, and the number of computers in the home. SenseCam was generally acceptable to participants, although there were some reservations.

**Conclusion:** This study found that a wearable camera can be used to examine and validate aspects of the obesogenic home environment in early childhood. Further research should aim to replicate the validity estimates.

### 173) Abstract 1366

#### CHRONICITY OF MATERNAL EXCESS ADIPOSITY ASSOCIATED WITH SUBOPTIMAL BREASTFEEDING DURATION

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**Background:** Exclusive breastfeeding (EBF) for the first 6 months of life with continued total BF (TBF) for 12 months is medically recommended. This recommendation is based on documented benefits of BF for mothers and infants. However, women with excess adiposity have lower rates of BF than their normal weight peers, and the obstacles are not clear. In particular, the potential impact of the timing of maternal excess adiposity is unknown. We examined whether chronicity and onset of excess adiposity was related to BF duration among a large sample of women who had attempted to breastfeed. **Method:** 1,901 mothers were recruited via snowball sampling and completed an online survey about their BF and weight history. EBF and TBF duration was calculated continuously (months) and dichotomously for EBF (0=< 6 months; ≥6 months) and TBF cut-offs (0=< 12 months; ≥12 months). Participants self-reported chronicity and onset and were categorized such that higher values indicate greater chronicity and earlier onset as: 0=Never Overweight, 1=Intermittent Overweight/Post-pubertal Onset, 2=Intermittent Overweight/Pre-pubertal Onset, 3=Chronic Overweight/Post-pubertal Onset, 4=Chronic Overweight/Pre-pubertal Onset. Regressions were used to examine the relationship between obesity timing and BF variables after adjusting for maternal age, race, delivery type/term, hypertension, post-partum depression, and pacifier use. **Results:** Results revealed that 52% of the sample met the ≥ 6 month EBF cut-off, whereas 56% met the ≥ 12 month TBF cut-off. An estimated 80% reported intermittent excess adiposity, whereas 11% endorsed chronic excess adiposity, and 7% never had excess adiposity. Linear regressions indicated that the obesity timing variable was associated with EBF ( $\beta=-0.10, p<.001$ ) with a trend for TBF ( $\beta=-0.04, p=.054$ ) duration. Those with chronic excess adiposity had lower BF duration in months (EBF  $M=4.1\pm4.3$ ; TBF  $M=11.2\pm8.0$ ), especially compared with those who had never been overweight (EBF  $M=5.6\pm4.8$ ; TBF  $M=12.2\pm7.2$ ) (see **Figures 1 & 2**). **Conclusions:** Chronic and earlier onset excess adiposity had adverse effects on breastfeeding success and duration, especially for EBF. Compared to their normal weight peers, breastfeeding women with a history of excess adiposity may require additional medical and/or psychosocial intervention in order to meet medically recommended cut-offs.

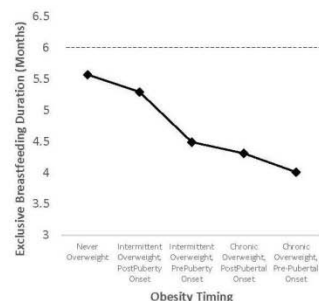


Figure 1: Exclusive Breastfeeding Duration Across Different Groups of Obesity Chronicity and Onset.

Note. Dashed line represents medically recommended duration for exclusive breastfeeding: ≥ 6 months.

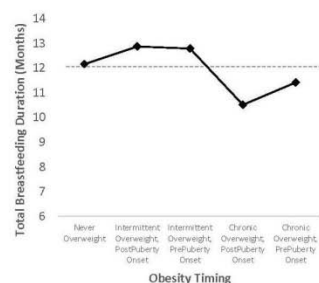


Figure 2: Total Breastfeeding Duration Across Different Groups of Obesity Chronicity and Onset

Note. Dashed line represents medically recommended duration for total breastfeeding: ≥ 12 months

### 174) Abstract 1315

#### ELEVATED LEVELS OF SELF-STATE DISCREPANCIES AMONG CHILDREN WITH FUNCTIONAL SOMATIC SYMPTOMS ARE NOT RELATED TO FAMILY FUNCTIONING

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**Background:** functional somatic symptoms (FSS) are common in pediatric medical settings. These symptoms are often persistent, costly and may be disabling for the children and their families. Many factors have been related to FSS, including dysfunctional family patterns and child's physical or psychological vulnerability. According to self-discrepancy theories (SDT), self-state discrepancies (ideal, undesired, ought) are associated with emotional distress. Among children, especially in families with dysfunctional patterns, such emotional distress may result in somatic symptoms. Thus, the current study's purpose was to examine the relationship between familial patterns and child's levels of self-state discrepancies, as they relate to the appearance and persistence of FSS.

**Methods:** our sample included 46 mother-child dyads, 23 children diagnosed with FSS and 23 children with orthopedic problems (and their mothers). Both mothers and children completed the *Child Somatization Inventory* (CSI) and the *Integrated Self-Discrepancies Index* (ISDI). Mothers also completed the *Family Assessment Device* (FAD-12) to assess level of family functioning.

**Results:** children in the FSS group had higher levels of symptom intensity compared to those in the orthopedic group. In addition, mothers of children in the FSS group reported significantly higher levels of family dysfunction compared to mothers in the orthopedic

group. Mothers and children in the FSS group reported higher levels of discrepancies for both ideal and ought self-states compared to their counterparts in the orthopedic group. No significant differences between the two groups were found for the undesired self-state discrepancies. No significant correlations were found between the different self-states discrepancies and the level of family dysfunction.

**Conclusions:** the current study strengthens the theoretical approaches regarding dysfunctional familial patterns among children with FSS. However, the elevated levels of self-state discrepancies found in the current study were not related to family symptomatology. To our knowledge, this is the first study to associate between self-state discrepancies and the presence of FSS. Integrating SDT and FSS may enable professionals to untangle some of the emotional discomfort and reduce levels of somatoform symptoms in clinical populations.

#### 175) Abstract 1208

##### **IMPEDANCE CARDIOGRAPHY IN HEALTHY CHILDREN AND CHILDREN WITH CONGENITAL HEART DISEASE: IMPROVING STROKE VOLUME ASSESSMENT**

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**Introduction** Stroke volume (SV) and cardiac output (CO) are core measures in the clinical evaluation of cardiac patients and are also frequently required for research purposes. Impedance cardiography (ICG) is a non-invasive way to continuously measure SV and CO. However, spot-electrode based SV estimation by the use of the frequently employed Kubicek formula is not yet optimal. Partly, this is due to the fact that the original development of the technique was done using band-electrodes. Also, ambiguity in scoring of the characteristic B- C- and X-points in the ICG distorts SV estimation. The aim of this study was to improve SV scoring derived from a spot-electrode based ICG in a pediatric population of both healthy and diseased children.

**Methods** 128 healthy volunteers and 66 patients 9.9±3 years after repair of their congenital heart disease (closing of a ventricular septal defect or correction of a coarctation of the aorta) were recruited to participate. Healthy volunteers were divided into a discovery set (70%) and a replication set (30%). First, scoring methods for ambiguous ICG signals were optimized in a discovery set of healthy children by testing the agreement of the B- C- and X-points in the ICG with simultaneously measured opening of the aortic valve, maximal flow in the aorta and closing of the aortic valve using transthoracic echocardiography (TTE). Second, the Kubicek equation was optimized using SV measured by TTE. Finally, validity of the new ICG-based SV assessment was tested in the replication set of healthy children and in a group of pediatric cardiac patients.

**Results** SV assessment by ICG strongly improved from ICC=0.33 before correction to ICC=0.72 after replacing baseline thorax impedance ( $Z_0$ ) in the Kubicek formula by  $Z_{0\text{-corrected}}$  estimated as:  $7.337 - 6.208 * dZ/dt_{\min}$ , where  $dZ/dt_{\min}$  is the amplitude of the ICG signal. Assessment was always worse in patients compared to the healthy controls.

**Conclusions** We advise to adjust the Kubicek equation for SV estimation by replacing  $Z_0$  for  $Z_{0\text{-corrected}}$  when using spot electrodes. Stroke volume assessed by the use of ICG is non-inferior to other modalities available and therefore usable in paediatric populations. Additionally, it has the advantage of measurement in an ambulatory setting, which may increase clinical relevance.

#### 176) Abstract 1589

##### **CHILDREN'S CORTISOL AND EXTERNALIZING STRESS SYMPTOMS ARE PREDICTORS OF ADIPONECTIN EVOLUTION OVER TWO YEARS.**

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**BACKGROUND** Adiponectin is an anti-inflammatory, insulin-sensitizing and energy-regulating adipocytokine. Consequently, the link between psychosocial stress and inflammatory diseases like the metabolic syndrome might be partially explained by lower adiponectin levels in stress. Nevertheless, the stress-adiponectin association has seldom been tested and no clarity exists about the directionality.

**METHODS** In the Belgian ChiBS study, serum adiponectin and stress levels were measured in 348 children (5-10y) at baseline and in 168 of them after 2-year follow-up. Psychosocial stress was reported with the Strengths and Difficulties Questionnaire (parental report on emotional, peer, and conduct problems), negative emotions (anger, sadness, anxiety) and negative events. In addition, salivary cortisol diurnal patterns were available from 2 days with each 4 samples. Longitudinal linear regression analyses were performed including step-wise adjustment for age, sex, socio-economic status, body fat%, physical activity and snack frequency.

**RESULTS** Despite some positive cross-sectional associations, high daily cortisol output ( $\beta=-0.285$ ), anger ( $\beta=-0.233$ ) and conduct problems ( $\beta=-0.182$ ) were associated with less adiponectin increase over time, in most cases independent of the tested confounders. The other directionality was not significant: no longitudinal prediction of stress by adiponectin.

**CONCLUSION** In healthy children, daily cortisol output and externalizing stress symptoms were negative predictors of adiponectin evolution. These findings highlight the health-compromising effects of psychosocial stress.

#### 177) Abstract 1542

##### **CHRONIC PSYCHOSOCIAL STRESS IN CHILDREN AND GUT HEALTH: GUT BARRIER FUNCTION, FECAL SHORT-CHAIN FATTY ACIDS AND BACTERIAL COMPOSITION.**

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**Objectives:** The mechanisms underpinning the association between chronic stress and gut health are poorly understood. We investigated the relationship of stress measures with bacterial produced short-chain fatty acids, bacterial composition and gut barrier function.

**Methods:** In 113 Belgian children (8-16y old), a fecal sample, hair sample and questionnaire data were collected. Biological measures of stress included hair cortisol (most proximal 3cm) and 5-minute heart rate variability (high frequency HRV). Self-report measures of stress included emotional problems and negative events. Fecal calprotectin was determined as a marker of intestinal inflammation and an indirect indicator of gut barrier integrity. Fecal short-chain fatty acids (butyrate, propionate, acetate, valerate, isobutyrate, isovalerate) were measured with gas chromatography. After DNA extraction and PCR, samples were sequenced by Miseq Illumina. Linear regression analyses were adjusted for sex, age, socio-economic status, BMI, fiber intake and protein intake.

**Results:** Emotional problems were significantly associated with higher butyrate ( $\beta=0.263$ ), valerate ( $\beta=0.230$ ), isovalerate ( $\beta=0.231$ ) and isobutyrate ( $\beta=0.233$ ). Heart rate variability reflecting higher parasympathetic activity was related to lower valerate levels ( $\beta=-0.217$ ). Hair cortisol was not associated with the short-chain fatty acids. None of the stress measures and none of the fecal short-chain fatty acids were significantly related to fecal calprotectin. Preliminary sequence data showed some stress differences, but data will be final by the congress date.

**Conclusions:** In healthy children, the impact of chronic stress is manifested more obviously in terms of short-chain fatty acids than in intestinal inflammation measured by calprotectin. The rather counterintuitive associations with butyrate point to the need for further research on gut microbiome composition. In addition, we are recruiting children with clinical depression to contrast that clinical population with the current 'healthy' population to hopefully detect more clear-cut differences.

#### 178) Abstract 1168

##### **METABOLIC RISKS IN ADOLESCENTS AT RISK FOR BIPOLAR DISORDER**

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**Background:** Bipolar disorder is associated in mid-life with increased cardiometabolic risks, increased rates of diabetes and heart disease, and excess premature mortality. We recently reported increased metabolic dysregulation in a sample of early bi-polar patients, relative to a demographically similar healthy comparison group. To investigate whether metabolic dysregulation precedes the onset of bipolar disorder, we compared selected metabolic measures in two at-risk groups of adolescents and a healthy comparison group.

**Methods:** We compared six metabolic measures (systolic BP, diastolic BP, heart rate, weight, BMI, and omega 3 index) in three groups of adolescents of mostly similar age, sex, and race distributions: 1) "High risk" offspring with one bipolar parent and a personal history of a depressive episode (N=67), 2) "At risk" offspring with one bipolar parent and no personal history of a depressive episode (N=54), and 3) "healthy comparison" offspring with no parental history of bipolar disorder and no personal history of depression (N=54). We calculated differences across metabolic measures by ANOVA controlling for age and sex.

**Results:** Clinically and statistically significant differences were observed for weight ( $p=0.03$  for high risk vs comparison) and omega 3 index ( $p<0.01$  for high risk vs comparison), with a trend for BMI ( $p=0.16$ ). In contrast to our expectations, heart rate was significantly lower in the high risk group vs the comparison group ( $p=0.02$ ). **Conclusions:** Adolescents at high risk for bipolar disorder were significantly heavier than the comparison group. Their significantly lower omega-3 index also suggests metabolic dysregulation in this high risk group may be due to dietary factors. Longitudinal follow-up data may identify whether these metabolic dysregulations are associated with higher rates of onset of bipolar disorder in the high risk and at risk subgroups.

#### 179) Abstract 1220

##### **EMOTIONAL JUDGEMENT IN ADULTS WITH AUTISM SPECTRUM DISORDER; AN FMRI STUDY USING A NOVEL PARADIGM**

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**BACKGROUND** Difficulty recognising the emotional and social cues of others is an important feature of Autism Spectrum Disorder (ASD). Whilst autistic patients do not show learning impairment in non-social domains, they often fail to understand emotional context within the environment, leading to impoverished social abilities. Previous neuroimaging studies have shown differing amygdala response to emotional stimuli in individuals with ASD. Interestingly, both hypo and hyper-activation have been noted. Whether there is a consistent differential activation of select brain regions in ASD patients following exposure to emotional stimuli is currently unknown.

**METHODS** 21 patients over 18 with a diagnosis of ASD were recruited, alongside 21 control participants matched for age, sex and IQ. All participants underwent fMRI. Whilst in the scanner they were shown a modified version of Simon Baron-Cohens' 'Mind in the Eyes' Task, originally developed as a test of adult Theory of Mind. This consisted of a series of cropped face stimuli, in which only the eye region was visible. Participants were asked to estimate the emotion shown and approximate age of each pair of eyes seen, out of four available choices.

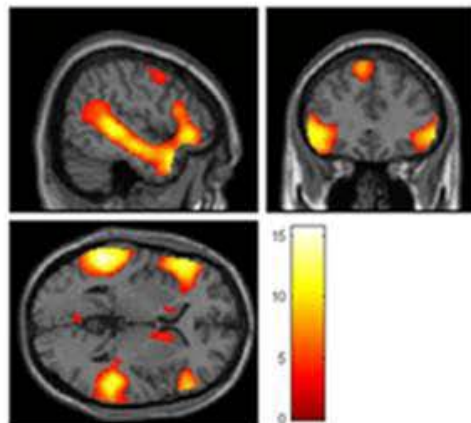
**RESULTS** Results showed brain activation across all subjects throughout the task in areas known to be involved with facial recognition and emotional processing, including the occipital cortex, fusiform face area, superior frontal gyrus, putamen, and the superior temporal sulcus. There was no statistically significant interaction between the autism or control group with regard to correctly assessing age vs. emotion. However, ASD patients showed amygdala hypoactivation during assessment of emotion when compared to control participants.

**CONCLUSIONS** This was a novel fMRI study with a unique paradigm. Unlike previous studies, the stimuli were identical across all conditions of the task, with the only change being the attentional focus. Our findings correlate with previous neuroimaging studies with regard to brain activation during face perception and emotional processing. Most significantly, the autism group showed a differential neural response when asked to make an emotional judgement. Although small, this study provides further evidence to support the theory of amygdala hypoactivation in response to emotional stimuli in the ASD population.

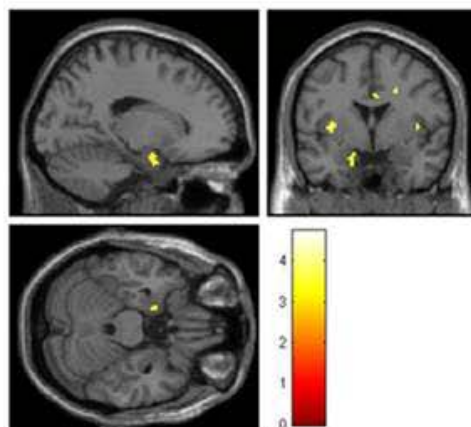
a) 'Mind In The Eyes' Task – age and emotion stimuli



b) Response across all subjects to emotional stimuli



c) Amygdala activation in ASD during age judgement



180) Abstract 1613

**HOW DO ALEXITHYMIA AND INTEROCEPTION RELATE TO BINGE DRINKING?**

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Rod Bond, Professor, Psychology, University of Sussex, Brighton, east sussex, england, Henrique Sequeira, Professor, Neuroscience, University of Lille 2, lille, hauts-de-france, France, Theodora Duka, Professor, Experimental Psychology, University of Sussex, Brighton, east sussex, england, Hugo Critchley, Professor, Neuroscience, Psychiatry, Brighton and Sussex Medical School, Brighton, east sussex, england

Alexithymia describes a dysfunction of emotional experience that is commonly expressed among individuals with addiction and alcohol abuse disorders. Alexithymic individuals are characterized by difficulties in identifying and describing their emotions. This impairment is linked to the development and maintenance of addiction. Moreover, an emergent theory suggests alexithymia is itself secondary to a failure of interoception (sensitivity to internal bodily signals).

The present study tested for hypothesized contributory roles of alexithymia and dysfunctional interoception in the expression of binge drinking. Alexithymia, subjective interoceptive sensitivity ('interoception sensibility'), and binge drinking scores were quantified using the Toronto Alexithymia Scale, the Body Perception Questionnaire and the Alcohol Use Questionnaire respectively, in a normative sample (N=445). Regression and bootstrapping mediation analyses were used to test the hypothesis that alexithymia mediated the association between interoceptive experience and binge drinking.

Alexithymia, interoceptive sensibility and binge drinking scores were all positively correlated. Mediation analysis revealed alexithymia fully mediated the relationship between interoceptive sensibility and binge drinking, such that the predictive effect of interoceptive sensibility on binge drinking became non-significant when controlling for alexithymia.

These results indicate that alexithymia is associated with subjective hypersensitivity to internal bodily sensations. Moreover, our findings support the theoretical proposal that alexithymia is an expression of impaired interoceptive processes that may lead to maladaptive coping strategies, including binge drinking. Our observations extend a growing literature emphasizing the importance of interoception and alexithymia in addiction, which can inform the development of new therapeutic strategies.

181) Abstract 1558

**ASSESSING THE LONGITUDINAL DIAGNOSTIC CONSISTENCY AND ACCURACY OF THE BECK DEPRESSION INVENTORY II IN CARDIAC PATIENTS**

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Objective: Depression represents an independent risk factor for cardiovascular disease morbidity and mortality, yet primary care screening utilizes inconsistent methodologies that often have been validated with non-cardiac populations. This study aimed to explore psychometric properties of the Beck Depression Inventory-II (BDI-II) in cardiac patients, to assess its stability across a six year period, and to identify potential cutoff values for depressive disorders.

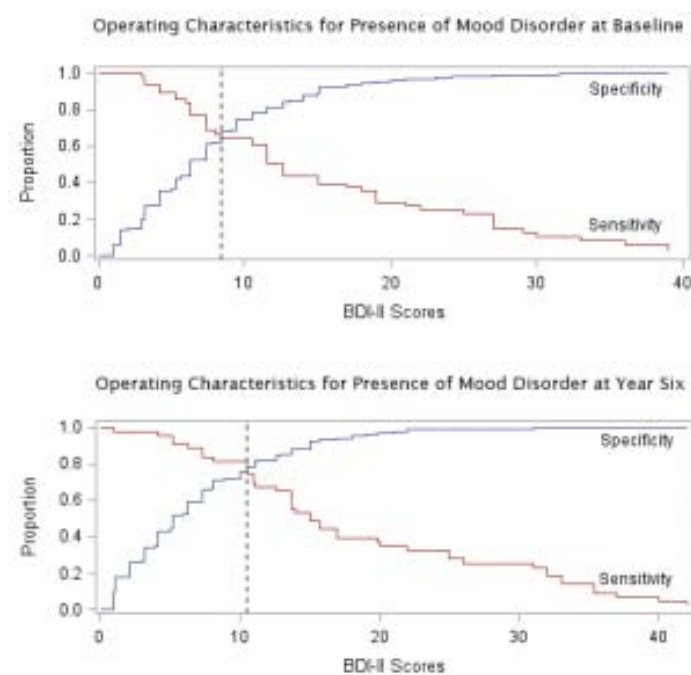
Methods: A sample of outpatients referred for stress testing at the Montreal Heart Institute was recruited (n = 380). Patients were administered the PRIME-MD, a brief psychiatric screening interview, by a graduate student or trained research assistant, to assess the presence of a DSM-IV-TR mood disorder (MD). Patients also completed the BDI-II on the day of their stress test. At a year six follow-up, patients were re-administered the PRIME-MD by telephone, and completed the BDI-II questionnaire by mail. Analyses used SPS 9.3, with the Harris (2010) ROC Macro.

Results: Based on PRIME-MD criteria, 77% of the patients did not present with MD at either time point, while 3.4% had MD across both



time points. 11% had MD at baseline, but not follow-up, while 9% did not have MD at baseline, but did at follow-up. BDI-II scores at baseline ( $M=8.23$ ,  $SD=6.98$ ) and year six ( $M=7.94$ ,  $SD=7.46$ ) showed moderately-strong correlation ( $r=.64$ ). ROC curves to assess performance accuracy of BDI-II at identifying MD were constructed for baseline and year six values. Though curves were similar, baseline did have a slightly smaller area under the curve (0.75) than year six (0.84). In figure 1, sensitivity and specificity scores are graphed along BDI-II scores, with the intercept point representing the BDI-II cut-off score with maximal sensitivity and specificity. Calculated cutoff scores were 8.4 at baseline, and 10.5 at year six.

Conclusions: Despite a large portion of the sample (20%) experiencing changes in MD status between baseline and year six, the psychometric properties of the BDI-II remained relatively consistent, suggesting it may represent a stable screening tool for use with cardiac patients. Though results suggest a cutoff score of 8 to 10 may optimize both sensitivity and specificity, it should be noted that different cutoffs may be used in clinical practice if additional sensitivity or specificity is required.



## 182) Abstract 1285

### THE BLURRED DIAGNOSTIC LINE OF CATATONIA AND NEUROLEPTIC MALIGNANT SYNDROME IN PSYCHOSOMATIC MEDICINE

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Introduction: Historically the diagnoses of catatonia and neuroleptic malignant syndrome (NMS) are thought of as distinct medical conditions. Catatonia has symptoms such as abnormal psychomotor activity, abnormal verbal communication, and negativism. While NMS, in the context of neuroleptic use, consists of hyperthermia, autonomic instability, rigidity, and altered sensorium. Through a psychosomatic medicine (PM) case report and a literature review, we wish to explore the overlapping findings of catatonia and NMS which may represent a diagnostic challenge to clinicians.

Case Presentation: The patient is a 60 year old male, with a diagnosis of schizophrenia, who was medically hospitalized for lethargy. Approximately 4 weeks prior to hospitalization, the patient was started on haloperidol. On evaluation by the PM service, the

patient appeared to be in a catatonic state. And while the patient's physical exam and lab findings were abnormal, his vitals were found to be stable. The PM service recommended holding his neuroleptic. On hospitalization day 5, the patient had improved physical exam and lab findings, but was not displaying improved mental status findings on exam. On hospitalization day 7, the patient was given a low dose trial of haloperidol. The patient within hours had concerning acute changes in mental status and lab findings. The patient's neuroleptic was held and his mental status soon after improved. On hospitalization day 10, the patient was started on lorazepam and within hours had improved mental status findings. On hospitalization day 15, the patient was deemed safe for discharge by the PM service.

Discussion: Catatonia is a recognized psychiatric diagnosis, while NMS is a medical condition where neuroleptic use is the primary cause of its diagnostic clinical findings. But in the case presented above, the patient appears to have elements of both. The patient had been started on a high potency neuroleptic prior to his presentation and restarted on it while hospitalized. In both instances, he clinically worsened displaying partial findings traditionally observed in NMS. Yet, the patient presented in a catatonic state and responded to a treatment for catatonia. Upon a review of the literature and the case presentation above, it appears likely that neuroleptic induced catatonic states represent a stage in a spectrum between catatonia and NMS.

## 183) Abstract 1557

### ASSESSING THE INFLUENCE OF MIGRANT STATUS ON SELF-RATED HEALTH AND MENTAL HEALTH OUTCOMES: A CROSS-SECTIONAL STUDY OF ARAB AMERICANS IN MICHIGAN

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Objective: The U.S. Census Bureau estimates that 1.9 million Americans are of Arab descent, with Michigan hosting the second greatest number of Arab Americans. A growing body of research indicates that refugees, immigrants, and immigrant-born children are either directly or indirectly subject to a host of pre- and post-migration stressors that can influence their mental health and overall wellbeing. This study examines how resident status, classified as refugee, immigrant, or U.S. born Arab, affects self-rated health, depression and anxiety.

Methods: Data were collected from Dearborn, Michigan at a community organization that provides health and social services to Arab Americans ( $n=275$ ). Of these, 55 were U.S.-born, 153 identified as immigrants and 67 as refugees. All participants completed an English (44%) or Arabic-language (56%) questionnaire covering demographics, health conditions, mental health, and risk behaviors. The sample was 62% female and the mean age was  $38.66 (\pm 14.60)$  years.

Results: In linear regression analysis adjusting for age and sex, refugee status was significantly associated with lower self-rated health ( $p=0.0002$ ), greater depression scores ( $p=0.0003$ ), and greater anxiety scores ( $p=0.05$ ) compared with U.S. born Arab Americans. There were no significant differences between immigrants and U.S. born Arab Americans in any of these outcomes. After further adjustment for marital status and duration of living in the U.S., refugee status remained significantly associated with self-rated health ( $p=0.02$ ) and depression ( $p=0.01$ ). After further adjustment for education, refugee status was marginally associated with poorer self-rated health ( $p=0.07$ ), but remained significantly associated with higher depression scores ( $p=0.02$ ).

Conclusion: In this convenience sample of Arab Americans from South-Eastern Michigan, those reporting refugee status appeared to have poorer self-rated and mental health in comparison to immigrants



and U.S. born Arab Americans. With the growing refugee population in the United States and worldwide, more systematic efforts are required to examine the magnitude and determinants of their physical and mental health challenges.

#### 184) Abstract 1234

##### **STRESSFUL LIFE EVENTS AND HEALTH: THE DIFFERENTIAL IMPACTS OF TRAIT REAPPRAISAL AND SUPPRESSION ON CARDIOVASCULAR FUNCTIONING, INFLAMMATION, AND PSYCHOLOGICAL DISTRESS**

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Exposure to stressful life events (SLEs) is known to negatively impact both psychological and physical health. Prior research has indicated a link between trait emotion regulation strategies and psychological wellbeing, as well as physiological response to acute stress in a laboratory. However, the effects of trait emotion regulation strategies and SLEs on physiological functioning and psychological distress at rest are unknown. As part of a larger study comparing immune functioning of healthy smokers and nonsmokers, we examined the interactive effects of two emotion regulation strategies and number of SLEs on blood pressure, resting heart rate (HR), heart rate variability (HRV), C-reactive protein (CRP), perceived stress, and depressive symptoms. Using Model 1 of the PROCESS Macro for SPSS, moderation analyses controlling for smoking status, age, sex, and BMI surprisingly yielded no significant interactions between exposure to SLEs and suppressive emotion regulation for any outcome. The same analyses for reappraisal revealed significant interaction effects for exposure to SLEs and reappraisal in predicting resting HR ( $\Delta R^2=.07$ ,  $p<.05$ ), HRV ( $\Delta R^2=.08$ ,  $p<.05$ ), CRP ( $\Delta R^2=.10$ ,  $p<.01$ ), perceived stress ( $\Delta R^2=.11$ ,  $p<.05$ ) and depressive symptoms ( $\Delta R^2=.02$ ,  $p<.10$ ), but not blood pressure (NS). Overall, reappraisal, but not suppression, moderated the relationship between SLEs and health differentially by system. When exposed to fewer SLEs, higher reappraisal seems to have beneficial impacts on perceived stress, depressive symptoms, and CRP. Conversely, higher reappraisal appears to be more taxing on the cardiovascular system at low SLE occurrence compared to those with lower reappraisal. In response to more SLEs, however, low reappraisers' HR increased and HRV decreased, resulting in levels similar to those with higher reappraisal. Additionally, as exposure to SLEs increased, participants higher in reappraisal had greater CRP and perceived stress. No effect existed for lower reappraisers, whose levels were elevated regardless of SLE exposure. Thus, at rest, trait reappraisal may only be psychologically and immunologically protective with lower SLE occurrence. Findings contribute to the understanding of how reappraisal and suppressive emotion regulation strategies impact psychological health and physiological functioning at rest.

#### 185) Abstract 1533

##### **DISTRESS AND COPING IN ADJUSTMENT TO RECENT HIV INFECTION DIAGNOSIS**

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**Objectives:** To evaluate psychological dimensions, including coping, prior psychiatric conditions and other comorbidities which interfere with adjustment to a recent HIV infection diagnosis.

**Methodology:** Participants completed *Distress Thermometer*, *Brief Symptom Inventory* (BSI), *Hospital Anxiety and Depression Scale* (HADS) and *Brief Cope* (BC). Sociodemographic data well as

clinical data were also recorded. Results were analyzed with IBM *Statistical Package for Social Sciences* 20 (SPSS).

**Results:** Preliminary sample consists of 30 HIV+ outpatients recently admitted at the Infectious Diseases Clinic at Hospital de Santa Maria (Lisbon). Their age ranges between 23 and 75 years (*mean* 40.1,  $\pm$  12.9) and 83.3% are males. Education was 12 years or more in 58,6%, and 52,4% were engaged in a stable relationship.

HADS mean scores were 5.45 ( $\pm$ 4,8) for Depression, 7.7 ( $\pm$ 4,7) for Anxiety and, concerning Distress Thermometer, the mean score was 6.2  $\pm$  3.7. Mean scores for BSI dimensions near clinical significance were 1,09 ( $\pm$  0,75) for Paranoid Ideation, 0,99 ( $\pm$  0,87) for Depression, 0,99 ( $\pm$  0,67) for Obsession-compulsion and 0,92 ( $\pm$  0,61) for General Symptoms Index. The coping dimensions presenting the highest mean scores were: Acceptance (2,98), Active Coping (2,90) and Planning (2,81).

Correlations pattern highlight a positive association between BC dimension Denial and BSI Somatization (0,654), Interpersonal Sensitivity (0,590), Phobic Anxiety (0,604), Paranoid Ideation (0,497) and Psychoticism (0,604), as well as HADS Anxiety (0,59) and Depression (0,49). BC Dimension Reorganization showed a negative significant correlation with HADS Depression (-0,443). Distress Thermometer, HADS Anxiety (0,571) and Depression (0,556), BSI Somatization (0,606) and BSI Depression (0,527) were also positively correlated.

In a Linear Regression model, using HADS scales as independent variables and *Brief Cope* dimensions as the dependent ones, the predictive model attained statistical significance for HADS Depression scale (*R Square* = 0.802, *Sig* = 0.030).

**Discussion:** Results suggest a significant relation between specific coping styles and depression levels – namely, Denial and Reorganization. These results stress the relevance of evaluation and early intervention in more vulnerable patients, in order to prevent psychopathological symptom barriers to HIV treatment management.

#### 186) Abstract 1265

##### **SYSTOLIC BLOOD PRESSURE VARIABILITY IS ASSOCIATED WITH DEPRESSION AND ACCELERATED COGNITIVE DECLINE OVER 10 YEARS: THE 3C DIJON MRI STUDY**

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**Background:** Accumulating evidence links blood pressure variability (BPV) with white matter hyperintensities (WMH) and stroke. The longitudinal association between BPV with cognitive function and depression remains unexplored.

**Methods:** Prospective cohort study of 2870 participant's age 65 years (median age 73 years, 63.8% female) without dementia. Serial clinic visits assessed blood pressure, cognitive function, depression disorder, and depressive symptoms. A brain magnetic resonance imaging (MRI) substudy was performed in 1275 persons to examine possible interactions between BPV and WMH.

**Results:** Symptomatic late onset depression and systolic BPV interaction terms were associated with cognitive decline on the Isaac Set Test (slope -5.89; 95% CI -9.63 to -2.15,  $p = .002$ ), Benton Visual Retention Test (slope -1.11; 95% CI -2.04 to -.18,  $p = .02$ ), Mini Mental State Examination (slope -.99; 95% CI -1.97 to -.02,  $p = .046$ ), and Finger Tapping Test (slope -.03; -.06 to .00,  $p = .05$ ) but not Trail Making Test B/A. The MRI substudy demonstrated that systolic BPV was associated with cognitive decline via interactions with depression and total WMH volume, but this was not dependent on either deep or periventricular WMH volumes.

**Conclusions:** The interaction between systolic BPV with depression and WMH volume was associated with accelerated cognitive decline. The findings raise the possibility that agents lowering systolic BPV could mitigate cognitive decline via reduced WMH burden in elderly populations.

**187) Abstract 1176****THE RELATIONSHIP BETWEEN MOOD AND ANXIETY DISORDERS AND CARDIOVASCULAR RISK: THE ROLE OF RUMINATION**

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**The Relationship Between Mood and Anxiety Disorders and Cardiovascular Risk: The Role of Rumination**

Cardiovascular disease (CVD) is the leading cause of death in adults in the United States. Given that approximately only 50% of new CVD cases can be predicted by currently known risk factors, much effort has been devoted to identifying other potential risk factors. Perseverative cognition (PC), mainly present in Major Depressive Disorder (MDD) and Social Anxiety Disorder (SAD) in the form of rumination, has been recognized as playing a role in the development of CVD. This study compares data on the role of PC in the interaction between SAD, MDD, and increased CV risk in 18 SAD subjects, 18 MDD subjects, and 18 healthy controls. Ambulatory heart rate (HR) and variability (HRV) of subjects was recorded for 24hrs while concurrently reporting their thoughts, moods, and activities via electronic diaries every 25-35min during waking hours. Random regression models were performed. Data for 16 SAD subjects has been acquired with 2 subjects yet to be recorded and analyzed. Compared to controls, MDD subjects reported more episodes of PC. In both groups, PC required more effort to be inhibited and interfered more with ongoing activities compared to mind wandering (MW) ( $ps < 0.0001$ ). This cognitive rigidity corresponded with autonomic inflexibility, with rumination characterized by lower HRV ( $p < 0.0001$ ) compared to MW. A worse mood was reported by MDD patients compared to controls, independent of their ongoing cognitive process. However, controls showed the highest mood worsening during PC compared to being on task and MW. HRV during rumination correlated with self-reported somatic symptoms on the same day and with several dispositional traits. MDD subjects showed lower HRV during sleep, which correlated with hopelessness rumination. Results showed PC is associated with autonomic dysfunctions in both healthy and MDD subjects. Unlike previous studies that artificially induced PC in the laboratory, this study's use of ecological momentary assessment enabled the interception of this phenomenon without losing its main characteristics of automaticity and spontaneity.

Keywords: perseverative cognition, rumination, mind wandering, heart rate, heart rate variability, ecological momentary assessment, ambulatory monitoring, social anxiety disorder, major depression disorder.

**188) Abstract 1608****EXAMINING PAIN AND HAZARDOUS DRINKING AMONG LATINOS IN PRIMARY CARE: EMOTION DYSREGULATION AS A POTENTIAL EXPLANATORY MECHANISM**

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**Method:** Participants were 252 low-income Latino adults ( $M_{age}=38.7$  years,  $SD=10.8$ ; 86.1% female; 95.2% reported Spanish as first language) attending a primary health care clinic in a large southwestern city in the United States. Participants completed self-report measures of pain, emotion dysregulation, and alcohol use. Analyses were conducted using PROCESS for SPSS (Hayes & Preacher, 2013), which estimates indirect effects of a predictor (X) on a

criterion (Y) via an intermediary variable (M). The indirect effect (ab) is computed as the product of path a (the effect of X on M) and path b (the effect of M on Y). Bootstrapping with 10,000 re-samplings was conducted to detect significance of the indirect effects.

**Results:** There were significant indirect effects of pain intensity via emotion dysregulation and pain-related disability via emotion dysregulation in relation to hazardous drinking. The indirect effect was small for pain intensity via emotion dysregulation and medium for pain-related disability via emotion dysregulation. Effects were evident after controlling for sex, marital status, education, and years in the United States. Post-hoc tests found similar indirect effects in relation to alcohol consumption and alcohol-related problems ranging in size from small to medium. Alternative models examined 'reverse' indirect effects (i.e., emotion dysregulation via pain and pain via hazardous drinking, respectively) and were statistically rejected.

**Conclusion:** Findings provide novel insight that among Latinos in primary care, emotion dysregulation is a possible explanatory factor underlying pain and alcohol use associations. Future work could evaluate treatments targeting emotion regulation among Latinos in primary care.

**189) Abstract 1221****AFFECTIVE IMPAIRMENT IN CHRONIC LOW BLOOD PRESSURE**

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Physical complaints such as faintness, dizziness, cold limbs and headaches have been well-established in chronic low blood pressure (hypotension). This study investigated the occurrence of adverse emotional states and the symptoms of depression in this condition. As autonomic dysregulation, particularly diminished sympathetic tone, is believed to be involved in the etiology of hypotension, the impact of different facets of autonomic cardiovascular control on mood and depressive symptoms was also explored. Forty individuals with chronic hypotension and forty normotensive control persons were presented with the Mood Scale and Beck Depression Inventory. Stroke volume, cardiac output, pre-ejection period, Heather index and aortic peak blood flow velocity were recorded under resting conditions as indices of beta-adrenergic inotropic drive. Respiratory sinus arrhythmia and baroreflex sensitivity were additionally obtained. Hypotensive individuals scored markedly higher on both questionnaire scales than controls, indicating an adversely affected emotional state and more severe depressive symptoms. In the entire sample, cardiac output, Heather index, and aortic peak blood flow velocity correlated negatively with the questionnaire scores; according to regression analysis, the Heather index explained the largest proportion of test score variance. Although hypotension does not constitute a serious medical condition, the findings of an adverse affective state and increased burden with depressive symptoms corroborate the view that it can have a considerable impact on wellbeing and quality of life. The correlations of the beta-adrenergic indices with the questionnaire scales indicate that cardiac sympathetic regulation plays a key role in the psychophysiological mediation of hypotension-related mood impairment.

#### 190) Abstract 1280

### ASSOCIATIONS BETWEEN THE FIBROMYALGIA DIAGNOSTIC CRITERIA OF THE AMERICAN COLLEGE OF RHEUMATOLOGY (ACR 2010) AND CENTRAL SENSITIZATION TO PAIN, PAIN SENSITIVITY, CLINICAL PAIN, AFFECTIVITY, FATIGUE AND INSOMNIA

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Twenty-four women with FM were assessed with the WPI, SS, State-Trait Anxiety Inventory, Beck Depression Inventory, McGill Pain Questionnaire, Perceived Stress Questionnaire, Fatigue Severity Scale and Oviedo Sleep Questionnaire. Pain threshold and tolerance and central sensitization (by the use of a temporal summation protocol) were measured by pressure algometry. Associations were analyzed by Pearson correlations and multiple linear regressions.

Results showed significant positive correlations between WPI and SS scores and clinical pain (especially the sensorial component), anxiety (especially trait-anxiety), perceived stress, depression, fatigue, and insomnia. SS scores, specifically waking unrefreshed and cognitive symptoms, were inversely associated with pain threshold and tolerance. No associations were obtained with central sensitization as measured by the summation procedure. Regression analysis showed that insomnia was the main predictor of both the WPI and SS scores.

We conclude that the ACR (2010) FM Criteria are associated with several symptoms domains of FM and some item of the SS scale especially with pain sensitivity. However, they do not index the suggested underlying pathophysiology of FM (central sensitization processes). It is suggested that the WPI and SS scales, as self-reported measures, may include a negative affect component that might artificially increase the intensity and frequency of self-reported symptoms.

Keywords: Fibromyalgia, pain, affectivity, central sensitization, diagnostic criteria.

#### 191) Abstract 1056

### EXPOSURE TO LOW-WAVELENGTH LIGHT DOES NOT INFLUENCE ACUTE PAIN SENSITIVITY BUT DOES INCREASE RATINGS OF PERCEIVED STRESS

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Low-wavelength blue light has an alerting effect on circadian pathways, and may increase levels of norepinephrine and serotonin. These neurotransmitters are implicated in mood and pain processing. Previous studies have suggested that phototherapy (exposure to low-wavelength light) may enhance mood in some individuals. Given the link between mood and pain sensitivity, this study investigated the influence of low-wavelength blue light on reports of stress and acute pain. Thirty-seven individuals (21 females, 16 males) were randomly assigned to sit with the light on (experimental group;  $n = 18$ ) or off (control group;  $n = 19$ ) for 20 minutes. During this time period they relaxed and colored for 10 minutes, then filled out a demographic questionnaire, the Perceived Stress Scale, and a pain history questionnaire. The pain history questionnaire asked participants to rate their perception of past physical pain (i.e. sharp, blunt, cold or hot) by using a slider to rate the pain on a scale from 0 - 100. After the questionnaires, participants underwent the cold-pressor pain task, during which their pain threshold, tolerance, intensity, and unpleasantness ratings were assessed. Analyses indicated that exposure to the light did not influence pain threshold, tolerance, intensity, or unpleasantness ratings (all  $ps > .10$ ). Similarly, light exposure did not influence scores on the pain history questionnaire. However, participants who were exposed to the light reported higher levels of

perceived stress than people not exposed to the light,  $t(34) = 2.17, p = .037$ . The data also indicated that a significant positive correlation exists between a participant's responses to physical pain history questionnaire and their acute pain perception. Participants who reported feeling more pain in previous instances, rated the cold pressor task as more intense ( $r = .36, p = .044$ ) and unpleasant ( $r = .50, p = .004$ ). The results of this ongoing study indicate that exposure to low-wavelength light does not influence pain sensitivity, but may influence perceptions of stress. Additionally, perception of pain may be influenced by past painful experiences. Further research on these issues is warranted.

#### 192) Abstract 1486

### THE RELATIONSHIP BETWEEN FIBROMYALGIA AND DISSOCIATIVE EXPERIENCES IS MEDIATED BY SYMPTOMS OF ORTHOSTATIC INTOLERANCE

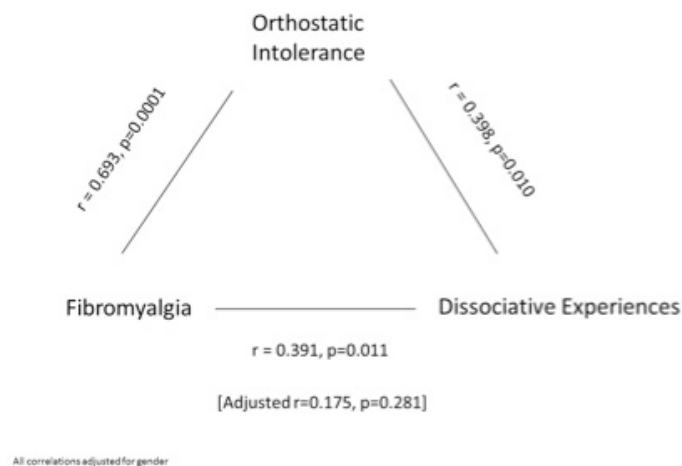
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**Background:** Non-musculoskeletal difficulties are common in Fibromyalgia and impact significantly on quality of life, including problems such as 'brain fog.' Interestingly high rates of dissociative experiences are reported in Fibromyalgia. Additionally, patients with Fibromyalgia may experience dysautonomia, particularly associated with orthostatic intolerance (e.g. PoTS). Fibromyalgia and dysautonomia are both associated with disorders of connective tissue, joint hypermobility.

**Methods:** 21 patients with Fibromyalgia (20 female; mean age 41.86 yrs) were recruited alongside 22 healthy controls (16 female; mean age 44 yrs). All completed the ASQoLS autonomic dysfunction scale, which includes orthostatic intolerance measures and the Dissociative Experiences Scale. Assessment for joint hypermobility/EDS-HT was performed using Brighton Criteria. Statistical comparison between groups was performed using independent samples t test. Mediation analyses were conducted according to the method of Baron and Kenny.

**Results:** The Fibromyalgia group reported greater (mean, SEM) dissociative experiences (48.67, 9.99) than the control group (18.14, 2.72,  $p = 0.005$ ) and greater symptoms of orthostatic intolerance (41.90, 4.93) than controls (8.64, 1.0,  $p = 0.001$ ). After adjusting for gender, the relationship between fibromyalgia and dissociation, ( $r = 0.391, p = 0.011$ ) remained significant. Additionally adjusting for symptoms of orthostatic intolerance rendered this relationship non-significant ( $r = 0.175, p = 0.281$ ), suggesting full mediation (Fig 1). Interestingly all three variables (Fibromyalgia, dissociative experiences and orthostatic intolerance) correlated significantly with the presence of joint hypermobility syndrome/EDS-HT.

**Discussion:** This is the first study, to our knowledge, to explore mediators of the relationship between fibromyalgia and dissociation, with the finding that dissociative experiences are fully mediated by symptoms of orthostatic intolerance. Both patients with fibromyalgia and PoTS frequently report brain fog. It may be that this is related to dissociation. This study would suggest such symptoms are mediated by autonomic dysfunction, which is related to underlying abnormalities of connective tissue, and offers possibility for treatments of often debilitating symptoms. Further study, including formal autonomic function testing, is underway.



### 193) Abstract 1390

#### ESTABLISHING A NEW SCREENING TOOL FOR PEDIATRIC SOMATIZATION FOR PHYSICAL THERAPISTS IN CLINICAL SETTING

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**Introduction:** Functional Somatic Symptoms (FSS) affects many children and adolescents. Typically, the patient's complaints do not coincide with the information gathered during the physical evaluation process. Treating these children is one of the most frustrating impediments for the physical therapists (PT). In addition, working with children presenting FSS requires a specific and different treatment approach (e.g., multidisciplinary treatment), compared to other children with physical disabilities. Therefore, it is important for PTs to identify indicative signs of FSS. **Purpose:** to establish a new screening tool for pediatric FSS, Pediatric Somatoform Screening – Physical Therapists (PedS-PT) for PTs in clinical setting. **Methods:** The PedS-PT was developed based on clinical experience and the literature pertaining to behavioral presentations of children with FSS (e.g., behavioral lability, lack of trust, "La Belle Indifference"). The scale's total score ranges from 0-11, with higher scores indicating higher FSS behavioral presentations. All participating children were diagnosed with FSS by a physician, prior to their admission to our pediatric rehabilitation center. The PedS-PT was completed by experienced pediatric PTs following the first two PT sessions. The PedS-PT internal consistency was investigated by Cronbach's alpha ( $\alpha$ ) coefficient. Overall reliability was assessed by intraclass correlation coefficient (ICC). The frequency of each FSS symptom was calculated and compared using Chi Square test. **Results:** Participated in this study 21 children with FSS (mean age:  $13.46 \pm 3.21$ ; 16 females) with mean FSS duration of  $6.92 \pm 7.02$  months. On average children presented six FSS behavioral presentations (range: 3-9 presentations). Out of the 11 items, in three items the distribution of answers ("Yes/No" FSS behavioral presentations) was significantly different ( $p < 0.05$ ) (e.g., "intensification of symptoms during therapy session") (Chi Square=3.85). PedS-PT internal consistency was acceptable (Cronbach's alpha= 0.772). ICC was moderate (0.550). **Conclusion:** The PedS-PT scale was found to be acceptable as a screening tool. Development of such a screening scale requires further examination. The tool is currently in the process, based on the results of this preliminary study.

### 194) Abstract 1207

#### PERCEIVED MORAL VALUE INCREASES PAIN SENSITIVITY

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A large body of research indicates that cognitive appraisal processes are central to pain. Little is known, however, about the influence of moral value on pain, or how pain is affected by social context. It was hypothesized that appraisals of moral value would affect pain experience and expression. Sixty-nine healthy adults completed the Moral Identity Scale (MIS), an initial cold-pressor test (CPT 1), and the McGill Pain Questionnaire (MPQ). Next, participants were randomly assigned to either a high or low perceived moral value condition, manipulated by instructions from a confederate. Both instructions were similar in structure and length, though it was emphasized that the study was "important to help improve treatments for those who suffer from pain" in the high moral value condition. Next, the confederate left the room and the participant and experimenter (blind to condition) continued with the second CPT (allegedly to establish "reliability of measurement"), and completed the MPQ. Facial pain behaviour was coded (blind to condition) during the 5-seconds of hand removal from the CPTs. The primary analysis included a 2 (high vs. low MIS) x 2 (high vs. low moral value condition) x 2 (CPT 1, CPT 2) general linear model for the MPQ. High moral value resulted in a relative increase in total pain as well as sensory pain in particular,  $F(1,61) = 7.84, p = .007, n2p = .114$ ;  $F(1,62) = 7.88, p = .007, n2p = .117$ , respectively. Similarly, there was also a significant condition x MIS interaction for facial pain behaviour,  $F(1,62) = 8.25, p = .006, n2p = .117$ . Specifically, participants in the high moral value condition showed a relative increase in facial pain behaviour, but only among those with low MIS. Results suggest moral value may increase pain sensitivity, perhaps through the influence of what we describe as an embodied instrumentality heuristic (Labroo & Kim, 2009). Painful experiences with a prosocial goal may lead to greater pain sensitivity. In conclusion, perceived moral connotation can alter a seemingly objective, low-level sensory process. Practical applications include health-care contexts in which painful procedures can be introduced at varying levels of subjective involvement.

### 195) Abstract 1162

#### SUPPORT THAT FLIES UNDER THE RADAR: INDIRECT EFFECTS OF INVISIBLE SUPPORT ON PULMONARY FUNCTION AMONG PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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**Objective:** Patients with a chronic illness like Chronic Obstructive Pulmonary Disease (COPD) rely on loved ones for social support; however, evidence for the beneficial effects of perceived support is mixed. Emerging research on a novel way of examining support interactions demonstrates that *invisible* support – support provided outside of the recipient's awareness – is linked with positive psychological outcomes. As research on the dyadic effects of social support on health outcomes is limited, the current study examined if invisible support was predictive of better pulmonary function. Specifically, we hypothesized that effects of invisible support would be mediated by reductions in depressive symptoms and illness perceptions. **Methods:** Data were collected from 66 patient-caregiver dyads enrolled in a multi-site study of self-management of chronic obstructive pulmonary disease (COPD). Patients completed measures of illness

perceptions (BIPQ), depressive symptoms (PHQ-9) and lung function (Predicted FEV<sub>1</sub>). Patients provided information on receipt of social support from caregivers while caregivers reported on provision of support to patients (CISS). Invisible support was calculated using the residual difference between caregiver-reported and patient-reported support.

**Results:** Participants were predominantly women (62% of patients; 75% of caregivers). Based on PHQ-9 cutoff scores, 32% of patients reported mild depression and 36% reported moderate to severe depression. Mean FEV<sub>1</sub> was 0.59 (SD=0.28). Consistent with our hypothesis, there were no direct effects of invisible support on lung functioning, but there were significant indirect effects on FEV<sub>1</sub> ( $b=-0.075$ , bootstrap 95% CI: -0.15, -0.03) through reductions in depression and negative illness perceptions.

**Conclusions:** Findings suggest that invisible support may lead to better physical health via improved psychological well-being for patients with chronic diseases like COPD. Dyadic interventions designed to improve support transactions between patients and caregivers may be beneficial in terms of addressing vulnerabilities in chronically ill populations.

#### 196) Abstract 1427

##### **MOTIVATIONS FOR MEDITATING: AN EXPLORATION OF THE MOTIVATIONAL, PERSONALITY AND PRACTICE CHARACTERISTICS OF MEDITATION PRACTITIONERS**

*Deanna M. Kaplan, MA, Matthias R. Mehl, PhD, Department of Psychology, University of Arizona, Tucson, AZ*

Research suggests that meditation can have positive health outcomes in both healthy and clinical populations, but little is known about what motivates people to begin and maintain a meditation practice. Given that the health benefits of meditation are positively associated with participants' adherence and practice time (e.g., Pace et al., 2009), understanding the motivational factors associated with adopting and sustaining a regular meditation practice may have important implications for the implementation of meditation-based interventions. Individuals with any kind of meditation practice ( $N=401$ ) were recruited from U.S. and international meditation communities to complete an online survey. Participants were asked to describe their meditation practice, their motivations for beginning and continuing to meditate, and completed the Ten Item Personality Inventory (TIPI). Grounded theory was used to identify seven overarching motivations for practicing meditation: health improvement, emotion regulation, thought modulation, personal development, benefiting others, outside influence, and curiosity. Emotion regulation (37%) and health improvement (31%) were the most common reasons for beginning meditation. Personality domains were associated with participants' current practice characteristics and motivations for beginning meditation (e.g., openness was positively associated with retreat experience; neuroticism was positively associated with regular contact with a meditation teacher; conscientiousness and neuroticism were associated with beginning meditation to improve one's health). This research has implications for minimizing attrition and maximizing adherence in meditation-based interventions.

#### 197) Abstract 1232

##### **UNDERSTANDING INTERSECTIONAL PATTERNS OF REPORTING DISCRIMINATION AND IMPLICATIONS FOR HEALTH DISPARITIES.**

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Experiences of discrimination, and the specific attributions (reasons/sources) as to its cause, predict worse health outcomes and

help explain health disparities. Also, belonging to multiple stigmatized groups ('intersectionality') may uniquely relate to level of mistreatment and attributions of discrimination. Adopting this intersectional approach, we examined the relationship between aspects of social identity and level of perceived mistreatment and attributions for discrimination. A diverse community sample of 292 adults (mean age 55 years; 53% female; 42% Black; 39% HS degree; 68% annual income <\$40K) reported amount of mistreatment and attributions of discrimination. Younger ( $p<.001$ ), Black ( $p<.001$ ), and those of lower SES ( $p=.04$ ) reported more mistreatment, but no intersectional effects (interactions) were identified for overall level of discrimination. Regarding attributions, a race by age interaction ( $p=.04$ ) revealed that Whites were less likely to endorse race as an attribution with higher age, but endorsement was uniformly high for Blacks. Females ( $p<.001$ ) and Blacks ( $p<.001$ ) more frequently attributed discrimination to sex. A sex by SES interaction ( $p=.05$ ) showed a crossover pattern; females were more likely than males to attribute discrimination to age at lower SES, but males were more likely to endorse age at higher SES. A similar crossover age by sex interaction ( $p=.02$ ) found that young females were more likely than young males to attribute discrimination to education, but older males were more likely to endorse education than older females. A race by SES interaction ( $p=.05$ ) indicated that Whites, but not Blacks, attributed discrimination to financial causes less frequently at higher SES. These findings suggest that research seeking to understand health disparities related to discrimination may benefit from examining the multiple social identities contributing to discrimination. In particular, our intersectional results were related to *attributions* for discrimination. Thus, the consequences of belonging to multiple stigmatized groups, and contexts where discrimination is attributed to multiple sources, may have particular relevance for health and well-being (e.g., for tailoring interventions to reduce health disparities).

#### 198) Abstract 1459

##### **SOCIAL MEDIA USE DURING CRISIS: THE UTILIZATION OF FACEBOOK IN RESPONSE TO CAMPUS VIOLENCE**

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Social media has become an important resource during and after crises. Platform affordances such as real-time information sharing and broad network reach have the potential to facilitate previously unprecedented communication among victims, witnesses, and their associated social network members. However, little is known about how social media is used in response to trauma, and how it may influence (long-term) well-being. Given the reliance on virtual communication during crises, as well as the importance of social support and emotional expression in promoting recovery after trauma, the current study assessed Facebook use for the purposes of seeking information, seeking social support, and expressing emotions in response to the acts of violence carried out at the University of California, Merced in November of 2015. Students ( $n = 552$ ) reported their uses of Facebook on the day of the attacks and their current depressive and post-traumatic stress disorder (PTSD) symptoms five months after the attacks. Results showed that many students were experiencing psychological distress even after five months. The majority of students reported using Facebook more, and in different ways than normal in response to the events, with most reporting using it to seek information. Although students reported short-term affective change, using the site to seek information, seek social support, or express emotions was not significantly associated with depressive or PTSD symptoms five months later. Findings highlight the lasting impact of campus violence on psychological well-being as well as the function and impact of social media use during crisis.



### 199) Abstract 1488

#### PARENTING BEHAVIOR AND PERSONALITY AS SIGNIFICANT PREDICTORS FOR THE SEVERITY OF SOCIAL ANXIETY DISORDER

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The relationship between parenting behavior, temperament and social anxiety disorder in adulthood is far unsettled. In the present study, we investigated this relationship and formulated on the basis of previous studies the following hypotheses: Social phobics (SP) compared to controls remember more parental control, less parental care, show higher harm avoidance as well as lower self-directedness. Abovementioned factors can explain a significant proportion of the severity of social phobia symptoms.

404 SP were compared to 82 healthy subjects. Psychological diagnoses (Structured Clinical Interview-I for DSM-IV), social anxiety symptoms (Social Phobia Inventory), depression (Beck Depression Inventory), parenting behavior (Parental Bonding Questionnaire) and personality (Temperament and Character Inventory) were investigated. SP and controls were compared by analysis of covariance (covariates: age, sex, education, BDI; Bonferroni correction). Based on linear regression parenting behavior and personality were examined as predictors for the severity of social phobia.

SP showed reduced care by father ( $p < 0.001$ ,  $d = 0.51$ ) and mother ( $p < 0.001$ ,  $d = 0.37$ ) and an increased control by their mother ( $p < 0.003$ ,  $d = 0.27$ ). In the personality inventory they also showed decreased scores on novelty seeking ( $p < 0.001$ ,  $d = 0.65$ ) and self-directedness ( $p < 0.001$ ,  $d = 0.76$ ) as well as an increased harm avoidance ( $p < 0.001$ ,  $d = 1.47$ ). The predictors parenting behavior and personality explained 32.7% (adjusted  $R^2$ ) of the variance of the social phobia inventory (control variables age and gender 1%) with maternal care ( $\beta = -0.166$ ,  $p = 0.002$ ), paternal control ( $\beta = 0.224$ ,  $p < 0.001$ ), harm avoidance ( $\beta = 0.376$ ,  $p < 0.001$ ) and self-directedness ( $\beta = -0.164$ ,  $p = 0.001$ ) as significant predictors.

SP remember high maternal control and low parental care and show a personality profile characterized by high behavioral inhibition and little self-efficacy. Paternal control, low maternal care in conjunction with this personality profile can explain about one-third of the total variance of the severity of social anxiety symptoms. The results underline the importance of parenting behavior and personality for diagnosis and treatment of social anxiety disorder.

### 200) Abstract 1356

#### THE EFFECT OF EMOTIONAL DISTRESS ON PSYCHOSOMATIC HEALTH MAY DEPEND ON LIFE CIRCUMSTANCES

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Emotional reactions to major life events are common and appropriate. The hypothesis of the study was that emotional distress (depression, anxiety, perceived stress) has less of a negative effect on psychosomatic health, or may even be health-protective, if it occurs in the context of major life events. To test this hypothesis, we used data from 14 waves (2000-2013) of the French GAZEL cohort study, which sends annual health surveys to the employees of the national gas and electricity company. The sample included 17,348 respondents (27% women, baseline age 47-61).

Each year, participants reported on life events in the previous 12 months, including divorce, bereavement, as well as other major life

changes. The Holmes-Rahe Inventory was used to ascribe a severity score to each event. For each wave, the scores for all events were summed to yield an indicator of a total exposure. Each year participants also reported whether they experienced depression, anxiety, or stress in the past 12 months, as well as a number of health problems. The study focused on frequent colds and flu, headaches and impaired sleep, gastrointestinal complaints, hypertension, and back ache – all of which are thought to have a psychosomatic component. Generalized estimating equations were used to test whether at each wave, the link between depression, anxiety or stress and the above health conditions was moderated by the severity of recent events.

Depression, anxiety or stress was associated with higher likelihood of all of the investigated health conditions. The severity of life events also increased the likelihood of all conditions except hypertension and, in women, headaches. The negative effects of emotional distress and life events on headaches, impaired sleep, and back ache were additive. However, there was an interaction between emotional distress and severity of life events in predicting frequent colds in women and hypertension in men: the link between distress and these conditions was considerably weaker if the distress occurred in the context of major life events. Moreover, if multiple traumatic events occurred within the same year, men who did not experience distress during that year had a higher likelihood of hypertension. These results question the validity of the idea that emotional distress is a health risk factor regardless of its cause.

### 201) Abstract 1040

#### THE SELF-ASSESSMENT KIOSK: OPPORTUNITIES TO EXPLORE BIOPSYCHOSOCIAL HYPOTHESES BY PROVIDING FREE ONLINE ACCESS TO SURVEYS WITH PERSONALIZED FEEDBACK

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An online resource that allows free public access to validated measures of many biopsychosocial health constructs, scores them and provides evidence-based feedback was launched in September 2016. Visitors may use the resource with or without consenting to research. We analyzed the first 5 weeks of data from users of the Self-Assessment Kiosk ("the Kiosk") in order to assess the feasibility of using this database for research. **Methods.** The Kiosk includes measures of physical and mental health diagnoses, illness impact, health goals, mental health symptoms, trauma, coping and interpersonal constructs. Anonymous users complete measures they choose from a menu and are provided with a results report. At its launch, the Kiosk was publicized with emails to colleagues and through Twitter. **Results.** Of 474 home page hits, 438 users indicated that they were visiting for the first time, 269 of these (61%) advanced to the consent page, and 181 of these (67%) consented to research. There were no differences in demographics, physical health or mental health between those who provided or declined consent. Consenting users were largely white (67%), university educated (79%), and female (71%). Significant medical illness was common (43%). The median number of questionnaires completed was 4 (interquartile range 2-7). Users had a mean PHQ9 depression score of 15.8 (SD 5.5, 43%  $\geq$  score of 15) and a median number of adverse childhood experiences of 3 (IQR 1-5). The frequency of questionnaires completed varied from the most popular (depression, anxiety, attachment: 39-45% of users) to the least popular (attention deficit, pain severity, hazardous drinking: 8-22%). **Discussion.** The volume of responses and consent rate suggest that the Kiosk meets a perceived need and is a feasible vehicle for gathering biopsychosocial data. The frequency with which multiple questionnaires are selected suggests that the database will allow testing relationships between biopsychosocial variables as it grows. Users are self-selected and unrepresentative of other populations, so the Kiosk will be more valuable for exploration and hypothesis-generation than for hypothesis testing. Early adopters are likely to include colleagues (who received notices at launch) as users, a bias which may decrease

over time. Data will be updated to reflect the first 5 months of Kiosk experience in February 2017.

## 202) Abstract 1153

### ADVERSE LIFE EVENTS IN CHILDHOOD AND BODY MASS INDEX TRAJECTORIES FROM ADOLESCENCE TO EARLY YOUNG ADULTHOOD.

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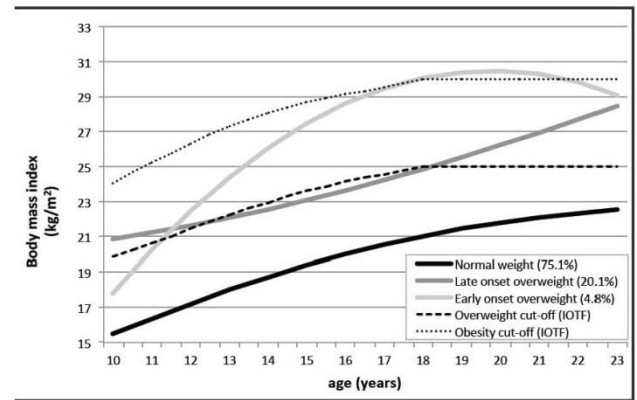
**Background:** Little is known about differences in body mass index (BMI) development between children from adolescence to early young adulthood. Whether the accumulation of adverse life events, such as disease or death of a family member and parental divorce, is related to differences in BMI development is also unclear.

**Objective:** To investigate (1) whether there are different classes of BMI development trajectories from adolescence to early young adulthood and (2) whether these classes are related to the number of adverse life events children experienced.

**Methods:** Data are from the TRAILS (Tracking Adolescents' Individual Lives Survey) cohort study, following Dutch adolescents from 10-12 to 21-23 years. At all five assessment waves, height and weight were objectively measured. At T1, adverse events between birth and T1 were measured with a parent interview. At T3 and T5, adverse events between T1 and T3 and between T3 and T5 were measured with a semi-structured interview (Event History Calendar) with the adolescent. An adverse events score was calculated per wave. Growth Mixture Modeling was used to identify different BMI trajectory classes (n=2218). In conditional Growth Mixture Models, gender, socio-economic status (SES), ethnicity, pubertal status and adverse events score at T1 were initially included as covariates (n=2105). In a second step, the adverse events scores between T1 and T3 and T3 and T5 were additionally included (n=1178).

**Results:** Three distinct BMI trajectory classes were identified; a 'normal weight' class (75.1%), a 'late onset overweight' class (20.1%) and an 'early onset overweight' class (4.8%). Higher SES and lower pubertal status were associated with a lower likelihood of being in the 'late onset overweight' class (OR=0.501,  $p<0.001$  and OR=0.539,  $p<0.001$ , respectively) and the 'early onset overweight' class (OR=0.457,  $p<0.001$  and OR=0.498,  $p<0.001$ , respectively) in comparison to the 'normal weight' class. Boys were less likely than girls to be in the 'late onset overweight' class (OR=0.659,  $p=0.026$ ) than the 'normal weight' class. The number of adverse life events children experienced was not related to BMI trajectory class membership.

**Conclusions:** Three trajectories of BMI development can be distinguished from adolescence to early young adulthood. Accumulation of adverse life events is not related to a specific BMI trajectory.



## 203) Abstract 1453

### INCREASES IN SUBJECTIVE SOCIAL STATUS DURING A 12-WEEK WALKING INTERVENTION PREDICT HEALTH IMPROVEMENTS IN MIDDLE-AGED AND OLDER WOMEN

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Subjective social status (SSS) assesses one's perceived position in a social hierarchy, most often within the U.S. or one's community. Typically measured on a 10-rung ladder, prior studies have found that perceived status strongly predicts health, with each step down in SSS predicting incremental increases in health risks. However, little is known about the stability of SSS ratings over time and how status among closer comparison groups, such as friends, predicts health.

Participants were 47 women (mean age = 60.13 years $\pm$ 6.56) taking part in a 12-week physical activity intervention for middle-aged and older women. At weeks 1 and 12, participants self-reported on perceived chronic stress, depressive symptoms, and SSS using the MacArthur ladders (community and U.S.) and modified ladders for status among neighborhood, family, and friends.

Repeated-measures ANOVAs revealed that across the 12 weeks, perceived stress and depressive symptoms decreased ( $F(1, 46)=11.44$ ,  $p=.001$ ;  $F(1, 46)=5.26$ ,  $p=.026$ , respectively). Status relative to neighborhood ( $F(1, 46)=5.87$ ,  $p=.019$ ) and community ( $F(1, 46)=6.26$ ,  $p=.016$ ), but not friends or family, increased (both  $p > .19$ ; trend increase in US status:  $F(1, 46)=3.81$ ,  $p=.057$ ). However, increases in status among friends were associated with decreases in stress ( $F(1, 43)=3.75$ ,  $p=.059$ ,  $\eta_p^2=.080$ ) and depressive symptoms ( $F(1, 43)=2.97$ ,  $p=.092$ ,  $\eta_p^2=.065$ ). Increase in community status was linked with trend-level decreases in perceived stress ( $F(1, 43)=3.46$ ,  $p=.070$ ,  $\eta_p^2=.074$ ) and increase in neighborhood status predicted decreases in depressive symptoms ( $F(1, 43)=3.09$ ,  $p=.086$ ,  $\eta_p^2=.067$ ).

In the context of a 12-week walking study, some domains of SSS are more stable than others, with improvements emerging for more distal reference groups (neighborhood, community), rather than more proximal social networks (friends, family). This suggests that different domains of SSS capture distinct information about an individual's perception of their social standing, highlighting the value of measuring status among a variety of social groups. Improvements in status among closer social groups translated into health-relevant changes, suggesting that status in these domains may be understudied predictors of stress and mental health. Future studies should explore interventions to improve health by helping an individual to increase perceived social standing.

#### 204) Abstract 1631

##### **CONGRUENCE BETWEEN ECOLOGICAL MOMENTARY ASSESSMENT AND DAILY DIARIES OF COLLEGE STUDENT DRINKING: IMPLICATIONS FOR PREVENTION**

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College student drinking remains a significant public health concern in the United States and can lead to numerous short- and long-term consequences. With the development and availability of smartphones, there have been advances in both in-the-moment data collection (ecological momentary assessment; EMA) and targeted momentary interventions (MI). However, there are several concerns surrounding the use of EMA to collect college drinking data, foremost of which is whether participant intoxication affects EMA compliance and validity of in-the-moment reporting. Thus, the current study investigated: 1) congruence between EMA drinking logs and subsequent morning recall (MR) of drinking events, 2) whether self-reported EMA intoxication levels predicted completion of MR the next morning, and 3) whether self-reported intoxication level during the MR was associated with failure to complete EMA drinking logs the previous night. Participants ( $N = 84$  first-semester college women) used an application on their personal smartphones to complete a 14-day EMA protocol, which included momentary assessments of drinks consumed and level of intoxication at each drinking event, and daily MR of drinking and intoxication levels from the previous day. Zero-order correlations, means and standard deviations were used to compare the EMA drinking logs and the MR diary reports. Multilevel logistic regression was utilized to assess the effect of intoxication on completion of surveys. A total of 950 MR diary entries were collected. Of those occasions where drinking was reported in the MR ( $n = 224$ ; 23.6%), 189 (84.4%) had at least one EMA drinking log reported the previous night. Nineteen drinking events reported via EMA did not have subsequent MR data. EMA and MR reports of drinks consumed and level of intoxication were significantly correlated most days. Multilevel logistic regressions indicated no significant associations between EMA-reported intoxication and completion of the MR the next day, or between MR-reported intoxication level and completion of EMA drinking logs the previous day. Findings suggest intoxication may not have a large impact on compliance and validity of reporting, and that MI may be a feasible approach before or during students' drinking events to help prevent risky drinking and consequences.

#### 205) Abstract 1569

##### **HYDROXYUREA AND SICKLE CELL DISEASE: USING SOCIAL MEDIA TO UNDERSTAND PATIENTS AND CAREGIVERS PERCEPTIONS OF AN UNDERUTILIZED EVIDENCED-BASED TREATMENT**

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Sickle cell disease (SCD) is a genetic blood disorder associated with high morbidity and early mortality. Hydroxyurea (HU) is currently the only evidence-based disease-modifying drug approved for SCD, yet 60% of eligible patients may not receive or adhere to HU therapy. Patient perceptions of HU are an important factor contributing to this underutilization. Social media presents an unique opportunity to understand these perceptions and guide development of interventions for increasing HU uptake.

Therefore, we examined user-generated data obtained from Facebook to understand patient and family perceptions and utilization of HU therapy.

**Methods:** We extracted data from the Sickle Cell Unite Facebook group between Jan 2014 and Nov 2015, which included 145 HU-related posts and 2618 affiliated comments. We developed deductive codes according to previously identified barriers and facilitators from published literature and theory. We used inductive coding to identify new themes. Each message was coded with a positive, negative or neutral valence toward HU.

**Results:** Of the 145 posts, 55% asked a question about HU, and 1,131 comments were received. Analysis of 481 of these comments showed that positive comments were more likely to associate HU with high efficacy, few or minor side effects and better quality of life. Negative comments were more likely to associate HU with lack of efficacy and numerous or harsh side effects. Hair loss or thinning was the most frequently cited side effect. Caregivers were more supportive of HU than patients. Two potential patient barriers not been identified in prior studies were found: 1) patients/caregivers perceived that HU was masking SCD symptoms (e.g. artificially improving blood counts) and making it more difficult for them to receive needed acute care because they don't appear sick; 2) users expressed awareness of HU as a "cancer drug", a fact that deterred uptake. These novel findings suggest that stakeholders may share beliefs in a social media setting that are not being captured by traditional research.

**Conclusions:** This is the first study to use social media data for understanding patient perceptions and uptake of an evidenced-based therapy in SCD. Our social media data revealed a wide range of perceptions regarding HU and we identified two important barriers to HU use that have not been reported in prior research.

#### 206) Abstract 1341

##### **POSITIVE OPINION OF ONE'S BODY FUNCTIONS AND PERCEPTIONS OF MORE POSITIVE APPEARANCE JUDGMENTS BY OTHERS ARE LINKED TO PHYSICAL ACTIVITY IN MIDDLE-AGED WOMEN.**

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**Introduction:** In younger women, body-esteem in general and appearance concerns in particular are consistently shown to drive physical activity behavior. However, very little is known about this dynamic in older women or about the role of body function concerns, which may overshadow appearance concerns later in life. To test this hypothesis, the current study explored the relationship between appearance-versus-function body-esteem and Fitbit-assessed weekly step counts in middle-aged and older women.

**Method:** Sixty-eight women (mean age 59,  $SD = 6.78$  years) taking part in a physical activity intervention study tracked their daily steps for one week with a Fitbit One. Appearance satisfaction, weight satisfaction, and appearance attributions were assessed by the *Body-Esteem Scale for Adolescents and Adults* and body function satisfaction with the *Body-Esteem Scale* (items 18-29).

**Results:** Independent of BMI, with increasing age, women walked less ( $r = .21, p = .09$ ) and were more satisfied with their appearance ( $r = .23, p = .064$ ). However, across all ages, neither appearance satisfaction nor weight concerns were associated with physical activity (all  $p$ 's  $> .40$ ). In contrast, for middle-aged participants only, a more positive view of one's body functions as well as perceiving more favorable appearance judgments by others were linked to walking more ( $\beta = -.34, p = .006$ ;  $\beta = -.29, p = .018$ , respectively).

**Conclusion:** The findings suggest that in addition to switching from upward to downward comparisons when judging one's own appearance, older women may adjust their expectations for body function satisfaction and appearance judgments by others toward what is common in their same-aged peers. In lieu of body-esteem factors, more global or objective measures of health may influence activity in older women, as features of normative aging and chronic diseases may limit their activity level. In contrast, in middle-aged women, emerging

body function concerns may not only overshadow their own weight and appearance concerns, but also sensitize them to appearance judgment by others. As such, improving body function may be a particularly relevant motivator to improve health behaviors. These findings emphasize the health-relevance of body-esteem in middle-aged women, and caution against generalizations in predicting or trying to alter health behavior in older adults.

#### 207) Abstract 1360

##### **APPLYING A NEW ANALYSIS TECHNIQUE FOR ADHERENCE TO RECOMMENDED BEHAVIOURS USING MODERN TECHNOLOGY: AN EXAMPLE USING THE INHALER COMPLIANCE AID™ IN PATIENTS WITH COPD**

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##### Background

Novel mobile technologies, such as adherence monitors, often have sophisticated data output which requires new statistical approaches. Analysing such data correctly may increase precision of prediction and intervention. The Inhaler Compliance Aid™ (INCA™) is a unique device that can identify not only when a person takes an inhaler, but whether it is taken correctly. INCA™ data can help identify behavioural mechanisms of non-adherence, including different types of inhaler technique error and allow estimation of the amount of drug absorbed.

##### Aim

We employ a novel statistical approach to modelling adherence to inhaled medication in COPD to illustrate the value of more precise devices and analysis.

##### Methods

Data from 204 COPD patients was analysed using a newly-developed statistical procedure, which accounts for the precise effects of dose-timing as well as several types of technique errors. A number of potential psychosocial mediators of adherence were explored.

##### Results

While overall percentage of prescribed doses taken was high (74%, SD 25%), when accounting for timing and technique errors the mean successful adherence rate drops to 23% (SD 29%). Attempted adherence, as measured by dose count, was negatively correlated with health literacy ( $r = -0.19$ , 95% CI -0.34 to 0.04), while cognitive ability was negatively associated with technique and timing errors ( $r = -0.18$ , -0.35 to -0.03). Anxiety and depressive symptoms were not predictive of adherence. While a standard adherence AUC measure was associated with reduced COPD exacerbations (OR=0.7, 0.51 to 0.89, per SD increase in adherence), adopting the new statistical model demonstrated stronger effects (OR=0.5, 0.36 to 0.75). The new model also predicted optimal drug dosage per person.

##### Conclusions

Our new statistical modelling allows for new insights into biobehavioural data that provides important clinical and research insights. This method allows us to investigate effectiveness of treatments while correcting for confounds due to non-adherence and timing errors.

##### Funding

Irish Research Council #LoveIrishResearch

#### 208) Abstract 1227

##### **STRAIN-REDUCTION INTERVENTION EFFECTS IN DUAL-EARNER HEALTHCARE EMPLOYEES**

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Coinciding with an increase in dual-earner relationships (i.e., relationships where both partners earn money outside the home), work hours have risen, causing individuals to split limited time between work and home/family life (Bray et al., 2013). With greater responsibilities in both domains comes greater probability of conflict (work-family conflict [WFC]; Amstad et al., 2011) for dual-earners. WFC is related to a myriad of negative health outcomes, including higher rates of musculoskeletal pain, disrupted sleep, and poorer mental health, such as increased burnout (e.g., emotional exhaustion), and thus may be a fruitful point of intervention (Hammer et al., 2016). Healthcare employees already experience high levels of strain; therefore, those who are also dual-earners are particularly vulnerable and might benefit most from work-family interventions.

The current study describes a randomized controlled trial examining the effectiveness of an intervention designed to reduce WFC and improve health (Bray et al., 2013), comparing effects on dual-earner occupational caregivers versus non-dual-earner occupational caregivers from a large, long-term healthcare company.

Mixed model longitudinal analyses were used to test the interaction between two level-2 (between-subjects) variables, intervention condition (intervention  $n=324$ ; control  $n=379$ ) and dual-earner status (dual-earners  $n=428$ ; non-dual-earners  $n=207$ ), and one level-1 (within-subjects) variable: time (pre-intervention/6 mo/12 mo). There was a significant three-way interaction ( $\gamma=0.51$ ,  $SE=0.24$ ,  $p<.05$ ). In the intervention condition, WFC decreased more over time for dual-earners compared to non-dual-earners ( $\gamma=-0.55$ ,  $SE=0.26$ ,  $p<.05$ ). Further, the slope for WFC at 12 months was declining significantly for dual-earners in the intervention condition ( $p<.01$ ). Additionally, dual-earners reported more burnout at pre- and 6 months in the intervention ( $ps<.05$ ), but at 12 months, there was no difference between the four conditions ( $p=.24$ ).

The intervention significantly decreased WFC and burnout for dual-earner caregivers. Workplace interventions aimed at reducing WFC may be especially effective for dual-earners balancing their work and non-work lives and, concurrently, their physical and mental health. High-risk industries, such as healthcare, may benefit from paying special attention to this specific population.

#### 209) Abstract 1393

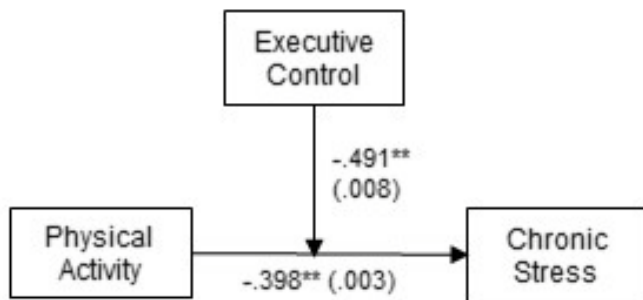
##### **EXECUTIVE CONTROL MODERATES THE RELATIONSHIP BETWEEN PHYSICAL ACTIVITY AND CHRONIC STRESS**

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Chronic stress (CS) has been shown to have negative health consequences, often related with alterations in the cortisol awakening response (CAR). Not much is known about how CS affects cognitive functioning (like executive control performance) that is essential for daily living. One lifestyle factor that is drawing more and more attention is physical activity (PA), because regular PA can reduce stress-associated physiological changes like increased cortisol levels. The goals of our study were to examine 1) whether there is a relation between CS and executive control performance and 2) whether the association between PA and CS is influenced by cognitive performance. Fifty-six healthy subjects ( $35.4 \pm 18.1$  years, 28 male, 28 female, BMI:  $24.6 \pm 3.5$  kg/m<sup>2</sup>) participated. On two days, diurnal salivary cortisol was measured at six time points (0, 30 minutes, 1, 4, 9 and 13 hours after wake-up). The CAR was estimated as Area under Curve relative to increase (AUCi). PA was assessed by means of the

Paffenbarger Activity Questionnaire (PPAQ) as total hours of exercise per week. Error rates in a 45-second backward counting (BC) task and accuracy scores in a Red-Green (RG) task (saying „Go“ when „GREEN“ and „Stop“ when „RED“ is displayed in the congruent and vice versa in the incongruent condition) were used as measures for executive control performance.

Higher AUCi values (steeper CAR increases) were related with higher levels of PA ( $r = .27$ ,  $p = .047$ ), with smaller error rates in the BC ( $r = .27$ ,  $p = .044$ ), and with better performance in the congruent condition of the RG task ( $r = .37$ ,  $p = .026$ ). Furthermore, we found that the association between the amount of regular PA and CS was moderated by the performance in the BC task ( $\beta = .491$ ,  $p = .008$ ,  $R^2_{\text{total}} = .513$ ,  $p_{\text{total}} = .001$ , Fig. 1). Lower error rates in the BC task (better executive control performance) reduced the association between PA and CS. No moderating effects were found for the RG task. Taken together, we were able to show that CAR patterns were related with the amount of regular PA and with executive control performance. This is an important step in understanding the long-term health-promoting influence of regular PA on CS and on cognitive functioning. However, the directions are still unclear. Thus, future studies should use longitudinal designs and should employ more objective measures of PA.



**FIGURE 1:** Standardized regression coefficients for direct and indirect effects of regular physical activity and executive control on chronic stress.

## 210) Abstract 1610

### A TEST OF THE STRESS BUFFERING HYPOTHESIS FOR THE NEGATIVE IMPACT OF FINANCIAL STRAIN ON HEALTH-RELATED QUALITY OF LIFE

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Financial strain refers to difficulty affording food, clothing, housing, major items (e.g., car), furniture/household equipment, leisure activities, and bills (Pearlin et al., 1981). Unlike traditional, objective measures of socioeconomic status (SES), financial strain represents an undesirable mismatch between income and the combination of expenses and accumulated debt (Peirce et al., 1994) and is applicable to individuals of all SES strata. Theoretical models of stress posit that the chronic stress that develops as a byproduct of financial strain can lead to poorer health outcomes (Frank et al., 2014; Pearlin et al., 1981; Steptoe et al., 2005; Williams et al., 2007). Consistent with the stress buffering hypothesis (Cohen & Wills, 1985; Lakey & Cohen, 2000; Thoits, 2011), distinct facets of perceived social support may mitigate the deleterious effects of financial strain on health. The present study

examined the extent to which appraisal, belonging, and tangible social support ameliorate the effects of financial strain on health-related quality of life (HRQoL). A community sample ( $n=238$ , 67.2% female,  $M_{\text{Age}}=43.4$  years) completed in-person surveys as part of a larger study of health behaviors. Greater financial strain and less social support were associated with poorer HRQoL. Additionally, both appraisal and belonging support moderated the effects of financial strain on HRQoL components, such that higher appraisal and belonging support were associated with diminished effects of financial strain on HRQoL. Current findings suggest nuanced associations between financial strain and HRQoL, and provide evidence for the deleterious effect of financial strain on HRQoL, the benefit of social support on HRQoL, and the buffering agency of social support dimensions for the negative impact of financial strain on HRQoL. Clinically, current findings underscore the negative impact of financial strain on poor HRQoL and highlight the importance of addressing emotional and belonging social support, particularly among persons experiencing elevated stress related to financial obligations.

## 211) Abstract 1272

### HOW ARE BEHAVIOUR CHANGE INTERVENTION TECHNIQUES LINKED TO THEORY? EVIDENCE FROM LITERATURE SYNTHESIS AND EXPERT CONSENSUS

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**Background:** Behaviour change interventions typically contain several components, including behaviour change techniques (BCTs) which are the active elements of the intervention. BCTs are chosen to influence the theorised mechanisms of action i.e. the processes via which the intervention acts to change behaviour. However, there is no agreed method of linking BCTs with mechanisms of action as these links are not always clearly reported. Identifying agreed links would be helpful both in designing theory-based interventions and in examining theoretical explanations for the success or failure of interventions.

**Aim:** To identify links between BCTs and mechanisms of action in behavioural theories using evidence from published literature and expert consensus.

**Methods:** Four studies were conducted. In Study 1, links between BCTs and mechanisms of action hypothesised by the authors were identified from 277 intervention papers. Study 2 identified links hypothesised by 105 behaviour change experts. In Study 3, data from Studies 1 and 2 were triangulated and discrepancies discussed by a different group of 16 experts in order to identify agreed links. In Study 4, links between groups of BCTs and theories were identified in a final consensus exercise involving 25 experts.

**Results:** Study 1 identified 2639 BCT- mechanism of action links while Study 2 identified 90 links. Across Studies 1 and 2, 36 links were shared and 185 inconsistencies were identified. These inconsistencies were discussed by Study 3 experts. Final agreed links between (groups of) BCTs and (i) mechanisms of action and (ii) theories were summarised in two heat maps.

**Conclusions:** There is clear consensus that some BCTs are linked with specific mechanism of action and that they are not linked with others. For other possible BCT-mechanism of action links there is less agreement or they have rarely been investigated. These results can be used to inform intervention development, evaluation, and synthesis.



**212) Abstract 1091****CAN ARTIFICIAL INTELLIGENCE DETERMINE INDIVIDUALS' SPIRITUAL TYPE ACCORDING TO HAPPY SCIENCE THEORY?**

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Numerous publications have shown that spirituality/religiosity can boost mental resilience and alleviate psychiatric illness. In particular, depressive symptoms can be effectively reduced using a novel spiritual group psychotherapy and intercessory prayer based on Happy Science theory, which was developed by Master Ryuho Okawa in Japan as *Kofuku-no-Kagaku* (literally, "the Science of Human Happiness") in 1986. Happy Science has grown into one of the most influential religious organizations in Japan (ranking first among people who have joined Japanese religious groups), and includes members from over 100 countries worldwide. In this study, drawing on recent advances in artificial intelligence, we examine the validity of using artificial intelligence to assess individuals' "spiritual type" according to Happy Science doctrine. The spiritual types were defined in terms of the seven colors of the spectrum of Buddha's light: yellow (law and compassion), white (love), red (justice and miracles), violet (hierarchical order), blue (philosophy and ideology), green (harmony and nature), and silver (science and the modernization of contemporary culture). We had the neural networks of an artificial intelligence (IBM SPSS Modeler Premium 17.0) learn the sentences of each of the seven colors' "spiritual message" (which were each about 20,000 words). These spiritual messages (*Reigen* in Japanese) are the words of spirits revealed through Master Okawa's vocal chords. Unlike most mediums, Master Okawa can summon any spirit at will and remain conscious throughout the procedure. We examined the test-retest reliability as well as the validity, which involved using the spiritual messages from individuals with the same color. The present study is expected to show some intriguing results and to lead to the next step in developing an artificial intelligence for evaluating individuals' spiritual type according to Happy Science.

**213) Abstract 1060****STRESS, DEPRESSION, AND RISK FOR CARDIO-VASCULAR DISEASE AMONG URBAN INDIANS**

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Participants were urban residents from 11 cities in India (n=5234; Men=2891; Mean Age=48.36 years) were evaluated as part of a larger study of cardiovascular risk for prevalence of depression and perceived stress due to work, home, or finances and cardiovascular disease risk. Logistic regressions were computed to test associations.

Results indicated that age-adjusted prevalence of depression was: men=23.5%; women=24.7%. Participants who were depressed were more likely to be physically inactive, have a high Waist-Hip Ratio, Low HDL Cholesterol, and diabetes compared to non-depressed participants (p<.05). Participants who reported more stress were less likely to be physically active, truncal obesity, hypertension, low HDL cholesterol, diabetes and metabolic syndrome compared to participants who did not experience a high level of stress (p<.05).

These data represent preliminary evidence from a large-scale epidemiological study that psychosocial factors may be associated with cardiovascular risk among Urban Indian participants. Discussion will include exploring the specific kinds of stress reported and the association of sociodemographic variables associated with depression and stress in this population.

**214) Abstract 1209****COGNITIVE PERFORMANCE AND PSYCHOLOGICAL WELL-BEING IN DEMENTIA CAREGIVERS FOLLOWING STRESS REDUCTION TECHNIQUES**

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**Background:** Caring for a relative with dementia is considered particularly stressful and is associated with numerous adverse health effects. Previous research from our group has indicated heightened depression and impaired cognitive performance in dementia caregivers compared to non-caregiving control participants. The current study aimed to examine the impact of interventions designed to help dementia caregivers manage stress and the caregiving role on cognitive performance and mental well-being of the caregivers.

**Methods:** We examined mental well-being and cognitive performance in dementia caregivers. Caregiver participants were recruited via clinics at St. Finbarr's Hospital, Cork. Participants completed validated tests of stress, anxiety, and depression. Participants also completed cognitive tasks from the CANTAB battery. We employed tests assessing visuospatial memory (paired associates learning task, PAL), working memory (spatial span, SSP), sustained attention (rapid visual information processing, RVP), simple reaction time (SRT) and executive function (Emotional Stroop). Caregivers completed both a carer training program and mindfulness-based stress reduction (MBSR) program. Each program was delivered in a group setting by an experienced instructor and lasted 6-8 weeks.

**Results:** Following both interventions, caregivers had improved performance on the PAL task, which engages the hippocampus, as well as improved performance on RVP, which engages the frontal cortices. Caregiver performance in the other cognitive tests was not affected. However, reported stress, anxiety and depression were not significantly altered following the interventions.

**Conclusions:** Carer training and MBSR may be beneficial in improving cognitive performance across domains which are impacted by the stress of caregiving. A comprehensive physiological phenotyping of dementia caregivers is required to better understand the mechanisms of these effects.

**215) Abstract 1336****DEVELOPMENT OF A COMPREHENSIVE STRESS RATING SCALE FOR ECOLOGICAL MOMENTARY ASSESSMENT: ITS WITHIN-INDIVIDUAL PSYCHOMETRIC PROPERTIES**

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Computerized ecological momentary assessment (EMA) has been applied in psychosomatic medicine with its advantages of ecological

validity and time accuracy. Although paper-based questionnaires have usually been diverted to EMA use, items may be inappropriate for EMA and psychometric properties should ideally be confirmed from both between- and within-individual perspectives by EMA data. In order to develop a comprehensive scale of stress for EMA, we previously proposed scales for psychological demand, interpersonal stress and stress responses, in which items were selected by item response theory through a paper questionnaire survey. The aim of this study was to investigate the within-individual psychometric properties of the scales when conducted in the form of EMA.

The subjects were five women with psychiatric or psychosomatic disorders (five women, age 28-65) and six healthy subjects (five women and one man, age 34-42). They carried a smartphone as a diary for seven days and recorded any stressful events since the last recording and answered the items in the scales at alarms (about every four hours), when going to bed, when waking up and when they felt strongly stressed.

A total of 634 recordings were made by all subjects. As regards within-individual reliability, individual Cronbach's  $\alpha$ s were 0.93 (median, 0.74-0.97) for psychological demand, 0.50 (median, 0-0.94) for interpersonal stress and 0.89 (median, 0.70-0.96) for stress responses. As regards within-individual validity, multilevel analysis showed that scores were significantly higher with any stressful events than without in psychological demand ( $p = 0.002$ ) and stress responses ( $p < 0.001$ ) and were not in interpersonal stress ( $p = 0.052$ ). Both psychological demand and interpersonal stress were significantly positively associated with stress responses ( $p < 0.001$ ).

Although internal consistency of scales for psychological demand and stress responses was good, Cronbach's  $\alpha$ s were not large enough for interpersonal stress and it may be attributed to little within-individual variances in some subjects. Within-individual validity was shown to be fair. Further investigation with more subjects would also allow investigation of between-individual psychometric properties. In parallel, implementation of computerized adaptive testing should be considered for more precise estimation with less burden.

## 217) Abstract 1157

### DEPRESSION AS A RISK FACTOR FOR 30-DAY RE-HOSPITALIZATION FOLLOWING ACUTE CORONARY SYNDROMES

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**Background:** Early re-hospitalization after hospital admission for major medical conditions is very common, with estimates ranging from 15%-20% in the United States and 7%-10% in Europe. Re-hospitalization within 30 days occurs relatively frequently after acute coronary syndromes. Psychological factors such as depression are associated with an increased risk of recurrent cardiac events, but little is known about the predictive value of depressive symptoms at the time of the index hospitalization for subsequent 30-day re-hospitalization.

**Methods:** A total of 295 patients with acute coronary syndromes (271 myocardial infarction, 24 unstable angina with signs of ischemia) were enrolled in this study (mean age =  $62 \pm 11$  years; 24% women). Depression was measured while patients were admitted in the Emergency Department (First Heart Aid unit) using the Patient Health Questionnaire (PHQ-9), or by an interview-adapted version of the PHQ-9 after discharge. Re-hospitalizations were defined as an admission to the hospital that lasted at least one day; short-term emergency room visits were not counted as re-hospitalization events.

**Results:** Of the 295 patients, 36 (13.3%) were re-hospitalized within 30 days. The reason for re-hospitalizations were as follows: cardiovascular causes (N=11), non-cardiac medical conditions (N=3: COPD (1), general internal medicine (2)), post-admission complications (N=2), planned re-admissions (N=2), cardiac symptoms for which no new ischemia or other cardiac causes could be identified (N=18).

Depression status (PHQ-9>10; N=41, 14%) was significantly predictive of 30-day re-hospitalization (OR=2.38, 95%CI=1.02-5.59), adjusting for age and sex. Results for continuous PHQ-9 scores showed a similar pattern (OR=1.07, 95%CI=1.00-1.14). Exploratory analyses indicated that the risk of depression for 30-day re-hospitalizations related to cardiovascular causes was significant (OR=4.4, 95%CI=1.2-16.5) and this risk was higher than for 30-day re-hospitalizations for non-cardiac events (OR=2.5, 95%CI=0.9-7.5).

**Discussion:** Depression at the time of admission for acute coronary syndromes is an important factor to consider in predicting early re-hospitalization. The present finding also indicate that the risk associated with depression is not limited to all-cause re-hospitalizations but also relevant to re-hospitalizations for recurrent cardiac events.

## 218) Abstract 1416

### POSITIVE AFFECT IS ASSOCIATED WITH LOWER SALIVARY C-REACTIVE PROTEIN IN YOUNG ADULTS WITH AND WITHOUT CHRONIC PAIN

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Emerging evidence suggests that negative affect (NA) is associated with higher, and positive affect (PA) with lower, circulating levels of inflammatory biomarkers. To our knowledge, the association of NA and PA with salivary biomarkers of inflammation has not been examined. Two measures each of NA and PA were utilized: 1) from aggregated daily diary measures of affect (morning and evening ratings averaged across 14 days to create daily-derived [DD] NA and PA, and 2) a baseline measure of affective self-report from the two weeks prior to the start of the daily diary period. We investigated the degree to which these measures predicted salivary C-reactive protein (CRP) and interleukin (IL)-6 in a sample of 139 young adults (58% female), a subset of whom had chronic back pain (n=58). CRP and IL-6 were determined from saliva obtained at the end of the daily diary period. Biomarker data were log-transformed, and all models statistically controlled for age, gender, BMI, and salivary flow rate. Independent regressions revealed that baseline PA and DD PA were each negatively associated with salivary CRP ( $\beta=-0.02$ ,  $p<.01$  and  $\beta=-0.02$ ,  $p=.05$ , respectively). Baseline NA and DD NA were unrelated to inflammatory markers. As temporal dynamics may be important in the connection between affect and plasma cytokines, we verified that results were similar when looking at DD PA and NA from just the first or second week. Chronic pain status did not significantly moderate any results. When both baseline PA and DD PA were entered into the same model, baseline PA (but not DD PA) remained a significant predictor of salivary CRP. The association between baseline PA and salivary CRP remained significant after controlling for potential confounding variables: race, SES, depressed mood, DD pain, and self-reported health ( $\beta=-0.02$ ,  $p<.01$ ). Neither measure of either NA or PA predicted salivary IL-6, perhaps in part because salivary IL-6 is more influenced by oral health. In conclusion, salivary CRP was linked with both baseline PA and DD PA, and the connection between baseline PA and salivary CRP seemed more robust. Surprisingly, CRP was unrelated to either measure of NA. Thus, although salivary CRP may be a useful marker for future studies, additional research with diverse samples is needed to characterize how psychosocial factors and affect relate to both salivary and plasma CRP.

## 219) Abstract 1433

### DOES RAICAL IDENTITY MODERATE THE ASSOCIATION BETWEEN RACIAL DISCRIMINATION AND SLEEP QUALITY?

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**INTRODUCTION:** There has been growing interest in the association between racial/ethnic discrimination and sleep quality. Additionally, racial identity has been associated with racial discrimination. However, to the best of our knowledge, no study has explored the extent to which racial identity can exacerbate or buffer poor sleep quality. The aim of the present study was to examine the association between experiences of racial discrimination and sleep quality, and the moderating effects of racial identity on this association. **METHODS:** We utilized data from the African American Women's Heart and Health study, a community sample ages 30-50 in the San Francisco Bay area, which examines the effects of stress and cardiovascular disease. Participants completed the Experiences of Discrimination Scale (EOD), and the Multidimensional Inventory of Black Identity (MIBI). The MIBI assesses racial identity across dimensions of centrality, regard, and ideology. Subjective sleep quality was taken from the Pittsburgh Sleep Quality Index using the item "During the past month, how would you rate your sleep quality overall?" **RESULTS:** 208 women (Mage = 41.76 ± 6 years) completed baseline measures. The mean discrimination score was 19.38 ± 9.10. Multivariable logistic regression (controlling for age, poverty, education, employment, neuroticism, marital status, and health insurance) revealed a significant relationship between experiences of discrimination and sleep quality (t=1.88, p=0.060). A positive interaction was found with the public regard dimension of the MIBI, the extent to which an individual believes others view African Americans positively or negatively has a positive or negative racial identity, and discrimination on sleep quality (t=1.99, p=0.046). There were no other significant findings of the other dimensions of the MIBI. **CONCLUSION:** These results reveal that racial discrimination and racial identity may be important targets for intervening on sleep quality among this population. This is considerably important, given the high correlation of sleep quality and the number of adverse health consequences that impact African American women including obesity and diabetes. Dr. Williams was supported by NIH K23HL125939

## 220) Abstract 1082

### CHILDHOOD MALTREATMENT IS ASSOCIATED WITH A DOSE-DEPENDENT REDUCTION OF THE OXYTOCIN RECEPTOR IN PERIPHERAL BLOOD MONONUCLEAR CELLS OF MOTHERS

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**Introduction:** Childhood maltreatment (CM) has been related to alterations in the oxytocin (OXT) system. However, contradictory results were found with respect to OXT peptide hormone analyses. Recent literature shows e.g. a stress-induced elevation of urine OXT in maltreated children just as well as lower OXT levels in women with a history of CM. One reason for these contradictory results might be that not only the OXT hormone level, but also the expression of the OXT receptor (OXTR) needs to be taken into consideration. Therefore, we

hypothesize that OXTR alterations in adulthood may reflect CM experiences, additionally to peripheral OXT levels.

**Methods:** Peripheral blood mononuclear cells (PBMCs) of 44 mothers 3 months after parturition were analyzed with western blot and OXT plasma levels were determined by radioimmunoassay. The childhood trauma questionnaire (CTQ) was used to assess adverse childhood experiences.

**Results:** OXTR protein levels showed a significant negative correlation with the CTQ sum scores, ( $R^2 = -.36$ ,  $p\text{-value} = .015$ ) whereas OXT plasma levels were not related to CM ( $R^2 = -.07$ ,  $p\text{-value} = .667$ ).

**Conclusion:** The study demonstrates for the first time to our knowledge that OXTR protein can be semi-quantitatively assessed in human PBMC. This technique allows the detection of OXTR system modulations in relation to CM experiences in a long-term way until adulthood. Alterations in the OXTR in immune cells might have consequences for physical health of affected mothers.

## 221) Abstract 1161

### PATTERNS OF ILLNESS PERCEPTION IN PATIENTS WITH CORONARY ARTERY DISEASE

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#### Methods

166 patients (age: 64.4 ± 12.1, 80.7% male) were recruited after angiography at the cathlab of an hospital. Cluster analysis on the items of the Brief Illness Perception Questionnaire was used to identify distinct patterns of IP. The resulting groups were characterized with regard to Quality of Life (MacNew questionnaire), anxiety and depression (GAD-7 and PHQ-9) and resilience (RS-13). **Results:** Cluster analysis revealed 4 distinct groups (see Fig.). They differed significantly with regard to the items covering the perception of the physical (identity, consequences) and emotional impact of disease (emotional response and concern). Stronger perceptions in these domains were associated with lower Health Related Quality of Life and higher levels of emotional distress. Group 1 included the patients with the strongest perceptions of the physical and emotional impact of disease. They expressed low treatment control, high chronic timeline and significantly higher levels of depression than the other groups. This pattern comprised 33.1% of the sample and was labelled as "high distress".

Group 2 was characterized by more moderate perceptions of the emotional and physical impact of disease together with low scores on illness coherence and chronic timeline. The group included 27.7% of the patients and was labelled as "moderate distress with poor illness understanding". Groups 3 and 4 reported smaller physical and emotional impact of illness. The decisive difference existed with regard to chronic timeline: While patients of group 3 reported the highest, patients of group 4 showed the lowest scores in chronic timeline of all groups. The optimistic outlook on the course of disease of group 4 was associated with a significantly higher level of resilience compared to all other groups. Group 3, comprising 25.3%, we labelled as "low distress with long-time expectation" and Group 4, comprising 13.9%, as "very low distress with short-time expectation".

**Conclusion:** We identified 4 groups of CAD-patients sharing similar patterns of IP. Our result corresponds largely to recent findings in patients with COPD and chronic muscle disease thereby indicating parallels of IP in patients with different kinds of chronic illness. Further research is needed to explore if stratification of patients according patterns of IP can help to inform targeted psychosomatic interventions.

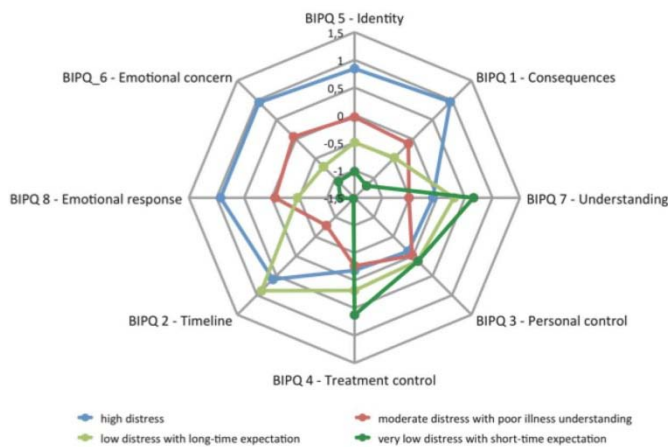


Fig. Comparative mean (z-scores) of illness perception domains.

## 222) Abstract 1081

### DO CARDIAC HEALTH: ADVANCED NEW GENERATION ECOSYSTEM (DO CHANGE) - FIRST RESULTS OF A RANDOMIZED CONTROLLED TRIAL

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**Purpose:** Cardiac diseases are one of the leading causes of death worldwide. Changing patients' lifestyle (e.g. diet, physical activity, distress) could be one means by which the onset and/or deterioration of cardiac diseases could be addressed. However, living with a chronic disease can be very challenging for patients and requires high patient involvement and self-management.

The Do CHANGE ecosystem for cardiac patients is developed in order to assist patients in living with the heart condition and changing their lifestyle. This study investigates the treatment effectiveness at 3 months follow-up for improving lifestyle and disease self-management.

**Methods:** A total of 150 coronary artery disease, heart failure and hypertension patients will be recruited from the Elisabeth-TweeSteden Ziekenhuis, the Netherlands (N=75) and the Hospital Municipal de Badalona, Spain (N=75). They will be randomized to either the Do CHANGE intervention or the care as usual group. Patients will receive an online 3-months behavioral intervention, integrating new technologies to facilitate lifestyle change and improve disease management.

**Results:** Results of the primary outcomes at 3 months follow up will be presented at the meeting. By that time, we expect to have complete data for 150 patients (N=75 intervention; N=75 care as usual) on the effect of the intervention on patients' disease self-management and lifestyle improvement.

**Conclusions:** Current findings will inform the clinical practice on the effectiveness of an online, technology supported, personalized intervention for improving lifestyle and disease self-management in cardiac patients.

## 223) Abstract 1473

### PROCOAGULANT MARKERS IN A PSYCHO-THERAPEUTIC INTERVENTION WITH DEPRESSED CAD-PATIENTS - RESULTS OF THE SPIRR-CAD STUDY

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Depression influences different pathways of progression of coronary artery disease (CAD) and worsens autonomic imbalance and inflammation in CAD patients. In the present study we examined a) if there are associations between pro-coagulant markers (PM) and depression, anxiety or vital exhaustion and (b) if there is a change of PM during a psychosocial intervention in depressed CAD patients.

In a multicenter trial, 450 male and 120 female CAD patients aged 18-75 y with HADS depression scores >7 were randomized into psychotherapy intervention (I; 3 individual sessions and 25 group sessions over 12 months) or usual care (UC). In this substudy we analyzed levels of PM (fibrinogen, D-dimer, v.Willebrand Factor (vWF), Factor VII, PAI-1, and a sum score of these markers: prothrombotic index (PI)) in 137 patients (age <61 y; 30 f) at baseline and 18 months later. We checked for correlations with indicators of depression (HADS, PHQ-9, HAM-D), vital exhaustion (MQ) and anxiety (HADS).

We found a) a highly significant correlation of fibrinogen with HADS anxiety ( $r=0.27$ ;  $p<0.001$ ) but no significant correlations between levels of PM and depressive symptoms. In regression analysis, fibrinogen was predicted by anxiety (HADS) and BMI. With regard to question b) there was no significant correlation between depression change and PM change over time. fibrinogen decreased (time effect  $p=0.05$ ) but PM change did not differ significantly between I and UC. Patients with high vital exhaustion (MQ28) significantly differed from low MQ (<28) patients in the course of fibrinogen (time x exhaustion,  $p=.009$ ) and of PI (time x exhaustion,  $p=.01$ ).

In depressed CAD patients we found correlations of anxiety (but not depression) with fibrinogen, but no other clotting factors. The change of PM was unrelated to the psychosocial intervention and did not correlate with the reduction of anxiety or depression. However, vWF and PI showed a significant reduction in patients with high compared to low vital exhaustion. This positive effect on coagulation in a subgroup of CAD patients with high exhaustion and therefore high cardiac risk (Zimmermann et al 2013) should be replicated in further analyses of the complete SPIRR-CAD study sample. The detection of coagulation pathways as possible mediators for CAD progression during more time points and over longer time, seems a demanding task for the future.

## 224) Abstract 1152

### ILLNESS PERCEPTIONS IN PATIENTS WITH HEART FAILURE: DIMENSIONAL STRUCTURE, VALIDITY AND CORRELATES OF THE BRIEF ILLNESS PERCEPTIONS QUESTIONNAIRE.

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**Background:** Patients' illness perceptions are associated with psychological wellbeing and can be measured with the Brief Illness Perceptions Questionnaire (B-IPQ). However, little is known about illness perceptions in heart failure patients. We examined the dimensional structure, validity and clinical and psychological correlates of the Dutch, French and German official translations of the B-IPQ in patients with heart failure and an implantable cardioverter defibrillator (ICD).

**Method:** 585 European heart failure patients participating in the REMOTE-CIED study completed a set of questionnaires 1-2 weeks post ICD-implantation, including the B-IPQ. Clinical data were captured from patients' medical records.

**Results:** A 2-factor structure (I='Consequences'; II='Control') represented 7 out of 8 B-IPQ items in the total sample and Dutch, German and French subgroups. The B-IPQ had a Cronbach's  $\alpha$  of .69, with the 4-item 'Consequences' subscale being more internally consistent ( $\alpha=.80$ ). Both the B-IPQ and its 'Consequences' subscale were significantly correlated with a variety of psychological characteristics, but not with clinical characteristics. Multivariable logistic regression analysis indicated that poor health status (OR=2.66, 95%CI=1.72-4.11), anxiety (OR=1.79, 95%CI=1.001-3.19), depression (OR=2.81, 95%CI=1.65-4.77), negative affectivity (OR=1.93, 95%CI=1.21-3.09) and poor ICD acceptance (OR=2.68, 95%CI=1.70-4.22) were independently associated with threatening illness perceptions as indicated by total B-IPQ scores.

**Conclusion:** The B-IPQ demonstrated good psychometric properties in Dutch, French and German patients with heart failure. Psychological factors were the most important correlates of patients' perceptions of their heart failure, emphasizing the importance of targeting maladaptive illness perceptions in this patient group, due to their impact on patients' well-being and quality of life.

## 225) Abstract 1645

### SOCIAL ENVIRONMENT AND CORONARY ARTERY DISEASE - RESULTS FROM THE SPIRR-CAD STUDY

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Low socio-economic status (SES) has been associated with an increased coronary risk in both women and men in Western countries. Women have been less often studied than men, but it is suggested, that their coronary risk by low SES is even higher than in men. All stress experiences are more pronounced in low SES women with stress emanating both from family and marriage (marital stress) problems and from problems with job and money.

The SPIRR-CAD study offered an excellent opportunity to examine this risk in German speaking mildly and medium depressed patients with CAD. In this German multi-centre randomized controlled trial of 450 male and 120 female coronary patients, we examined the standard risk factors and the psycho-social risk factor profiles in relation to SES, as assessed by educational level. All differences between low and high SES were in the inverse direction. Of standard risk factors, only smoking and obesity were socially graded. Smoking was more common in low SES and there was a trend towards a higher mean body mass index (BMI) in low SES. Of psycho-social factors and emotions, exhaustion showed the strongest and most consistent inverse social gradient, but also anger, anxiety and depression were socially graded. The findings suggest that in German patients, as in other national groups, social gradients in CHD risk factors are strong. They are found

for both psycho-social and standard risk factors. In two year follow up, the prospective significance of social risk factors was analyzed. Low SES patients had more disease events at follow up, but the differences between low and high SES were not statistically significant and therefore firm conclusions from follow up were not possible.

## 226) Abstract 1242

### THE PREDICTIVE VALUE OF TYPE D PERSONALITY AND POSITIVE AFFECT FOR ADVERSE CARDIOVASCULAR OUTCOMES IN PATIENTS WITH NON-OBSTRUCTIVE CORONARY ARTERY DISEASE.

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**Background:** Patients with non-obstructive coronary artery disease (NOCAD) have a relatively favorable prognosis for future adverse cardiac events, but continue experiencing disabling symptoms. NOCAD was defined as coronary artery disease with coronary stenosis < 60%. Psychological risk factors such as Type D personality have been associated with adverse outcomes in diverse cardiac populations. Positive affect (PA) has shown a cardioprotective potential. Little is known about the predictive value of Type D personality and PA for long-term outcomes in patients with NOCAD. We investigated Type D personality and PA on need for recurrent cardiac testing, emergency department (ED) visits and, as a secondary outcome, major adverse cardiac events (MACE).

**Methods:** A total of 547 patients (mean age 61 years  $\pm$  9, 48% male) who underwent a coronary angiography or CT-scan between January 2009 and February 2013 answered questionnaires concerning Type D personality (DS14) and PA (GMS). Chi-square tests, ANOVA's and Cox proportional hazards analyses, adjusting for covariates, were performed. Multivariable analyses were used to adjust for age, sex, education, diagnosis by group, BMI and hypertension.

**Results:** After a mean follow-up of 3.8 years, 98 (18%) patients needed cardiac tests, 90 (17%) had ED admissions and 25 patients (5%) experienced MACE. Cox proportional hazard regression showed that Type D personality was not significantly associated with need for cardiac testing (HR = 1.10, 95%CI 0.70-1.71), ED admissions (HR = 1.14, 95%CI 0.71-1.84), or MACE (HR = 1.63, 95%CI 0.70-3.82). PA was a significant predictor of need for cardiac testing after adjustment for age, sex, education, diagnosis by group, BMI and hypertension (HR= 0.64, 95%CI: 0.41-0.99,  $p= 0.046$ ), but none of the other outcomes (ED; HR= 0.83, 95%CI: 0.52-1.32) (MACE; HR= 0.51, 95%CI: 0.22-1.15).

**Conclusion:** Patients with NOCAD with more PA were less at need for recurrent cardiac testing, whereas Type D personality was not predictive of adverse events in the present study. Research on psychosocial factors in NOCAD patients should consider the importance of choices of endpoint, given the heterogeneity of NOCAD patients.

## 227) Abstract 1400

### SLEEP RESTRICTION UNDERMINES CARDIOVASCULAR ADAPTION TO STRESS, CONTINGENT ON EMOTIONAL STABILITY

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Sleep restriction is associated with poor cardiovascular health although the exact pathogenic disease mechanisms remain unclear. This study sought to examine whether sleep-restriction disrupts the natural ability to habituate to stress, while taking account of individual differences in personality, specifically trait emotional stability (ES).

Eighty-eight female participants underwent a standardized laboratory stress protocol on two occasions, either rested or following sleep-restriction. Order of rest/sleep-restriction sessions were counterbalanced across the sample. During the stress protocol, participants engaged in a challenging visual tracking task on a computer in order to elicit a stress response. Throughout the protocol, cardiovascular function was recorded photoplethysmographically using a Finometer beat-to-beat cardiovascular monitor. ES was derived using the Ten-Item Personality Inventory.

The impact of ES on habituation was examined using a general linear model, with all five personality traits entered as continuous variables. Rest/sleep-restriction was a within-groups variable in a factorial model. Profiles of habituation during the seven-minute stress exposure were examined as the mean recordings taken during the first, fourth, and seventh minutes, entered in the model as a repeated-measures factor.

As predicted, ANCOVA revealed a significant sleep  $\times$  ES  $\times$  time interaction, indicative of an effect for personality on habituation while sleep deprived. Specifically, all participants exhibited habituation during stress while rested. However, while sleep-restricted, participants high in ES exhibited sharp increases in SBP during stress, indicative of response sensitization ( $F(2,80) = 5.47, p = .02$ ). Scrutiny of profiles of cardiac output and total peripheral resistance suggested that this sensitization of SBP was driven by disproportionate elevations in TPR, i.e., vascular responding.

Overall, the results suggest that disrupted ability to habituate to stress may account for the impact of sleep-restriction on cardiovascular health. This effect is contingent on personality such that it is exacerbated by low trait emotional stability.

## **228) Abstract 1624**

### **ETHNIC DIFFERENCES IN HEMODYNAMIC PROFILE AND COMPENSATION DEFICIT TO ORTHOSTATIC CHALLENGE: EVIDENCE FOR THE CARDIOVASCULAR CONUNDRUM IN AFRICAN AMERICANS**

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African Americans (AA) have higher rates of hypertension and hypertension-related disorders than European Americans (EA). However despite years of research the exact basis of this health disparity remains poorly understood. One factor that has been proposed is greater vascular activity in AAs compared to EAs. Moreover, a growing literature suggests that AAs may show a paradoxical pattern of elevated peripheral resistance and elevated vagally-mediated heart rate variability (vmHRV). In the present study we utilized the hemodynamic profile (HP)-compensation deficit (CD) model to examine ethnic differences in cardiovascular responses to orthostatic challenge in a sample of healthy, young AAs ( $n=24$ ) and EAs ( $n=31$ ). Hemodynamics [cardiac output (CO) and total peripheral resistance (TPR)] and heart rate were recorded continuously during a 5 minute seated baseline, a 5 minute stand, and a 5 minute seated recovery. HP (higher values indicate more vascular response) and CD (higher values indicate increased TPR that is not associated with commensurate decreased CO) as well as the log of high frequency HRV derived from spectral analysis were calculated for the stand and seated recovery conditions. During the stand condition, AAs had greater HP [ $t(52)=2.95, p=0.005$ ] and CD [ $t(52)=2.01, p=0.05$ ] as well as greater vmHRV [ $t(50)=2.36, p=0.02$ ] compared to EAs. These results suggest that AAs have greater vascular responses to orthostasis that are not

adequately compensated by either decreased CO or decreased vmHRV. These findings provide further support for the “cardiovascular conundrum” pattern that we have previously identified in AAs and help elucidate the physiological basis of the health disparity in hypertension and related disorders in AAs.

## **229) Abstract 1629**

### **ETHNIC DIFFERENCES IN ENDOTHELIAL-DEPENDENT ARTERIAL DILATION: FURTHER UNRAVELING OF THE CARDIOVASCULAR CONUNDRUM**

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In comparison to European Americans (EAs), African Americans (AAs) show greater blood pressure (BP) mediated by elevations in total peripheral resistance (TPR). A recent meta-analysis found AAs to have greater high frequency heart rate variability (HF-HRV), an index of cardiac vagal activity, at rest in comparison to EAs – a factor that is considered cardio-protective and is associated with lower TPR and BP. We termed this counterintuitive pattern of findings in AAs the *Cardiovascular Conundrum*; we recently showed that in a resting state, the baroreflex – responsible for reflexively adjusting cardiac and vascular activity in response to changes in BP – was less effective in AAs in modulating TPR compared to EAs. Interestingly, endothelial-dependent arterial dilatation (EDAD) represents nitric oxide (NO) mediated vasodilation, however research has not yet investigated ethnic differences in EDAD, hemodynamics, and HF-HRV simultaneously. The following study sought to rectify this situation in a sample of 306 individuals (mean age = 29.43, SD = 2.98, 160 AAs). Baseline hemodynamics and heart rate were measured for 15 minutes using an impedance cardiogram while participants rested in a supine position. Resting-state HF-HRV (0.15-4 Hz) was calculated, in addition to mean arterial pressure (index of BP) and TPR. Artery diameters were calculated via an automated border detection system. EDAD was expressed as percent (%) change of brachial artery diameter to reactive hyperemia induced by pressure cuff constriction and release, with lower scores reflecting less EDAD. Directional t-tests showed AAs had higher resting TPR ( $t(298) = -5.54, p < .001$ ), BP ( $t(298) = -6.43, p < .001$ ), and HF-HRV ( $t(298) = -1.39, p = .082$ ). AAs also had less EDAD ( $t(298) = 1.73, p = .042$ ) compared to EAs. Our data fit the previously identified *Cardiovascular Conundrum*, showing AAs to have higher BP, TPR, and HF-HRV in comparison to EAs. Novel results showed AAs showed lesser EDAD compared to EAs. The current data, in combination with our research on baroreflex effectiveness, suggests that AAs may maintain both higher HF-HRV and greater TPR and BP by way of a less effective baroreceptor which, importantly, is likely mediated by lesser NO. In sum, NO may be a primary target in helping minimize the mortality rate from cardiovascular and other related diseases amongst AAs.

## **230) Abstract 1619**

### **TIME DOMAIN ASSESSMENT OF THE THREE BRANCHES OF THE BAROREFLEX: A VALIDATION STUDY IN SEDENTARY VERSUS FIT INDIVIDUALS**

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The spontaneous sequence method in time domain was used for the evaluation of the cardiac, vasomotor and myocardial branches of the

baroreflex. Obtained estimates were compared between two samples of young physically active vs. sedentary participants and between rest and mental stress periods. Blood pressure (BP), inter-beat interval (IBI), stroke volume (SV), Total Peripheral Resistance (TPR), and pre-ejection period (PEP), (impedance cardiography) were continuously recorded in 33 physically active and 25 sedentary participants at rest and during a mental arithmetic task. Spontaneous sequences of three to six consecutive cardiac cycles were located in which Systolic BP (SBP) increases were accompanied by increases in IBI or PEP and decreases in TPR or SV and those in which SBP decreases were accompanied by decreases in IBI or PEP and TPR or SV increases. The slope of the regression line between the SBP and IBI-TPR-SV-PEP values produced an estimate of baroreflex sensitivity (BRS). The proportion between the number of progressive SBP changes followed by reflex effects and the total number of progressive SBP changes yielded an estimate of baroreflex effectiveness (BEI). For BRS results showed greater cardiac, vasomotor and myocardial (obtained with the PEP measure, not with SV) sensitivity in the active than in the sedentary group. However, only the cardiac branch was sensitive to mental stress, decreasing BRS during the arithmetic task. Cardiac, vasomotor, and myocardial (computed with PEP) BEI decreases during mental stress but in the firsts two measures only in the sedentary group not in the active individuals. High correlations were observed between BRS in the three branches and their output measures (IBI for the cardiac, TPR for the vasomotor and PEP for the myocardial). Cardiac BRS was associated with BRS in the vasomotor and myocardial (PEP) branches. In conclusion, the method appears appropriate and valid for the simultaneous assessment of the three baroreflex branches. The assessment of the vascular branch of the baroreflex may have clinical relevance as a vulnerability or prognostic factor in the development of hypertension or arteriosclerosis diseases. This work was supported by a grant from the Spanish Ministry of Science and Innovation, co-financed by FEDER funds (Project PSI2015-69235).

### 231) Abstract 1492

#### ELEVATED HPA AXIS RESPONSE DUE TO AN ATTACHMENT-RELATED STRESSOR IN PATIENTS WITH PRIMARY HYPERTENSION

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#### Background:

Primary hypertension is linked to heightened stress responsiveness as well as to a higher prevalence of attachment difficulties. If attachment-related stress which often occurs in daily life would also trigger a heightened stress response has not been analyzed yet. Therefore, we aimed to investigate the effects of attachment-related stressors on the stress response of patients with hypertension compared to healthy participants.

#### Material and Methods:

50 patients with primary hypertension, treated with at least one antihypertensive drug, and 25 healthy individuals were recruited. Attachment-related stress was induced with the Separation Recall (SR), a short-time stressor, which activates attachment-related emotions and thoughts by talking five minutes about a personal experience of loneliness. Blood samples were taken and measurements of blood pressure were performed before and after the SR as well as 10 minutes

after recovery. Areas under the curve with respect to increase (AUCi) were calculated for adrenocorticotrophic hormone (ACTH), cortisol and mean arterial pressure (MAP). Parameters were compared using Wilcoxon signed rank test, Mann-Whitney-U-test and (related samples) t-test where appropriate.

#### Results:

In response to the SR, MAP, ACTH and Cortisol significantly increased (all p-values <.001). Comparing hypertensive patients and healthy participants, baseline levels of cortisol were significantly higher (p=.002) in hypertensive than in healthy participants whereas MAP and ACTH did not differ between the groups. AUCi of cortisol and MAP was significantly higher (p=.006 and p=.022, respectively) in hypertensive than in healthy participants with no differences in AUCi of ACTH.

#### Conclusion:

The attachment related stressor SR elicited a significant response of the hypothalamus pituitary adrenal (HPA) axis, which was remarkably enhanced in patients with hypertension. Our data suggest that attachment-related stress aggravates cortisol reactivity in hypertensive patients which may contribute to a stress-related progression of the hypertensive disease.

### 232) Abstract 1626

#### SYNERGISTIC IMPACT OF PERCEIVED DISCRIMINATION AND HOSTILITY ON ADRENERGIC RESPONSIVITY

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Racial discrimination is increasingly recognized as an important factor in cardiovascular disease risk among African Americans. Previous research has shown that there is significant overlap between perceived discrimination (PD), and hostility (HO), an established predictor of vascular dysfunction and CVD mortality. Amid growing evidence that discrimination also is associated with vascular impairment, the present study sought to examine the effects of PD and HO on adrenergic receptor responsiveness. In a sample (N=57) of African American adults with normal and mildly elevated blood pressure,  $\alpha_1$ - and  $\beta$ -adrenergic receptor responsiveness were assessed via the requisite change in either blood pressure, or heart rate following consecutive bolus doses of phenylephrine and isoproterenol, respectively. Lifetime perceived discrimination was measured using the Perceived Discrimination Scale, and hostility was assessed using the Cook-Medley hostility scale. PD was correlated with HO ( $r=.50, p=.001$ ), and both HO ( $r=.28, p=.033$ ) and lifetime perceived discrimination ( $r=.43, p=.001$ ) were significantly associated with  $\beta$ -, but not  $\alpha_1$ -adrenergic responsiveness. In hierarchical regression models, PD emerged as a significant predictor of  $\beta$ -adrenergic receptor responsiveness and this effect remained robust after HO was included in the model. Moderation analysis further revealed that the association between PD and  $\beta$ -adrenergic receptor responsiveness was strongest among those with higher hostility. These findings suggest that the effects of PD on vascular function is due in part to blunted  $\beta$ -adrenergic receptor responsiveness and may be compounded by other negative psychosocial traits.

### 233) Abstract 1270

#### SELF-MANAGEMENT SUPPORT FOR PATIENTS WITH HYPERTENSION USING ONLINE VIDEOS AND AUTOMATED, BIDIRECTIONAL TEXT-MESSAGING

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of Medicine, Pittsburgh, PA, Lora Burke, PhD, Nursing, Thomas Kamarck, PhD, Health Psychology, University of Pittsburgh, Pittsburgh, PA, Bruce L. Rollman, MD, Matthew F. Muldoon, MD, Medicine, University of Pittsburgh School of Medicine, Pittsburgh, PA. Hypertension is a leading cause of heart disease, stroke and kidney failure yet the US control rate is approximately 50%. Home blood pressure monitoring (HBPM) has been shown in clinical trials to lower BP but its mechanism(s) of effect are unknown and no patient-centered programs facilitating HBPM are in widespread use. The current pilot project sought a) to develop a convenient aide for patients attempting HBPM, and b) to explore putative behavioral mechanisms potentially linking HBPM with BP changes. We recruited 33 patients with hypertension (31-70 years old, 52% female, 55% black) from an urban emergency department (ED) and a hypertension referral center. Basic hypertension knowledge was delivered at enrollment via online videos. An automated, bidirectional text-message system designed by physicians and patients sent prompts instructing the participant to measure and text back their BP at 4 self-selected times per week for 6 weeks. Participants received rolling average BP feedback with each submission and summary reports at the end of each 2-week period. An exit interview included open-ended questions about personal beliefs about one's hypertension and experience with the program, as well as specific questions about behavior change and self-efficacy. Compared to those from the hypertension center, patients from the ED had higher BP at enrollment (168/98 vs 136/83 mmHg,  $p < .01$ ), marginally less college (41% vs 73%  $p = .09$ ), fewer medications (1.6 vs 3.1  $p < .01$ ) and lower baseline HBPM (33% vs 100%,  $p < .01$ ). Overall, 94% of patients submitted at least one self-measured BP, and response rates (100% \* #BP readings/24 prompts) in patients from the ED and hypertension center averaged 70% and 91%, respectively. Response rate did not vary as a function of age, gender, race, or education. Qualitative analysis of exit interview data revealed that the large majority of participants viewed the program very positively and favor longer term participation. Most attempted to improve diet, exercise, or stress-reduction behaviors, with patients recruited through the ED also reporting increased self-efficacy with regard to measuring and controlling their BP. These results indicate that automated programs facilitating HBPM are acceptable and useful to an inclusive and diverse sample of patients with hypertension and, further, that HBPM may elicit healthy behavior change.

#### 234) Abstract 1522

##### INTERACTIVE RELATIONS OF RACIAL DISCRIMINATION AND POVERTY STATUS TO BLOOD PRESSURE LEVELS AMONG AFRICAN AMERICANS: HANDLS

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Cardiovascular disease (CVD) disproportionately affects the African-American (AA) community. Previous research indicates that perceived racial discrimination (RD) is a source of chronic stress for AAs and is related to CVD, at least in part, via hypertension. Little is known about whether lower socioeconomic status (SES) exacerbates the connection between RD and blood pressure (BP). Thus, AAs living below the poverty line and experiencing RD—both of which are independently linked to BP—may be facing greater stress. In this study, we examined whether the association between RD and BP was moderated by poverty status. The sample included 1393 AAs (mean age 30-64 years,  $SD = 9.2$ ; 56% women) participating in the Healthy Aging in Neighborhoods of Diversity across the Life Span (HANDLS) study. Approximately 46% of participants had household incomes below 125 % of the poverty

threshold. Participants rated experiences of RD across 6-items which inquired about experiences in housing, at work, or with the police/courts. BP was assessed using a standard brachial artery auscultation method following a 5 min rest in a seated position. Multiple regression analyses addressed independent and interactive relations of RD and poverty status to systolic and diastolic BP after adjustment for age, sex, depressive symptoms, body mass index, cigarette and alcohol use. A significant two-way interaction of RD by poverty status was observed for SBP,  $B = -.94$ ,  $SE = 0.45$ ,  $p = .04$ . Among AAs living above the poverty line, higher RD was associated with higher SBP whereas among AAs living below the poverty line this association was reversed. Despite greater opportunities and resources typically associated with living above the poverty line, higher levels of RD in different areas of life (e.g., school, work, medical settings) are linked with higher SBP among AAs. However, it is unclear why RD and SBP were inversely related for AAs living below the poverty line despite similar levels of reported RD (above poverty = 7.6,  $SD = 1.9$ ; below poverty = 7.7,  $SD = 1.9$ ). Perhaps coping mechanisms utilized among AAs exposed to both sources of stress contributes to a blunting of their link to blood pressure. Further research should explore whether coping processes shape the linkages among RD, poverty level, and BP.

#### 235) Abstract 1517

##### MARITAL RELATIONSHIP QUALITY BEGINS WITH ME: THE IMPACT OF ONE'S OWN BEHAVIOR TOWARD SPOUSE ON AMBULATORY BLOOD PRESSURE

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**Background:** Marriage has been associated with better health outcomes although quality of the marriage matters. Relationships which contain both high levels of positivity and high levels of negativity (ambivalence) may not be as protective as more positive relationships. However, measures of supportiveness or ambivalence generally only examine an individual's perception of the partner's behavior, ignoring one's own behavior. The current study aims to elucidate physiological pathways by which one's own supportive (high positivity) or ambivalent (high positivity and high negativity) behavior toward one's spouse may influence long-term health via daily ambulatory blood pressure (ABP), an independent predictor of cardiovascular (CV) health.

**Methods:** 46 married working couples ( $n=92$ ) aged 21-37 ( $M=24$ ) were fitted with ambulatory blood pressure monitors, assessing ABP randomly twice an hour during wake hours and once an hour during sleep, for a 24-hour period. Participants completed a Survey Monkey diary reading within 5 minutes of cuff inflation on their smart phone; diary readings assessed BP variables at time of reading for analysis control (i.e., position, consumption, activity level). No diary entries were required during sleep.

**Results:** Participants were mostly middle-income, educated and White (88%). We used SAS proc mixed and modeled the covariance structure for the two repeated measure of dyad and measurement occasion (i.e., number of ABP readings). We examined potential covariates that influenced ABP (i.e., age, posture, activity) in our analyses. Our analysis indicated that one's own ambivalent behavior toward one's spouse was significantly associated with increased systolic blood pressure ( $p=.008$ ) and increased diastolic blood pressure ( $p=.04$ ). Additionally, feeling mixed and conflicted about one's own ambivalent behavior toward the spouse was associated with increased DBP ( $p=.01$ ).

**Conclusions:** Despite the positive behaviors they report in their own behavior toward their spouse, ambivalent participants' negative behavior may be creating stress through such processes as cognitive dissonance as they treat someone whom they love poorly. Individuals who behave ambivalently in their interactions with their spouse may be

at increased risk for poor CV health. Interventions aimed to decrease negativity in one's own behavior may provide CV protection.

### 236) Abstract 1160

#### **PREDICTING THE COURSE OF DEPRESSION AND STRESS AND THE LINK WITH MORTALITY IN PATIENTS WITH GASTROINTESTINAL CANCERS**

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**Background:** The chronicity of stress and/or depression is thought to be important with regard to the impact on health. The aims of this study were to examine the course of stress and depression, understand demographic, disease-specific, and psychological/behavioral predictors, and test the link of trajectories of stress and depression with survival in a cohort of advanced cancer patients.

**Methods:** A cohort of gastrointestinal cancer (GI) patients were assessed for depression, stress, pain, fatigue, optimism, and social support, and circulating cytokines every 4 months for 18 months. Demographic and disease specific factors were collected from the patients' medical chart. We used cross-lagged panel analyses, semi-parametric trajectory analyses, multinomial logistic regression, and Cox regression to test our aims.

**Results:** Of the 568 patients, the majority were male (64.8%) and Caucasian (89.6%), and the mean age was 62. Approximately 35% of patients reported moderate depression (CES-D>18) and 10% reported severe depression (CES-D>32), all of which had trajectories remained consistent over time. Predictors of chronic depressive symptoms included regional or systemic chemotherapy versus surgical intervention ( $p=0.003$ ), greater levels of fatigue ( $p=0.001$ ) and pain ( $p=0.02$ ), and lower levels of optimism ( $p<0.001$ ). The majority of patients (59%) reported moderate levels of stress and 22% high levels of stress. Predictors of stress included having a diagnosis with poor prognosis ( $p=0.031$ ), lower levels of social support ( $p=0.01$ ), higher levels of pain ( $p=0.031$ ) and lower levels of optimism ( $p=0.007$ ). None of the circulating cytokines predicted trajectories of stress or depression or survival. The moderate depression group had a 32% higher risk of death than the low depression group and the moderate stress group had a 52% higher risk of death than those in the low stress group. Unexpectedly, depression predicted stress over time and the trajectories of stress and depression were not significantly related.

**Conclusion:** Chronic levels of stress and depression were predictive of increased risk of mortality. Evidence-based interventions to reduce stress and depression are needed to improve the quality of life and possibly survival in patients diagnosed with cancer.

### 237) Abstract 1614

#### **SYSTEMATIC AMBIENT LIGHT EXPOSURE DURING STEM CELL TRANSPLANT TO REDUCE CANCER-RELATED FATIGUE, DEPRESSION AND SLEEP PROBLEMS**

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**Introduction:** Cancer-related fatigue (CRF) is the most commonly reported negative sequelae of cancer and its treatment. Patients undergoing Autologous Stem Cell Transplantation (ASCT) for Multiple Myeloma (MM) are particularly susceptible to experiencing CRF. It is most severe approximately one week after stem cell infusion (at the point of lowest white blood cell count). There has been no research on inpatient interventions to treat CRF among MM. It hypothesized that disruption in the circadian rhythms, caused by cancer and/or its treatment, is the primary cause of CRF. In the present research we are investigating whether light, one of the strongest synchronizers of circadian rhythms can be used to promote entrainment during ASCT and prevent/reduce CRF.

**Participants:** Mt Sinai Medical Center (MSMC) MM patients scheduled for ASCT are consented and randomly assigned to active or comparison conditions using permuted block randomization.

**Intervention:** Floor lamps with active and comparison ambient conditions were installed in the hospital rooms. The active condition consists of bluish-white (ambient lighting) - 400 lux (lx) provided during the day. Control condition consists of yellow-white lightening - 50 lx provided during the day.

**Procedure:** Participants are assessed at 6 time points: 1-2 weeks before ASCT (baseline), Day 2, Day 7, two days prior to discharge of hospitalization (intervention), and 3 weeks and 3 months after hospital discharge. During these assessments participants complete several measures, including the Functional Assessment of Chronic Illness Therapy- Fatigue scale (FACIT-Fatigue). In addition, participants complete visual analogue scales daily to determine their level of fatigue.

**Results:** Initial findings demonstrate that patients in the active ambient light condition report less CRF during hospitalization as assessed by the visual analogue scales and the FACIT-fatigue scale.

**Discussion:** The present research is the first to explore if light therapy, delivered in MM ASCT patient hospital rooms prevent/reduce CRF and related negative sequelae. Our preliminary findings are promising which suggests that this easy to deliver low cost intervention can reduce CRF among MM patients undergoing ASCT.

### 238) Abstract 1529

#### **DYADIC INTERNET-BASED HEALTH LIFESTYLE INTERVENTION FOR COLORECTAL CANCER SURVIVORS AND THEIR FAMILY MEMBERS: PILOT STUDY**

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Cancer survivors and their family caregivers, particularly older adults, are at extreme risk for functional decline, yet they have suboptimal lifestyle behaviors. However, currently there is a dearth of healthy lifestyle behavior interventions aim at these at-risk older CRC survivors and their partners. This study aimed to test feasibility and acceptability of dyadic internet-based healthy lifestyle intervention for cancer survivors and their family members.

A pilot sample of five colorectal cancer survivor and their family member dyads participated (4 spousal dyads and 1 mother with cancer and adult daughter dyad; 1 African American, 5 Hispanic, 4 non-Hispanic White; mean age=52). The 12-week healthy lifestyle intervention (Healthy U, Healthy Us) was delivered weekly via Skype. Feasibility and acceptability were evaluated by interventionist records and participant reports, respectively.

Feasibility was established by enrolling 5 CRC survivors and family member dyads within 2 months; retaining 4 dyads (80%) by 6 months post-T1 assessment; 4 dyads completed all 8 main sessions within 12 weeks with the fourth dyad completing 6 of 8 sessions. Adherence with

the 2 booster sessions was 63%. On average, participants received 94% of intervention dosage. No adverse events were noted.

Acceptability was established by participants' evaluation of the informational materials, intervention content and mode of delivery, and the interventionist at greater than 80% satisfaction. Two expressed only 60% satisfaction with visual presentation of study materials, which has been enhanced. No intervention session had to be rescheduled due to technical difficulties with Skype. Brief disruption in Skype connection (total 5 minutes) occurred during a total of 36 intervention sessions (total 1,120 minutes). All participants chose their home for receiving the intervention.

Findings support that the Healthy U, Healthy Us intervention was safe and highly feasible as well as acceptable. This pilot information also provides strong support for popularity and reliability of Skype as an intervention delivery technology for older adult CRC survivors and their family caregivers. The knowledge to be obtained from a larger trial will guide future studies that aim to investigate psychosocial intervention effects on health behavior changes of cancer survivors and their primary support partners.

### 239) Abstract 1609

#### RELATIONSHIP OF SYSTEMIC CYTOKINE CONCENTRATIONS TO COGNITIVE FUNCTION OVER TWO YEARS IN WOMEN WITH EARLY STAGE BREAST CANCER

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Cancer and its treatment are frequently associated with cancer-related cognitive impairment (CRCI). While CRCI has been linked to chemotherapy, there is increasing evidence that the condition may start prior to treatment and for some, remain unresolved after active treatment and into survivorship. Alterations in systemic cytokines are a possible mechanism linked to cognitive dysfunction in breast cancer and other conditions.

**Methods:** We assessed 75 women with early-stage breast cancer at five points over two years, starting prior to the initial chemotherapy through 24 months after chemotherapy initiation. Measures included a validated computerized evaluation of domain-specific cognitive functioning and a 17-plex panel of plasma cytokines. Linear mixed-effects models were applied to test the relationships of clinical variables and cytokine concentrations to each cognitive domain.

**Results:** Levels and patterns of cytokine concentrations varied over time: six of the 17 cytokines (IL-6, IL-12, IL-17, G-CSF, MIP-1b, and MCP-1) had the most variability. There were multiple relationships among cytokines and cognition, which varied over time. At baseline, elevated concentrations of G-CSF and reduced concentrations of IL-17 were associated with faster psychomotor speed. At the second time-point (prior to the mid-chemotherapy), multiple cytokines had significant associations with psychomotor speed, complex attention, executive function, verbal memory, cognitive flexibility, composite memory and visual memory. Six months after chemotherapy initiation and at the one-year point, there were multiple, significant relationships. At two years, fewer significant relationships were noted; however, lower concentrations of IL-7, a hematopoietic cytokine, were associated with better psychomotor speed, complex attention, and memory (composite, verbal and visual).

**Conclusion:** The associations among cytokines and cognitive performance provides evidence that not only prototypical cytokines

(i.e. IL-6, TNF- $\alpha$ , and IL-1 $\beta$ ) but also cytokines from multiple classes may contribute to the inflammatory environment that is associated with cognitive dysfunction. Future studies to better delineate the cytokine changes, both individually and in networks, are needed to precisely assess the mechanistic link between cytokines and cognitive function in women receiving treatments for breast cancer.

### 240) Abstract 1119

#### BRUXISM AS A CONSEQUENCE OF CHEMOTHERAPY?

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##### **Introduction:**

Bruxism is a syndrome with uncertain etiology but with proposed factors: psychosocial, peripheral and central. Treatment is also controversial and one of the options focuses in GABA theory and regularization of ion channels.

Xelox (capecitabine + oxaliplatin) and bevacizumab is indicated for metastatic colorectal cancer, being oxaliplatin the most neurotoxic agent (acute syndrome and/or a chronic sensory neuropathy).

Acute neurotoxicity is very frequent and it's a sensory and/or a motor toxicity (as tongue tingling or jaw spasms). The proposed pathogenesis - neuronal hyperexcitability due to alterations of voltage-gated ion channels - is supported by mechanism of action of some treatments.

**Methods:** Description of a clinical case.

**Results:** This is a story of 76 years old men in treatment for metastatic colon cancer that developed toxicity: nausea (treated with haloperidol), bruxism and gingival atrophy.

He was referred to psycho-oncology by involuntary movements of mouth and trunk.

The patient complained of sadness, anhedonia and insomnia since recurrence of cancer and related the movements with CT. At observation he was anxious, tearfulness and agitated.

He was treated for a depressive episode, but the doubt remained about involuntary movements: haloperidol was a confounding factor for oxaliplatin acute neurotoxicity, also aggravated by psychic and peripheral factors.

##### **Conclusions:**

The authors believe that bruxism is linked to CT in a very complex relation that includes psychic, peripheral and central factors.

Psychiatrists need to keep attention to the patient as a whole, not being seduced by easy answers like psychosocial factors.

### 241) Abstract 1101

#### POSITIVE PATIENT EXPERIENCES IN CANCER CARE, SELF-EFFICACY, AND HEALTH-RELATED QUALITY OF LIFE IN LATINO CANCER SURVIVORS

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Evidence suggests that Latinos experience significantly greater decrements in health-related quality of life (HRQoL) following the



diagnosis and treatment of cancer than non-Latino whites. The primary aim of the current study was to identify modifiable factors that are associated with improved HRQoL in Latino breast, colorectal, and prostate cancer survivors. Specifically, this study evaluated direct and indirect associations among positive patient experiences in cancer care, self-efficacy, and HRQoL. Analyses were conducted using baseline data (N = 288) from an NCI-funded randomized behavioral clinical trial that aimed to reduce symptom burden and improve adherence to treatment recommendations. Structural equation modeling analyses examining multiple indirect effects revealed that several facets of self-efficacy (i.e., patients' perceived confidence in managing psychological distress, support from close others, hobbies/social activities, and communication with providers) fully explained the relationship between positive patient experiences in cancer care and greater HRQoL (all  $p$ 's < .01; CFI = 1.00; TLI = .99; RMSEA = .03; SRMR = .01). Importantly, less acculturated and monolingual-Spanish speaking patients reported lower self-efficacy in communication with providers; however, controlling for these relationships did not alter results. These findings suggest that it may be possible to target HRQoL in Latino cancer survivors through modifiable factors such as patient experiences in cancer care and self-efficacy. Ensuring positive patient experiences in cancer care (e.g., timely appointments, ready access to medical advice, patient inclusion in care decisions) may increase self-efficacy, and in turn, HRQoL in Latino cancer survivors. Future research should include longitudinal designs in order to examine how these relationships unfold across time.

#### 242) Abstract 1317

##### **QUALITY OF LIFE FOLLOWING CANCER TREATMENT IN WORKING AGE ADULTS - RELATIONSHIPS TO ILLNESS PERCEPTIONS, DISTRESS, FATIGUE, AND SUBJECTIVE COGNITIVE COMPLAINTS**

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**Objective** Cancer survivors often experience a poor quality of life (QoL). Little is known about which factors are associated with poor quality of life in working age cancer survivors who may be striving to return to work and to former daily activities. In the present study we explored the reciprocal relationships of several factors which have been implicated in QoL studies in other populations, namely illness perceptions, fatigue, subjective cognitive complaints, and emotional distress.

**Methods** Fifty-seven cancer survivors aged 19 to 50, 6 months-6 years following completion of treatment, were matched to healthy controls on age, education, and sex. All participants completed self-report measures for symptoms, physical functioning, overall QoL, emotional distress, fatigue, and subjective cognitive complaints. Patients also self-reported their illness perceptions. Correlation and hierarchical regression analyses were conducted to explore relationships and potential pathways between variables.

**Results** Patients reported higher levels of symptoms, emotional distress, fatigue, cognitive complaints, poorer functioning, and QoL than matched controls; all these variables were intercorrelated. Those with more negative illness perceptions (specifically a higher symptom load and a longer anticipated timeline for their illness) reported higher levels of cognitive complaints, higher levels of anxiety and depression, and fatigue. In a regression model containing all the predictor variables, only depressive symptoms and cognitive complaints were significant independent predictors of overall quality of life.

**Conclusions** This work constitutes the first step in the development of a model that could be used in clinical practice to help us to understand

factors associated with a poor QoL in working age cancer survivors. Negative illness perceptions may be amenable to change and depressive symptoms may be treatable. Further research is needed to determine whether interventions based on modifying these factors will improve quality of life for working age survivors of cancer.

#### 243) Abstract 1308

##### **DEPRESSIVE SYMPTOMS RELATE TO CIRCADIAN DISRUPTION AND INFLAMMATION IN HEAD AND NECK CANCER**

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A diagnosis of head and neck cancer (HNC) introduces numerous unique stressors (e.g., facial pain, trouble eating). Depressive symptoms early in the cancer trajectory are common among HNC patients, and we have previously found these to be predictive of poorer overall HNC survival. To examine potential mediators of these effects, we piloted the collection of circadian, endocrine, and immune data among a sample of HNC patients. We hypothesized that depressive symptoms would be related to circadian disruption and systemic inflammation. Patients presenting for initial consultation at a Multidisciplinary HNC Clinic (N=56) provided data prior to initiation of chemoradiation. Patients were evaluated for depressive symptoms (PHQ-9), wore actigraphy watches for six days to determine circadian rest/activity rhythm, and provided serum for a discovery panel of cytokine concentrations with markers of angiogenesis (VEGF) and inflammation (IL-6) analyzed here. Preliminary bivariate correlations determined which demographic and/or clinical variables would serve as controls. Hierarchical regressions were used to discover relationships with alpha set at .10 for these pilot data.

Patients (53% male, mean age=56) presented primarily with advanced (66% stage III/IV) oral, hypopharyngeal, oropharyngeal or laryngeal cancers. Patients reported mild depressive symptoms (PHQ-9 mean=6.19, range=0-25). Depressive symptoms were significantly related to circadian rest/activity rhythm (adjusted for income, partial  $r=.458$ ,  $p=.012$ ). Depressive symptoms (adjusted for site of disease, partial  $r=-.319$ ,  $p=.025$ ) and rest/activity rhythms (partial  $r=-.333$ ,  $p=.077$ ) related to systemic levels of IL-6, but not to VEGF.

These initial data demonstrate that depressive symptoms correlate with both circadian rest/activity disruption and systemic inflammation (IL-6) prior to HNC treatment. Results highlight behavioral and biomarker pathways that may mediate relationships between depressive symptoms and cancer progression. Ongoing work with a larger sample of HNC patients will confirm these findings and examine the role of diurnal salivary cortisol. (Support: University of Louisville Multidisciplinary Research Grant)

#### 244) Abstract 1535

##### **PREDICTORS OF AT-HOME PRACTICE AFTER A MIND-BODY INTERVENTION FOR BREAST CANCER PATIENTS**

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**Background:** Common side effects of chemotherapy include disrupted sleep, increased fatigue, and decreased quality of life. We previously reported that a Tibetan yoga program (TYP) delivered during chemotherapy for women with breast cancer reduced sleep disturbances for those engaging in out-of-class practice at least 2 times a week or more. This study sought to determine the association between baseline social support and subsequent home practice.

**Methods:** At the start of chemotherapy women were randomized to the TYP or a stretching (ST) or wait-list control groups. The TYP and ST interventions were 4 sessions during chemotherapy and 3 booster sessions over the next 6 months. Participants were encouraged to engage in daily at home practice. Participants reported on their social support at baseline as measured with the MOS Social Support Survey (MOS-SSS), including four subscales (emotional support, tangible support, positive social interaction, and affectionate support) and benefit finding during the follow-up period. At home practice was self-reported at the end of the TYP program, 3, 6, and 12 months later based on how often participants engaged the practices per week, ranging from not at all to more than once a day. Linear regression analyses were run to determine baseline social support and benefit finding during follow-up with at-home practice during the 12-month period.

**Results:** 227 women, average age 49.5, with stage I-III breast cancer (21.3%, 56.6%, and 22.1%, respectively) participated. Most were non-Hispanic Caucasian, employed, married, and highly educated. The majority of participants had undergone surgery and all were receiving chemotherapy. MOS-SSS total score and subscales at baseline were not associated with out of class practice. However, benefit finding during the follow-up period was associated with at home practice ( $r = 0.22$ ,  $p = .002$ ). After controlling for age and stage of disease, benefit finding remained associated with home practice.

**Conclusion:** Previous research has shown that at home practice of mind-body interventions leads to better outcomes. As benefit finding was associated with home practice, increasing benefit finding may help encourage more at-home practice in participants.

#### 245) Abstract 1244

##### EXAMINING THE EFFICACY OF PSYCHOSOCIAL INTERVENTIONS FOR THE MANAGEMENT OF FATIGUE IN END-STAGE KIDNEY DISEASE (ESKD): A SYSTEMATIC REVIEW WITH META-ANALYSIS.

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**Background:** Fatigue affects 42-89% of ESKD patients, with huge repercussions on functioning, quality-of-life, and patient outcomes. Its

management represents a clinical priority, yet the majority of currently available interventions revolve around drug-treatments or exercise, with only modest and short-term improvements.

**Aim:** To investigate whether psychosocial interventions are effective at reducing fatigue in ESKD.

**Methods:** MEDLINE, PsycINFO, EMBASE, CINAHL, Global Health, Web of Science, and CENTRAL databases were searched to identify randomized controlled trials (RCTs) and quasi-RCTs that determined the effect of psychosocial interventions on fatigue (primary or secondary outcome), in the renal patient population. All included studies underwent quality assessments. A narrative synthesis and meta-analyses were undertaken.

**Results:** 16 RCTs ( $N = 1,536$ ) were included, predominantly amongst dialysis patients, with fatigue mainly treated as a secondary outcome. Although 10 trials failed to find a significant improvement in fatigue following the delivery of a psychosocial intervention, the quantitative synthesis demonstrated a significant improvement in fatigue ( $N = 14$ ;  $SMD = 0.37$ ,  $p = 0.001$ ; 95% CI 0.15-0.59,  $I^2 = 69.1\%$ ,  $p < 0.001$ ). There was evidence for greater effectiveness of interventions including stress-management/relaxation techniques, evaluated amongst fatigued samples meeting diagnostic thresholds, against passive/non-active comparison groups. The studies were generally of poor quality, with high heterogeneity and some indication of publication bias; therefore, the findings should be interpreted with caution.

**Conclusions:** There is a lack of theory-driven interventions targeted specifically at fatigue in ESKD; however, there is some promising evidence in support of psychosocial interventions, in particular interventions including stress management/relaxation techniques. Development and evaluation of a fatigue-specific psychosocial intervention is warranted in this setting.

#### 246) Abstract 1241

##### MENTAL AND PHYSICAL HEALTH EFFECTS OF MEANINGFUL WORK AND REWARDING FAMILY RESPONSIBILITIES

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The study assessed the effects of meaningful work and rewarding family responsibilities on depressive symptoms, perceived stress, and physiological functioning in 203 Danish men and women (average age = 50). The study was based on a subsample of Copenhagen Ageing and Midlife Biobank. Participants reported on meaning of work (3 items: *Is your work meaningful?*, *Do you feel that the work you do is important?* and *Do you feel motivated and involved in your work?*). Participants were also asked if they provided regular care to their parents, spouses, children, grandchildren and other persons. For each of the care recipients, they were also asked how physically and emotionally straining it was to provide care to that person, as well as how rewarding it was. Depressive symptoms and perceived stress were reported using validated instruments. Physiological dysregulation (allostatic load, AL) index was based on 8 biomarkers, capturing cardiovascular (blood pressure), metabolic (triglycerides, HDL cholesterol, Total Cholesterol, glycated hemoglobin, and BMI), and immune (C-reactive protein, Interleukin-6) activity. AL was calculated as a number of markers whose values were beyond clinically established norms, with a possible range from 0 to 8.

Most participants provided care to at least one person. On average participants rated their caregiving responsibilities rewarding to a large degree and only a little straining and their work as meaningful to a large degree. For both men and women, there was a moderate reverse association between meaningful work and depressive symptoms. Caregiving reward was moderately associated with lower perceived stress in both men and women, controlling for other aspects of providing care. Significant gender differences were found in the effects of meaningful work and caregiving reward on AL. In men, meaningful work and caregiving reward were unrelated to AL. However, in women

both meaningful work and caregiving reward were related to *higher* AL ( $\beta = .22$ ,  $SE = .10$  and  $\beta = .25$ ,  $SE = .10$  respectively). The study adds to the accumulating evidence that particularly in women, the pursuit of meaning and purpose by engaging with work and family, which contribute to psychological well-being and make life worth living, may have a cost in terms of physical health.

#### 247) Abstract 1072

##### **DIABETES-SPECIFIC COGNITIVE BEHAVIORAL THERAPY ADAPTED FOR ELDERLY PEOPLE WITH DIABETES AND MINOR DEPRESSION COMPARED TO INTENSIFIED TREATMENT AS USUAL OR A GUIDED SELF-HELP INTERVENTION. RESULTS OF A MULTICENTER RANDOMIZED CLINICAL TRIAL.**

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**Objective:** To compare the efficacy of a diabetes-specific cognitive behavioural therapy adapted for the elderly (CBT) vs. intensified treatment as usual (iTAU) vs. a guided self-help intervention (SH) in elderly people with diabetes and minor depression.

**Methods:** The trial was conducted as a multicenter, open, observer-blinded, parallel group (3 groups) randomized controlled trial. We included 166 patients with type 2 diabetes mellitus, 65 to 85 years of age (mean age 71.6 years;  $\pm 4.4$ ), and 3 to 6 depressive symptoms assessed with a SCID interview (minor depression or mild major depression). Patients were allocated to weekly CBT, weekly SH or iTAU. After 12 weeks of open-label therapy, CBT and SH were reduced to one session per month and patients treated with iTAU were contacted every three months during the one-year long-term phase of the trial. Group differences were compared in intention-to-treat analyses regarding the mental quality of life (MCS, SF-36, z-values, primary outcome) and depression symptoms (HAMD-17) after 15 months compared to baseline with analyses of covariance controlled for confounders. Regarding the prevention of major depression we performed Kaplan-Meier analyses and measured the survival times (times-to-first PHQ score  $\geq 10$ ).

**Results:** In the 15 months-follow up improvement in quality of life was observed in CBT and iTAU for MCS and regarding depression (HAMD-17) for all treatment groups. However, there were no significant differences regarding the different groups. Completer analyses revealed that patients treated with CBT had a significantly improved mental quality of life compared to the SH group (MCS score difference = 0.53; 95% CI: 0.01-1.06;  $p=0.046$ ). Results of the Kaplan-Meier analyses displayed a significant advantage for CBT compared to iTAU regarding the prevention of major depression ( $p$ -value/logrank=0.038).

**Conclusions:** We observed a general improvement regarding quality of life and depression across the intervention groups but couldn't confirm our hypothesis of an advantage of CBT. Results of the completer analyses can cautiously be interpreted in the way that patients showing up more often to the CBT treatment visits have a higher benefit compared to the other interventions. More clearly, our results demonstrated that CBT is effective regarding the prevention of major depression in elderly patients with minor depression.

#### 248) Abstract 1065

##### **CARDIOVASCULAR RISK FACTORS AND DISEASE IN U.S. HISPANICS/LATINAS WITH AND WITHOUT A HISTORY OF GESTATIONAL DIABETES IN THE HISPANIC COMMUNITY HEALTH STUDY/STUDY OF LATINOS (HCHS/SOL)**

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Gestational diabetes (GD) is an increasingly common complication of pregnancy associated with future adverse cardiovascular health outcomes and increased morbidity for the mother. A history of GD is a risk factor for metabolic syndrome (MetS), diabetes, and cardiovascular disease (CVD) in the postpartum.

US Hispanics/Latinas have higher risk for GD compared to non-Latina whites (Bardenheier et al., 2015; Fujimoto, Samoa, & Wotring, 2013) and high burden of CVD risk factors (Daviglius et al., 2012). Few studies have examined to what extent a history of GD is associated with CVD in this population.

HCHS/SOL is a prospective, multi-center (Bronx, Chicago, Miami, San Diego), population-based study of health and disease in 16,415 US Hispanic/Latinos aged 18-74. 8262 are women aged 20-73 years ( $M=45.3$ ,  $SE=.29$ ) with at least one live birth. During standardized interviews, women who endorsed she first had diabetes when pregnant were classified as having a history of GD ( $N = 305$ ). At baseline clinic visit (2008-2011), waist girth (cm), blood pressure (mmHg), triglycerides (mg/dL), HDL-c (mg/dL), and fasting glucose (mg/dL) were measured via standardized procedures and fasting blood samples. National Cholesterol Education Program-Adult Treatment Panel III criteria were used for MetS, and American Diabetes Association criteria were used for diabetes classification. Coronary heart disease (CHD) combined ECG reports of prior MI, self-reported heart attack, angioplasty, stent, and bypass surgery to arteries of the heart. Cerebrovascular disease combined stroke, transient ischemic attack, balloon angioplasty, and surgery to neck arteries. Analyses were adjusted for sampling, clustering and stratification weights, and age (logistic regression adjusted also for body mass index, healthcare access, income, HCHS/SOL site, ancestry, diet, sedentary time, cigarette & alcohol use).

Women with a history of GD were younger (39.1 v. 45.5 years,  $p<.0001$ ), had more healthcare access (68.5% v. 54.4%,  $p=.0005$ ), greater waist circumference (101.6 v. 97.3 cm,  $p=.0001$ ), higher fasting glucose (116.0 v. 99.4 mg/dL,  $p<.0001$ ), and more likely to have MetS ( $OR=4.53$ ,  $CI=2.79-7.36$ ) and diabetes ( $OR=18.2$ ,  $CI=10.61-31.44$ ) than women without a history of GD. GD confers metabolic risk later in life and differences in CVD risk and diabetes do not translate into differences in CVD.

#### 249) Abstract 1248

##### **A LATENT PREDICTION MODEL OF TYPE D PERSONALITY, DEPRESSION AND ANXIETY IN 3314 ADULTS WITH DIABETES**

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**Background:** Type D personality has been associated with anxiety and depression in adults with type 1 or 2 diabetes (Nefs et al., 2015). However, conclusions about the presence and magnitude of the associations are conditional on the assumptions that the scores on the

scales measuring anxiety (GAD-7), depression (PHQ-9) and Type D personality (DS14) are normally distributed and measured without error. In our study we aimed to take into account both the measurement error and the extreme skewness of the GAD-7, PHQ-9 and DS14, enabling a minimally biased estimate of the relationship between Type D personality, depression and anxiety.

**Methods:** GAD-7, PHQ-9 and DS14 scores of 3314 Dutch adults with type 1 or 2 diabetes were used in a structural equation model, including both main effects and a latent interaction effect, as Type D personality refers to an interaction between its components negative affect (NA) and social inhibition (SI) (Smith, 2011). The latent interaction term was estimated using a matched pairs indicator multiplication method (Marsh, Wen & Hau, 2004). Skewed polytomous item responses were handled by fitting the model to the polychoric correlation matrix and estimating the parameters with weighted least squares estimation (Flora & Curran, 2004).

**Results:** After taking into account measurement error and skewed item scores, the relationship between Type D and depression and anxiety remained significant and the latent prediction model showed adequate fit, RMSEA 95%CI = [0.038, 0.041]. NA and SI were significantly associated with both anxiety ( $\beta_{NA}=.82$ , Wald  $Z=22.94$ ,  $p<.001$ ;  $\beta_{SI}=-0.10$ , Wald  $Z=-4.05$ ,  $p<.001$ ) and depression ( $\beta_{NA}=.80$ , Wald  $Z=20.99$ ,  $p<.001$ ;  $\beta_{SI}=-0.08$ , Wald  $Z=-3.05$ ,  $p=0.001$ ). These main effects were qualified by significant NA\*SI interaction effects on both anxiety ( $\beta_{NA*SI}=0.16$ , Wald  $Z=8.17$ ,  $p<.001$ ) and depression ( $\beta_{NA*SI}=0.17$ , Wald  $Z=8.21$ ,  $p<.001$ ).

**Conclusions:** People with both high negative affect and social inhibition tend to be more depressed and anxious than people with either high negative affectivity or high social inhibition. Thus, after correcting for measurement error and skewed item responses, Type D personality was associated with both depression and anxiety. These results are based on more accurate estimates of the association between Type D, depression and anxiety in adults with diabetes.

## 250) Abstract 1211

### TYPE D PERSONALITY, DYADIC ADJUSTMENT, AND PERCEIVED SOCIAL SUPPORT IN ADULTS WITH DIABETES

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**Background:** Type D personality is defined as high negative affectivity (NA) and high social inhibition (SI). In cardiovascular patients, it has been shown that Type Ds experience less social support compared to others. However, little is known about Type D personality, social support, and dyadic adjustment in people with diabetes.

**Methods:** 621 Dutch adults with diabetes completed an online survey. Binary logistic regression analyses were used to compare participants scoring (i) low on NA and SI; (ii) low on NA, high on SI; (iii) high on NA, low on SI; (iv) high on NA and SI (Type D). Analyses were adjusted for gender, age, educational level, and diabetes type. To measure quality of adjustment in couples, we used the 32-item Dyadic Adjustment Scale. To determine poor adjustment, we used the official cut-off of 97. We used the Multidimensional Scale of Perceived Social Support to assess social support from a special person, family, and friends.

**Results:** Type D participants experienced poor dyadic adjustment (OR=3.57; 95%CI=1.42-8.96;  $p<.01$ ) and low social support (OR=10.96; 95%CI=6.13-19.60  $p<.01$ ) more often compared to non-Type Ds. Type Ds had higher odds for low support from special persons (OR=6.45; 95%CI=3.79-11.00;  $p<.01$ ), friends (OR=7.39; 95%CI=4.08-13.37;  $p<.001$ ), and family (OR=4.18; 95%CI=2.51-6.96;  $p<.01$ ), compared to non-Type Ds. We also found that participants with

NA only had higher odds for poor dyadic adjustment (OR=3.31; 95%CI=1.24-8.89;  $p=.02$ ) and low social support (special person OR=3.25; 95%CI= 1.77-5.97;  $p<.001$ ; friends OR=3.88; 95%CI=1.99-7.58;  $p<.01$ ; family OR=3.38; 95%CI=1.91-6.00;  $p<.01$ ), compared to others. Participants with SI only had higher odds for low social support (special person OR=3.38; 95%CI=1.86-6.16;  $p<.01$ ; friends OR=3.70; 95%CI=1.91-7.17; family OR=2.12; 95%CI=1.17-3.85  $p=.01$ ), compared to others, but not for poor dyadic adjustment.

**Conclusions:** Diabetes patients with Type D had higher odds to experience poor dyadic adjustment and low social support compared to non-Type Ds. People with NA or SI only also had higher odds compared to others, but not as high as people with a Type D personality profile.

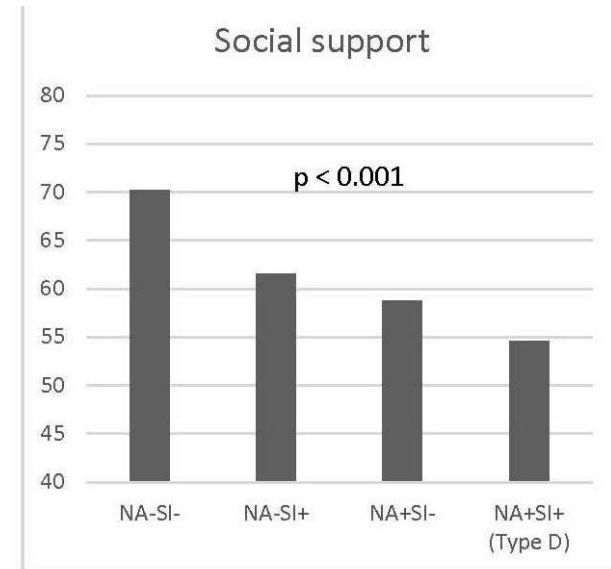


Figure 1. Social support stratified by personality

subgroups

## 251) Abstract 1623

### DIETARY RESTRICTION MODULATES SALIVARY ALPHA-AMYLASE REACTIVITY TO THE TRIER SOCIAL STRESS TEST

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**Rationale:** Dietary restriction of proteins has been shown to prolong the lifespans of rodents by 30% and also improve survival outcomes of these animals after surgery. It is unclear whether the benefits of dietary restriction are also conferred to humans. If this is the case, decreases in Sympathetic Nervous System (SNS) activation could result in less inflammation. In this study we set out to test whether DR is modifying reactivity of a marker of SNS activation, salivary alpha-amylase (sAA), to acute psychosocial stress.

**Methods:** Sixty adults (M=19.31 years, SD=1.85; 51% male; 42% Caucasian) with a mean BMI of 24.63kg/m<sup>2</sup> (SD=2.98), were randomly assigned to an 18-hour overnight fast (n=19), 72-hour juice fast (protein restriction; n=20), or control condition (n=20). All participants were exposed to the Trier Social Stress Test (TSST) and sAA was measured at baseline, and +1, 10, 20, 45, 60, and 120 minutes after the stressor.

**Results:** Analysis of baseline samples showed differences between overnight (M=59.63, SD=32.06) and control groups (M=86.18, SD=57.50), but not between those and the juice group

( $M=84.92$ ;  $SD=74.75$ ). An independent T test confirmed the difference between the overnight and control groups ( $t=1.80$ ,  $p=0.08$ ) at a trend level, while all other comparisons were insignificant. A repeated-measures ANOVA revealed a significant effect of time ( $F=15.81$ ,  $p<0.001$ ) indicating that amylase was reactive to the TSST. Further analysis showed that there were significant differences in reactivity (peak minus baseline;  $F=5.62$ ,  $p=0.01$ ) as the overnight ( $M=103.29$  U/mL,  $SD=66.59$ ) and juice groups ( $M=120.47$  U/mL,  $SD=103.29$ ) showed higher reactivity as the control ( $M=64.64$  U/mL,  $SD=82.69$ ).

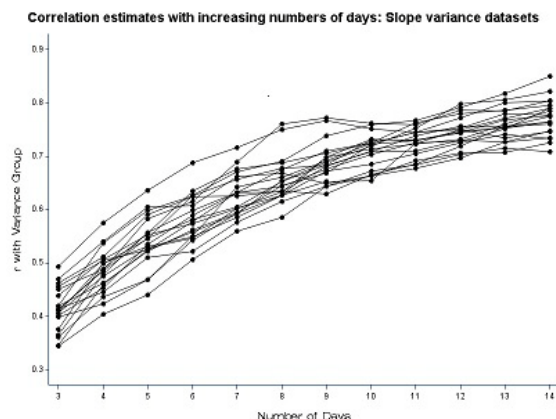
**Conclusion:** We found that DR modifies sAA reactivity to acute psychosocial stress, which indicates that DR affects ANS stress responses. These findings add to previous findings that DR is impacting stress responses, as differences in cortisol and inflammatory reactivity have already been described. These findings also add evidence that DR is decoupling systems that are typically linked, as increased ANS activation should result in increased inflammation, though the opposite has been found. Future studies should examine what systemic and intercellular mechanisms are responsible for this decoupling.

## 252) Abstract 1019

### INTRAINDIVIDUAL VARIABILITY IN DIURNAL CORTISOL: MEASUREMENT APPROACHES AND RECOMMENDATIONS

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Most of the variance in diurnal cortisol comes from intraindividual variability (IIV): short-term, reversible changes. Multiple methods for measuring IIV have been proposed, including the individual SD (iSD), rMSSD, and autocorrelation. The measurement of cortisol IIV (cIIV) is complicated by its ability to be decomposed into between-day (e.g., variability in slopes) and within-day (e.g., variability in residuals). IIV measurement approaches were applied to both simulated and real cortisol data to determine the most reliable and valid analytic approaches to cIIV. Simulated data comprised 2000 datasets with IIV at either the level of the slopes or residuals, analyzed using bootstrapping. The iSD of slopes and residuals best captured these differences; the iSD over all data and the rMSSD did poorly. Sampling frames that yielded at least 10 slopes (see Figure) and 50 residuals resulted in reliable and stable estimates of the iSD. In the real data from 119 law students sampled over 15 days, neuroticism was unrelated to mean cortisol levels ( $r = .06$ ,  $p = .51$ ) and mean slopes ( $r = .08$ ,  $p = .41$ ). However, neuroticism was significantly negatively correlated with the iSD in slopes ( $r = -.24$ ,  $p = .008$ ). This result, which was not captured by other measurement levels or approaches, may indicate that people higher in neuroticism had less flexibility in cortisol regulation. New research on cIIV suggests it is an important parameter, and reliable and valid measurement is a prerequisite for further research.



## 253) Abstract 1294

### PERCEIVED DISCRIMINATION IS ASSOCIATED WITH COGNITIVE FUNCTION IN URBAN-DWELLING AFRICAN AMERICANS

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Perceived discrimination (PD), a type of chronic stress that is particularly salient for African Americans (AAs), has been linked to untoward mental and physical health outcomes. However, little is known of its relation to brain health outcomes such as cognitive function. Here, we examined whether the relation of PD to cognitive function among AAs was moderated by poverty status. The sample consisted of 926 AAs, ages 30-64 years (57% women, mean age = 47,  $SD = 9.2$ ) who had completed the first wave of the Healthy Aging in Neighborhoods of Diversity across the Life Span (HANDLS) study. Participants rated their day-to-day experiences with PD with the Williams Everyday Discrimination Scale and underwent a neuropsychological evaluation that included measures of attention, learning and memory, and executive function. Analyses examined interactive and independent relations of PD and poverty status to cognitive performance after adjustment for literacy, sex, smoking, alcohol and illicit drug use. Results revealed significant interactions of PD and poverty status for the California Verbal Learning Test total recall ( $b = .05$ ,  $t(1, 917) = 2.23$ ,  $p < .05$ ), short delay ( $b = .03$ ,  $t(1, 917) = 2.35$ ,  $p < .05$ ), and long delay ( $b = .03$ ,  $t(1, 917) = 2.31$ ,  $p < .05$ ). Among those above the 125% poverty line, greater PD was associated with lower verbal recall scores; for those below the poverty line, greater PD was related to higher recall scores. Significant main effects were also noted such that higher levels of PD were associated with lower levels of performance on Trails B ( $b = .99$ ,  $t(1, 918) = 2.98$ ,  $p < .01$ ) and the Brief Test of Attention ( $b = -.01$ ,  $t(1, 918) = -2.08$ ,  $p < .05$ ). It appears relations of PD to verbal learning and memory performance varied by socioeconomic contexts. Interestingly, AAs above the poverty line may experience a "double edged sword" - while being above the poverty line may afford better opportunities, they may be subject to higher levels of PD in both daily life and the work place, which can influence cognition through various stress pathways. However, it is unclear why AAs living in poverty performed better on verbal memory measures in the context of PD. Because stress has been associated with both increases and decreases in hippocampal volumes, future research should identify potential linkages among PD, brain, and cognitive function.

## 254) Abstract 1083

### THE HUMAN BEHAVIOUR CHANGE PROJECT: DEVELOPMENT OF AN AUTOMATED SYSTEM TO SYNTHESISE EVALUATIONS OF BEHAVIOUR CHANGE INTERVENTIONS TO FURTHER THE SCIENCE AND APPLICATION OF BEHAVIOUR CHANGE

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**Background:** Behaviour change is essential if major health problems such as obesity are to be addressed. Evidence is needed by researchers, policy-makers and practitioners about what interventions work, for which behaviours, how well, for whom, in what settings and why. Such evidence is currently being produced on a vaster scale than humans can read and process but without the organisational structure which would allow computers to do this task. This paper describes a major project, *the Human Behaviour Change Project*, funded by the Wellcome Trust addressing this issue.

**Methods:** The project will involve an iterative process involving the following steps:

1. Building a consensus of international experts around a suitable ontology (*a formal structure for organising knowledge in terms of defined constructs and their relationships*) of behaviour change intervention evaluations that capture key features linking observed effect sizes with the interventions and their comparators, their reach and engagement, the behavioural outcomes being targeted, characteristics of the populations and setting, and mechanisms of action.

2. Building and training a natural language processing system to extract information from published research reports to populate the ontology.

3. Developing, testing and refining machine learning algorithms to integrate information in the populated ontology to generate a knowledge structure that captures principles of behaviour change.

4. Developing, testing and refining a user interface for researchers, policy makers and practitioners to be able to interrogate the knowledge structure and its supporting evidence base.

**Outputs:** The main outputs will be: an ontology of behaviour change interventions; a natural language processing system capable of extracting key information from research reports to populate the ontology, a machine learning system for synthesising evidence in the populated ontology to create knowledge about behaviour change; and an interface allowing users to interrogate and update the knowledge structure and evidence base.

**Conclusions:** This collaboration between behavioural, computer and information scientists has the potential to make a step-change in the accessibility and value of information about behaviour change interventions, and allow important societal behavioural problems to be addressed.

#### 255) Abstract 1399

##### **BIOLOGICAL MARKERS AND HEALTH BEHAVIORS DO NOT MEDIATE THE RELATIONSHIP BETWEEN TRAIT HOSTILITY AND THE METABOLIC SYNDROME**

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Much evidence links trait hostility with the metabolic syndrome (MS), but less is known about which components of hostility are most strongly linked to MS and their potential mechanisms. Here we investigate the relationship between dimensions of hostility and MS, as well as the role of blood pressure (BP) reactivity, metrics of adrenocortical activity, and health behaviors in accounting for any associations. In a cross-sectional sample of 493 healthy, employed middle-aged adults (mean age=42.7 years, 81% white, 53% female), we measured trait hostility using the Buss Perry Aggression Questionnaire (assessing Physical Aggression, Verbal Aggression, Anger, Hostility) and the Cook-Medley Hostility Inventory (assessing Cynicism, Hostile Affect, Aggressive Responding, Hostile Attribution). We operationalized MS using a continuous measure (zMS) averaging z-scores measuring each component (glucose, triglycerides, HDL, systolic and diastolic BP, and waist circumference). Lifestyle variables include smoking status, alcohol consumption, energy expenditure, caloric intake, and actigraphy-measured sleep duration. Participants

collected biological samples and hourly ecological momentary assessment (EMA) interviews across 4 monitoring days. We measured cortisol area under the curve (AUC) and slope using five samples collected from wake time to bedtime averaged across the 4 days. Epinephrine (EPI) and norepinephrine (NE) collected from two 15-hour overnight urine samples were expressed as a ratio to creatinine excretion. We measured ambulatory mean arterial pressure response (MAPR) to EMA-measured daily life social conflict.

When controlling for demographic variables, Physical Aggression ( $b=.015$ ,  $p=.009$ ), Anger ( $b=.014$ ,  $p=.016$ ), and Aggressive Responding ( $b=.032$ ,  $p=.023$ ) were significantly associated with zMS, but the other Buss-Perry and Cook-Medley scales were not. Of the biomarkers, significant associations with zMS emerged for EPI ( $b=-.079$ ,  $p=.038$ ), AUC ( $b=-.226$ ,  $p=.006$ ), and MAPR ( $b=-.986$ ,  $p<.0001$ ), however, only Aggressive Responding was associated with NE ( $b=.035$ ,  $p=.016$ ). Neither the five biomarkers nor the five lifestyle behaviors significantly mediated the relationship between hostility scales and zMS. Behavioral and affective components appear to be most strongly linked with MS, but further research on potential mechanisms is needed.

#### 256) Abstract 1461

##### **USING SOCIAL MEDIA AS A SHIELD AGAINST STRESS: FACEBOOK USE MAY BUFFER ACUTE STRESS**

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**Background and Aim:** A conflicting body of research suggests that Facebook use may both enhance and undermine well-being. Despite these associations, to date there have been hardly any objective measurement of the potential impact of Facebook use on well-being in the context of stress. We aimed to examine the impact of Facebook use on stress reactivity.

**Methods:** Forty-eight undergraduate students (mean age  $19.8 \pm 2.3$ ) were randomly assigned to either the experimental group (Facebook use) or the control group (digital reading materials) during 18 minutes before experiencing the Trier Social Stress Test (TSST). All participants completed measures of mood and well-being. Objective physiological markers (blood pressure, heart rate, and salivary cortisol) were collected at baseline and during recovery.

**Results:** The groups did not differ on any measure at baseline. During the TSST, the experimental group showed a decrease in heart rate, whereas the control group showed a steep increase ( $p<.05$ ). When considering just the TSST responders (i.e. salivary cortisol levels increasing or flat-lining 20 minutes after the onset of the TSST), participants in the experimental group showed a more blunted response to the TSST in terms of salivary cortisol ( $p<.05$ ). There were no significant differences in blood pressure or any subjective measures.

**Conclusion:** This pilot study showed that participants who used Facebook before experiencing acute stress showed a more blunted response to the TSST with regard to heart rate and salivary cortisol compared to the control group. Results suggest that Facebook use may act as a buffer against the physiological response to acute stress.

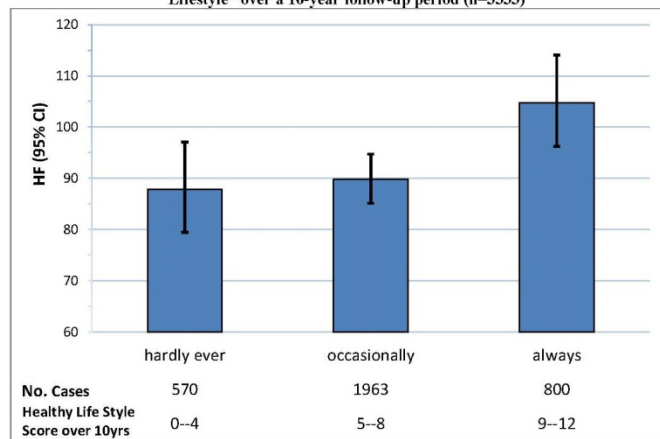
#### 257) Abstract 1505

##### **HEALTHY LIFESTYLE AND CARDIAC VAGAL MODULATION OVER 10 YEARS: WHITEHALL II COHORT STUDY**

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**Background:** A healthy lifestyle factors, including regular physical activity, not smoking, moderate alcohol consumption and healthy body mass index (BMI) have been individually and mostly cross-sectionally related to increased vagal modulation of the autonomic nervous system (ANS), an indicator of better cardiac health. But how these 4 important healthy lifestyle factors combine to affect ANS function in the longer term is not established. We prospectively examined the association between these 4 healthy lifestyle factors and vagal modulation over a 10y follow-up period. **Methods:** Data of the fifth (1997-1999), seventh (2002-2004) and ninth (2007-2009) calls of the UK Whitehall II longitudinal population-based study were analysed. The population size ranged from 2518 to 3479 (55.7ys at baseline). A healthy lifestyle score (HLS) was created wherein participants received 1 point for each healthy criterion met: physically active, healthy BMI, currently not smoking and moderate alcohol consumption. Two heart rate variability (HRV) measures reflecting vagal modulation were used: high-frequency HRV (HF; ms<sup>2</sup>) and RMSSD(ms). We applied general linear model and a random mixed models analysis. **Results:** Cross-sectionally, a significant positive graded association was observed between a HLS and both HRV measures at baseline ( $p_{\text{trend}} \leq 0.001$ ). The differences in HRV according to the HLS remained stable over time. Compared with participants who hardly ever adhered to healthy lifestyle practices over the 10ys, those who always had healthy lifestyles displayed higher HF ( $\beta=0.18$ ; 95%CI 0.04-0.31;  $p=0.009$ ) (Figure) and RMSSD ( $\beta=0.12$ ; 95%CI 0.04-0.20;  $p=0.003$ ) at follow-up after adjustment for age, sex, ethnicity, employment grade, cardiometabolic condition and medication use. Compared with participants who reduced their number of healthy lifestyle practices, those who increased the number of healthy lifestyle practices had higher subsequent HF ( $\beta=0.14$ ; 95%CI 0.01-0.26;  $p=0.033$ ) and RMSSD ( $\beta=0.08$ ; 95%CI 0.01-0.15;  $p=0.036$ ) after adjustment for the covariates. **Conclusion:** Findings suggest not only that increased vagal modulation may be a biological mechanism linking healthy lifestyle to better cardiac health, but also that maintaining healthy lifestyle throughout aging has a favourable effect on cardiac vagal functioning and these beneficial adaptations may be lost on cessation.

Predicted High-Frequency Heart Rate Variability at Follow-up according to Habitual Healthy Lifestyle\* over a 10-year follow-up period (n=3333)



Habitual Healthy Lifestyle practices over 10 years; "hardly ever", "occasionally" and "always" includes those participants who reported 0-4, 5-8 and 9-12 healthy lifestyle factors (not currently smoking, physically active, moderate alcohol consumption and healthy BMI) respectively out of the time points (phases 5, 7 and 9).

## 258) Abstract 1346

### A RANDOMIZED CONTROLLED TRIAL EVALUATING THE EFFECT OF WRITTEN DISCLOSURE ON SUBJECTIVE STRESS AND CORTISOL ACTIVITY AMONG PARENTS OF CHILDREN WITH AUTISM

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**Background:** Repeated exposure to stressful events creates sustained activation of the hypothalamic-pituitary-adrenal (HPA) axis which can contribute to poor health. Extensive research reports that parents of children with autism spectrum disorders (ASD) experience chronic caregiver-related stress, triggering increased risk for unfavorable health consequences. With prevalence rates of ASD rapidly increasing, it is imperative to identify effective interventions targeting attenuation of stress-related parent outcomes. Investigations of written disclosure (WD) have shown promising results in stress reduction for the general population but a paucity of research has evaluated WD with parents of children with ASD. Fewer have utilized the stress biomarker of cortisol activity to evaluate WD treatment efficacy.

**Hypothesis:** We hypothesized that parents who wrote about traumatic events (treatment) would display better psychophysiological stress profiles compared to parents who wrote about a neutral topic (control).

**Method:** We conducted a randomized controlled trial with 71 parents of children with ASD (ages 23 to 62 years;  $M = 38.0$ ,  $SD = 10.35$ ). We evaluated self-reported stress (perceived stress, parenting stress, and caregiver strain) and collected salivary cortisol to examine the cortisol awakening response (CAR) at baseline and 6-month follow-up.

**Results:** At 6-month follow-up treatment parents displayed more robust cortisol activity,  $F(1,52) = 12.08$ ;  $p = .002$ , and reported less perceived stress,  $F(1,56) = 9.14$ ;  $p = .004$ . While conditions did not differ at follow-up, parenting stress ( $F(1,56) = 7.64$ ;  $p = .008$ ) and caregiver strain ( $F(1,56) = 6.46$ ;  $p = .014$ ) were reported significantly better for all parents over time. Thus, results partially support WD as an effective stress-reduction treatment for parents of children with ASD. Given the small sample size, caution is warranted for generalizability.

**Conclusions:** Overall, the results of this study partially support the efficacy of written disclosure in improving stress-related outcomes at 6-month follow-up for parents of children with ASD. The improvement of health outcomes for parents of children with ASD is both significant and timely. Being able to simply write to evoke positive change to one's health and well-being appears welcomed in a population of uniquely distressed caregivers.

## 259) Abstract 1042

### FEASIBILITY OF OUT-PATIENT EXERCISE PROGRAMS TO IMPROVE COGNITION IN PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS (SLE)

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**Background:** Preliminary evidence suggests that limited exercise tolerance is associated with lower cognitive function in patients with SLE. No studies have objectively evaluated the impact of standardized exercise programs on cognitive improvement in this patient group.

**Methods:** Eligible SLE patients were enrolled and randomized to participate in an eight-week medical center-based, standardized, outpatient exercise program (n=3) or usual care without an exercise program (n=3). The average age of the active group was 39.3 years with 13.3 years of education and 69.7 months of disease duration. Outcomes included measures of cognitive, behavioral and cardiopulmonary function. The active subjects participated in an exercise program consisting of three 30 minute exercise sessions per week for eight weeks (total 24 sessions). Subjects began training on a treadmill at 60% of their personal peak oxygen consumption (VO<sub>2</sub>max). Exercise intensity was gradually increased via increased speed or incline each week. Evaluation of enrollment activities and barriers to patient participation in outpatient exercise were formally

assessed. **Results:** Improvement in aspects of exercise ability (mean peak oxygen consumption increased 9.5%), distance covered during a timed walk test (mean increase of 90 feet), and depression were noted in two of the three subjects. Improvement in resting heart rate (mean decrease of 10.3bpm), and weight loss (mean decrease of BMI by 0.66) were noted in all three subjects who participated in the exercise program. Work, school and family responsibilities, physical concerns (and limitations), and transportation issues were the primary reasons that SLE patients reported they were not interested in participating in outpatient exercise. **Conclusions:** Although some improvement in physical and psychological status was noted in select SLE subjects following an outpatient exercise program, no specific improvement in cognitive function was observed. Protocol-imposed exclusions (i.e. cardiovascular risks) and high frequency of exercise at baseline limited enrollment and overall conclusions. Home- or community-based programs and other methods to overcome barriers to participation should be explored in future studies aimed at improving cognition and health in patients with SLE.

## 260) Abstract 1354

### THE AIM JUSTIFIES THE MEANS - DIFFERENCES AMONG MUSICAL AND NONMUSICAL MEANS OF RELAXATION OR ACTIVATION INDUCTION IN DAILY LIFE

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Music listening has been shown to produce a wide variety of effects on mind and body. Music listening may be used for stress reduction in general, but it may also be used to specifically induce relaxation or activation. However, it is unclear whether these effects are specific to music listening or whether other activities may have similar effects.

We aimed to investigate the specific effect of music listening on relaxation and activation. To this end, we used an app that provided users with three different means of achieving relaxation and/or activation: 1) listening to self-selected music, 2) listening to guided relaxation or activation, accompanied by music, and 3) listening to self-enhancing instructions (no music condition). In 1) and 2), the participants were able to choose whether they wanted to achieve relaxation or activation. 62 subjects (age:  $M = 40.19$  years; 18 women) participated in the study. Each participant was equipped with an iPod and instructed to use the app as often as desired. Assessment duration was individualized and ranged from 3 to 10 consecutive days ( $M = 7.26$  days). Subjective stress, fatigue, relaxation and activation as well as skin resistance were assessed before and after using the app.

The app was used, on average, 10.19 times over the course of the study. The participants felt less stressed and fatigued as well as more relaxed and activated after using the app for all three means. Furthermore, after using the app, skin resistance was lower indicating an increase in autonomic arousal. There were no general differences between the three conditions in any of the outcomes. However, there was a stronger decrease in subjective stress and a stronger increase in relaxation when participants wanted to achieve relaxation.

The results indicate that all three different means had beneficial effects on stress, fatigue, relaxation, and activation. Interestingly, there were no general differences among means containing music and those not containing music. However, the aim for using the app predicted the outcome independent of the chosen means.

## 261) Abstract 1441

### TEMPERAMENT FACTORS AND DIMENSIONAL, LATENT BIFACTOR MODELS OF CHILD PSYCHOPATHOLOGY: TRANSDIAGNOSTIC AND SPECIFIC ASSOCIATIONS IN YOUTH

*Benjamin Hankin, PhD, Psychology, University of Illinois, Urbana, IL*  
Common psychopathology, including internalizing problems of anxiety and depression, and externalizing problems of hyperactivity and

conduct problems, significantly co-occur. Temperament factors, negative affectivity (NA), positive affectivity (PA), and effortful control (EC), predict emotional distress and behavioral problems. Little research has integrated these findings to understand how temperament operates as transdiagnostic risks broadly for psychopathology and specific risks to unique syndromes.

Common diagnoses (mood, anxiety, conduct and aggression) are best structured by a general psychopathology latent factor and unique internalizing and externalizing latent factors. The general psychopathology (the “p factor”) captures the co-occurrence across all measured symptoms. After statistically accounting for shared variance across all symptoms via the p factor, unique covariance that remains is independently organized by unique latent internalizing and externalizing dimensions.

Poor effortful control (EC) and higher negative affect (NA) are associated with most forms of psychopathology. Low positive affect (PA) is more specific to internalizing problems.

I examined links between temperament factors and child psychopathology when modeled via p factor and specific internalizing and externalizing latent dimensions. Past work studied temperament-psychopathology without all three temperament dimensions simultaneously and explicit consideration of psychopathology co-occurrence.

Data come from 571 children. They were 13.58 years old ( $SD = 2.37$ ). Child psychopathology included depression, anxiety, aggression, oppositional and conduct problems, ADHD. Temperament was assessed via EATQ and PANAS.

SEM showed the bifactor latent model fit well ( $CFI = .97$ ,  $RMSEA = .054$ ). All psychopathology loaded onto the p factor; depression and anxiety loaded onto internalizing specific factor; aggression, oppositional and conduct problems loaded on externalizing specific factor. Regression analyses showed the p factor was negatively predicted by EC, positively with NA. Internalizing-specific factor was positively predicted by NA, and negatively by EC and PA. The externalizing-specific factor was negatively predicted by EC, no effect of NA or PA.

Temperament relates transdiagnostically to general psychopathology and is linked more specifically to unique aspects of child psychopathology.

## 262) Abstract 1600

### PERCEIVING ONESELF AS A GIVER VS. RECEIVER ELICITS UNIQUE EMOTIONAL STATE BLENDS: A WEB-BASED ACTIVATION OF SUPPORT SCHEMAS IN OLDER ADULTS

*Diana Wang, B.S., Gerontology, University of Southern California, Los Angeles, CA, Tara L. Gruenewald, PhD, Family and Consumer Sciences, Gerontology, California State University, Long Beach, Long Beach, CA*

Epidemiological studies indicate that giving support to others is beneficial for health and well-being, above and beyond receiving support. However, the cognitive-affective and physiological pathways which may underlie the health benefits of support provision or receipt remain to be elucidated. The current study seeks to identify the unique or shared cognitive-affective states linked with perceiving oneself as a giver or receiver of support in older adults.

324 participants age 55+ were recruited for this online study through online survey panels (Qualtrics and mTurk) as well as from the greater Los Angeles area. Subjects were randomly assigned to one of three 10-minute writing conditions: discussing their role as support-givers or receivers, or previous-day activities. Immediately after, participants were asked to report perceived levels of positive and negative affect and feelings of control, social connectedness and ego achievement. ANOVA models were used to compare the mean levels of cognitive-affective states and expressions of positive and negative affect, social connectedness and ego achievement in written narratives as assessed with the Linguistic Inquiry and Word Count (LIWC) program.

There were significant group differences in mean levels of self-reported perceived control ( $p=.027$ ) and contributions to others ( $p=.044$ ). Givers report higher levels of control than receivers, and marginally higher levels of contributions to others compared to the neutral group. Linguistic expression analyses indicated that givers used less positive and negative emotion words ( $p<.001$ ), and marginally less affiliation words than receivers, but more achievement-related words than those in the giver and neutral conditions. Receivers also used greater levels of positive, negative, and affiliation and achievement-related words compared to the neutral group ( $p<.001$ ). Our findings indicate both shared and unique cognitive-emotional states linked with support giving and receiving in older adults, providing clues to the pathways through which the giving and receiving of support may be beneficial for health. We will also share findings from an ongoing investigation that utilizes our support provision paradigm to examine the endocrine and autonomic nervous system sequelae of support-giving and links to the cognitive-affective states examined in the current study.

### 263) Abstract 1003

#### LEUKOCYTE TELOMERE LENGTH AND PERSONALITY: ASSOCIATIONS WITH THE BIG FIVE AND TYPE D PERSONALITY TRAITS

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**Background:** Accelerated cellular ageing, which can be examined by telomere length (TL), may be an overarching mechanism underlying the association between personality and adverse health outcomes. This 6-year longitudinal study examined the relation between personality and leukocyte telomere length (LTL) over time among adults with a wide age-range.

**Methods:** Data from the Netherlands Study of Depression and Anxiety were used and included patients with a depression and/or anxiety disorder and healthy controls. Overall, 2936 persons (18-65 years, 66% female) had data on LTL at baseline and 1883 persons had LTL at six year follow-up. The Big Five personality traits (neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness) and Type D personality were assessed.

**Results:** Neuroticism was negatively ( $B=-2.15$ ,  $p=0.040$ ) and agreeableness was positively ( $B=3.98$ ,  $p=0.030$ ) related to LTL measured over two time points, which became just non-significant after adjusting for somatic health, lifestyle factors, and recent life stress ( $B=-2.08$ ,  $p=0.055$ ; and  $B=3.27$ ,  $p=0.087$ ). Type D personality was negatively ( $B=-53.02$ ,  $p=0.009$ ) related to LTL across two time points, which still remained statistically significant after full adjustment ( $B=-50.76$ ,  $p=0.017$ ). Associations did not differ by age, gender, and current psychiatric status.

**Conclusions:** The Big Five traits high neuroticism and low agreeableness and Type D personality were associated with shorter LTL measured over a six year period. Associations with the Big Five traits became non-significant after controlling for somatic health, lifestyle factors, and recent life stress, yet similar trends were observed. Type D personality remained independently associated with shorter LTL after full adjustment.

### 264) Abstract 1165

#### PHYSIOLOGICAL CONCORDANCE IN MOTHER-CHILD DYADS IN THE CONTEXT OF MATERNAL EMOTIONAL ABUSE HISTORY AND EMOTION DYSREGULATION

*Jacqueline R. O'Brien, B.A., Maureen Zalewski, Ph.D., Psychology, University of Oregon, Eugene, OR*

Physiological concordance in the parent-child dyad, conceptualized as similar physiological profiles of parent and child, has been associated with developmental milestones for children, while discordance has been viewed as a risk factor for negative child outcomes. The HPA-axis, a component of the sympathetic nervous system, uses its main hormonal output of cortisol to regulate the body's reaction to stressors. Heart rate variability (HRV), a component of the parasympathetic nervous system, has been indicated as a measure of emotion regulation. Maternal childhood trauma history and emotion dysregulation have both been associated with disrupted diurnal cortisol and HRV. The current study examined concordance rates for both cortisol and HRV in an at risk sample and determined whether maternal trauma history and emotion dysregulation moderates the degree of concordance.

Mother-preschooler dyads were recruited ( $N=68$ ) in which mothers with borderline personality disorder, a disorder marked by extreme emotion dysregulation and high levels of trauma history were oversampled. Maternal emotion dysregulation (Difficulties in Emotion Regulation Scale) and maternal trauma history (Childhood Trauma Questionnaire, emotional abuse subscale) were measured. Dyads completed a 5-minute baseline measure of HRV and collected cortisol samples at home for three days in the morning and evening.

Results showed that dyads exhibited cortisol concordance at every time point, except for the Day 1 PM sample, which was discordant. Dyads did not exhibit HRV concordance. When controlling for emotion dysregulation, mother cortisol levels predict child levels in the morning, but not in the evening. Neither emotion dysregulation nor mother HRV predict child HRV. When emotional abuse history is taken into account, mother cortisol levels do not predict child levels at any time point. However, emotional abuse history predicts child HRV. No interactions were significant.

While concordance has been viewed as a positive indicator of child development, it may be a risk factor that this sample showed cortisol concordance, as maternal emotion dysregulation and abuse history both lead to disrupted cortisol patterns that are associated with negative health outcomes. Further research will explore long-term effects maternal emotion regulation and trauma history has on dyad concordance and child outcomes.

Table 1. Bivariate Correlations in Salivary Cortisol (Transformed,  $\mu\text{dL}$ ) and HRV

	Concordance Rate
Day 1 AM	.362*
Day 1 PM	-.047
Day 2 AM	.339*
Day 2 PM	.346*
Day 3 AM	.284 <sup>†</sup>
Day 3 PM	.433*
HRV	.089

### 265) Abstract 1426

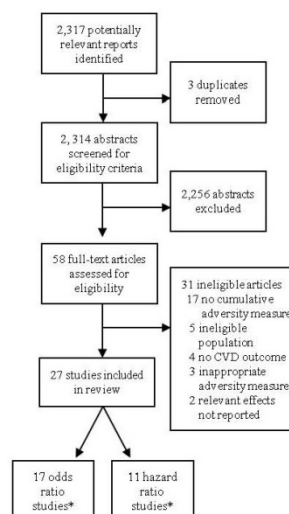
#### DOES BREASTFEEDING REALLY ENHANCE MATERNAL SENSITIVITY? AN EXPERIMENTAL TEST

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It is widely assumed that breastfeeding facilitates maternal sensitivity, in part, because breastfeeding triggers the acute release of oxytocin and

prolactin, hormones important for regulating social behaviors. While there is strong evidence from animal models that lactation and its related hormonal profile promote maternal behavior, no experimental evidence existed in humans. To experimentally test the hypothesis that breastfeeding triggers hormonal changes that enhance maternal sensitivity in humans, 40 breastfeeding mothers were randomly assigned to either breastfeed or bottle feed (with pumped breast milk or formula) in the laboratory. Afterwards, all mothers played with their infant for 12 minutes and provided a blood sample to assess levels of prolactin and oxytocin. Maternal sensitivity was coded by raters blind to participate condition using the National Institutes of Child and Human Development (NICHD) behavioral coding scheme. Mothers randomly assigned to breastfeed were rated as more sensitive to their infant's cues than mothers randomly assigned to bottle feed. Serum prolactin levels were also positively correlated with maternal sensitivity. Together, these findings provide the first experimental evidence in humans that breastfeeding and its associated hormonal changes do indeed help to facilitate maternal sensitivity. These results also suggest that breastfeeding promotion could be a target for interventions designed to enhance maternal sensitivity.

Figure 1. Flow chart showing inclusion/exclusion of studies identified from initial search.



Note. \*1 study was included in both odds ratio and hazard ratio analyses.

## 266) Abstract 1106

### ASSOCIATIONS BETWEEN CUMULATIVE ADVERSE CHILDHOOD EXPERIENCES AND CARDIOVASCULAR DISEASE AND MORTALITY: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Methods: The search returned 2314 articles (Figure 1). Included studies had a measure of cumulative adversity (an index that included at least 2 adverse childhood experiences from age 0 to 18) and at least one CV-related outcome (CV clinical events: hypertension, stroke, coronary heart disease; CV clinical risk scores: Framingham risk; and metabolic outcomes: diabetes, metabolic syndrome), or mortality measured at age 19 or older in a non-psychiatric population. Effect sizes were reported as regression weights, odds ratios (OR), or hazard ratios (HR), and were drawn from fully adjusted models. Given differences in the interpretation of OR versus HR, effects were pooled separately. Regression weights were included with OR. Overall, 27 studies were included: 11 HR studies (18 effects; N=268,960) and 17 OR studies (34 effects; N=464,215).

Results: Exposure to cumulative childhood adversity was associated with risk of CV-related outcomes in adulthood (OR [95%CI]=1.36 [1.26-1.47]) and time to event for CV-related outcomes and mortality (HR=1.34 [1.18-1.52]). Combined risk for CV clinical events, CV risk scores, and mortality was elevated relative to risk for metabolic outcomes (OR<sub>CV</sub>=1.51 [1.35-1.68] vs. OR<sub>metabolic</sub>=1.22 [1.08-1.38];  $Q_M=6.3$ ,  $p<.05$ ); this pattern was not seen in HR studies. Smaller effects were observed in HR, but not OR, studies that measured childhood SES in the cumulative index or adjusted for adult psychosocial factors. There was a threshold effect of 4-6 adversities for both HR and OR studies. Results did not vary by gender, location (U.S. vs. non-U.S.), design (prospective vs. retrospective report of adversity), type of adversities, adjustment for adult health behaviors, number of covariates, or years of follow-up. We were unable to assess moderation by race, given limited data in non-white samples.

Conclusions: Based on the current literature, there is a large estimated cumulative effect of childhood adversity on adult CV-related outcomes and mortality. However, greater numbers of adversities does not necessarily mean greater risk. The literature has not achieved consensus on the definition of adversity (i.e., some studies include poverty, others do not). It is time to have a conceptual perspective guided by developmental and life history theory on the types and timing of events that have maximal impact on CV-related disease and mortality.

## 267) Abstract 1601

### THE INSULAR GLUTAMATERGIC SYSTEM IN ALEXITHYMIA: A COMBINED FMRI AND MRS STUDY.

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Alexithymia is an emotion dysfunction characterised by the inability to describe and identify one's own emotions. A recent theory suggests that alexithymic features are the outcome of an interoceptive failure. Interoception refers to the sensation of internal bodily signals, which is supported by the insular cortex and guides emotional feeling states. In studies using functional magnetic resonance imaging (fMRI) and magnetic resonance spectroscopy (MRS) separately, alexithymia was found to show aberrant insular activation and enhanced insular glutamatergic levels, respectively.

A preliminary sample of 11 healthy male participants evaluated their empathy for pain in response to emotional pictures during fMRI scanning. To measure glutamate levels, MRS scanning was performed at 1.5T by placing a single voxel in the right mid insula of each participant. Metabolites were quantified with Tarquin using the unsuppressed water signal as reference. Non parametric correlations were calculated between scores of alexithymia (using the total and subscale scores of the TAS questionnaire) and glutamate levels of the insula.

Individuals scoring higher for alexithymia showed enhanced activation in the right insular cortex (IC) during emotional processing. Furthermore, the activation of the IC was positively correlated with scores of the factor 1 subscale of the TAS (difficulties describing emotions) of the TAS. Glutamate levels of the right mid insula were positively correlated with scores of the factor 2 subscale of the TAS (difficulties identifying emotions).

These findings confirm that alexithymia is related to a hyper excitability of the insular cortex, both at functional and physiological levels. This conclusion is in line with the emergent literature supporting alexithymia as the outcome of an interoceptive failure. Furthermore,



interoception seems to be disrupted in various clinical and subclinical psychiatric populations, and should be subject of further studies.  
Key words: Emotion, Interoception, Alexithymia, fMRI, MRS, Glutamate

**268) Abstract 1443**  
**THE RELATIONSHIP BETWEEN THE CORTICAL THICKNESS OF THE PREFRONTAL CORTEX AND BASAL CARDIAC AUTONOMIC NERVOUS SYSTEM ACTIVITY**

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Both animal studies and human functional neuroimaging studies have shown a network of brain regions to be involved in the regulation of the autonomic nervous system (ANS). However, limited studies have focused on structural brain correlates of ANS activity in humans. This study investigated the relationship between the cortical thickness of the prefrontal cortex, including the anterior cingulate cortex, and basal cardiac ANS activity (mean heart rate (HR) and heart rate variability (RMSSD)) using adjusted multiple linear regression in 391 participants from two consortiums in the Netherlands (297 from the NESDA and 94 from the NTR, mean age: 35,87 years, 62.7% females). The analysis revealed a significant difference between males in females with regard to the association between the thickness of the dorsolateral prefrontal cortex (DLPFC) and both HR ( $\beta = 1.354, p = .001$ ) and HRV ( $\beta = -.373, p = .002$ ). Post-hoc analyses revealed a significant positive association between thickness of the DLPFC and HR in females only ( $\beta = .228, p = .001$ ). Furthermore an indication of a negative association between thickness of the DLPFC and HRV was present, again in females only ( $\beta = -.188, p = .006$ ). Testing for an effect of the presence of a psychiatric disorder revealed that the association was stronger in females suffering from a psychiatric disorder compared to healthy control females. This finding fits well within the already established associations between DLPFC activity, HR and HRV with emotion regulations mechanisms and mood disorders and could be a starting point for further research on the explorations of the observed associations and its significance is emotion regulation and mood disorders.

**269) Abstract 1442**  
**OPIOID RECEPTOR GENOTYPE (OPRM1 A118G) PREDICTS TRAIT HARM AVOIDANCE IN MEN AND WOMEN**

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**Objective:** The Oklahoma Family Health Patterns project (OFHP) seeks to identify individual characteristics that may affect risk for substance use disorders. In prior work, central opioid receptor density accompanied higher scores on the Tridimensional Personality Questionnaire (TPQ) Harm Avoidance (HA) subscale. Cloninger proposed that variation in TPQ HA may contribute to hedonic experience and drinking behaviors. We examined the potential for TPQ HA to accompany a specific polymorphism of the mu-opioid receptor gene (*OPRM1* A118G). Persons carrying the *OPRM1* G allele (AG/GG genotypes) have higher receptor binding for the endogenous opioid,

beta-endorphin, compared to AA homozygotes, potentially accounting for differences in TPQ HA scores.  
**Methods:** The TPQ was completed by 253 healthy young adults, 23.5 years of age, participating in the OFHP. Genotyping was done using an OmniExpress array. Genotypes with African ancestry markers were excluded due to differences in allele frequencies.  
**Results:** TPQ HA (Table 1) was significantly higher among G allele carriers ( $F = 4.38, p = .0374$ ) and among women ( $F = 8.52, p = .0038$ ). The Pearson intraclass correlation between TPQ HA scores and the four Sex x AA, AG/GG genotypes was 0.24.  
**Conclusion:** The present study is the first to find an association between HA and variations in the *OPRM1* genotype associated with mu-opioid receptor binding. Further work is needed to identify potential contributions of the mu-opioid receptor genotype and its impact on the HA trait in relation to hedonic experience and alcohol intake. (Supported by the Department of Veterans Affairs and the NIH, grant AA12207).

**Table 1**

Sex	Male		Female	
OPRM1	AA	AG/GG	AA	AG/GG
N	74	30	110	39
HA	7.65	9.63	10.30	11.69

**270) Abstract 1043**  
**TRANSCRANIAL DIRECT CURRENT STIMULATION ENHANCES SOOTHING POSITIVE AFFECT AND VAGALLY-MEDIATED HEART RATE VARIABILITY IN HEALTHY INDIVIDUALS**

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Transcranial Direct Current Stimulation (tDCS) is a promising tool for the treatment of depression and the dorsolateral prefrontal cortex (dlPFC) is often targeted when exploring tDCS effects on mood. However, the basic effects of tDCS on momentary emotions are inconsistent. We tested whether a single-session of anodal tDCS over the left temporal lobe (T3) had effects on both vagally-mediated heart rate variability (HRV) and momentary affect in healthy participants. Fifty subjects underwent both sham and active tDCS in a counterbalanced random order. ECG was continuously recorded to derive both time and frequency domain HRV indexes. Before and after the tDCS protocol, participants completed momentary affect assessments. Results showed that HRV ( $p = .003, \eta_p^2 = .17$ ) and soothing positive affectivity ( $p = .029, \eta_p^2 = .14$ ) were both enhanced after a single-session of tDCS over T3, while negative and activating positive affect were not modulated by the stimulation (all  $ps > .20$ ). Moreover, increases in soothing positive affect were significantly predicted by concomitant increases in vagally-mediated HRV above and beyond the role of sex, age, and levels of anxiety and depression ( $\beta = .44, p = .02$ ). Deficits in soothing positive emotions have consistently been associated with psychopathology and psychotherapeutic approaches aimed to develop this type of emotionality have shown to improve psychological well-being. Thus, present exploratory results may impact future research investigating potential moderators (site of stimulation) and mediators (specificity for a determined type of momentary affect) of the effects of tDCS on psychopathological conditions such as depression.

## 271) Abstract 1293

### EMOTIONAL IMAGERY ABILITY IS ASSOCIATED WITH FUNCTIONAL CONNECTIVITY OF THE AMYGDALA

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**Background:** Mental imagery can regulate appraisals and emotions. However, its success depends on an individual's imagery ability, with higher imagery ability eliciting greater benefits. Previous research suggests the amygdala is important for the imagery of emotions. However, brain imaging research has been limited to examining neural activity during the imagery itself. The relationship between imagery ability and the amygdala activity at rest, such as its functional connectivity, may be more informative in understanding the neural correlates of someone's endogenous capacity or propensity to create and control images of emotional content. **Aims and hypothesis:** Examine whether individual differences in the ability to image emotional content (i.e., affect imagery ability) are associated with resting state neural connectivity of the amygdala. The association between functional connectivity of the amygdala and movement imagery ability was also examined to determine whether any affect-amygdala connectivity relationship was specific to emotion based imagery. It was hypothesized that only affect imagery ability would be positively associated with stronger connectivity between the amygdala and other areas associated with emotion processing. **Methods:** 40 females ( $M_{age} = 19.05$ ;  $SD = 0.22$ ) completed a 6-min resting state scan and provided self-report measures of affect and movement imagery ability. An amygdala seed was created and the CONN functional connectivity toolbox was used to generate functional connectivity maps at rest. **Results:** A whole-brain analysis indicated that affect imagery ability varied as a function of the connectivity between the amygdala and a cluster extending through the right caudate and putamen  $t(39) = 4.80$ ,  $p$  uncorrected  $< .001$ ,  $k = 123$ , (x, y, z) coordinates of peak cluster: 24, 14, 2. As hypothesized, higher affect imagery ability was associated with stronger connectivity between the amygdala and the right caudate and putamen during rest. There was no association between movement imagery ability and connectivity between the amygdala and any other area of the brain during rest. **Conclusions:** Connectivity of the amygdala with other areas of the brain associated with emotional processing and envisioning future emotional events may enable individuals to image feelings and emotions more easily.

## 272) Abstract 1512

### INTEROCEPTIVE TRAINING FOR ANXIETY MANAGEMENT IN AUTISM: ALIGNING DIMENSION OF INTEROCEPTIVE EXPERIENCE, ADIE©

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Internal states of physiological arousal contribute, through interoceptive feedback, to the expression and experience of anxiety. We developed a battery of objective and subjective measures of interoception (Garfinkel et al., 2015; HeartRater: ERC PoC grant 693143) to characterise the relationship between interoceptive dimensions and anxiety symptoms in both normative populations and in patients accessing secondary mental health services. We further demonstrated that the expression of anxiety symptoms by adults with Autism (Garfinkel et al., 2016) is predicted by 'interoceptive trait prediction error'. This interoceptive trait prediction error is measured from the discrepancy between objective behavioural accuracy on tests

of cardiac interoception (heartbeat detection task) relative to the self-reported belief in, and ratings of, interoceptive aptitude.

Here we provide evidence to demonstrate that interoceptive training ( $N=15$ ) can reduce this interoceptive error signal by elevating interoceptive accuracy on a heartbeat detection task [ $t(14)=-3.89$ ,  $0.002$ ], associated with corresponding reductions in both trait anxiety [ $t(14)=2.67$ ,  $0.02$ ] and depressive symptomatology [ $t(14)=2.94$ ,  $0.01$ ].

With support from a PsyImpact grant from MQ: transforming mental health (<https://www.mqmentalhealth.org/articles/psyimpact>), we are currently undertaking a clinical trial of 'ADIE' therapy (Aligning Dimension of Interoceptive Experience) in people with Autism to mitigate the development and worsening of anxiety symptoms. ADIE therapy will be compared to an active 'exteroceptive' control intervention; training ASC individuals on recognition of emotional prosody. In support of this clinical trial and to facilitate the translation into routine clinical practice, MQ are also funding the development of our research software protocols for interoceptive assessment and training, as a robust technology platform for wider clinical implementation.

Thus, ADIE is a novel therapy that builds on mechanistic research into anxiety at the interface between body and mind. Harnessing technology to target this mechanism adds translational value to our basic science and creates the platform for this therapeutic practice to be widely available for patients and health care professionals to access using personal devices such as tablet computers, maximising potential benefits.

## 273) Abstract 1527

### GLUCOCORTICOID SENSITIVITY OF THE INNATE IMMUNE SYSTEM IN DEPRESSION SUBTYPES

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Differences in respect to hypothalamus-pituitary-adrenal axis regulation and immune functioning between patients with different subtypes of depression have been repeatedly described. In order to further contribute to the understanding of these differences, the present study investigated the efficiency of glucocorticoid signaling with respect to the innate immune system in different subtypes of depression (atypical and melancholic subtype based on DSM-IV criteria) compared to healthy control subjects. Lipopolysaccharide (LPS)-induced interleukin (IL)-6 production and inhibition of IL-6 production by dexamethasone were assessed in  $N=21$  depressed patients of the melancholic subtype,  $N=14$  patients of the atypical subtype and in 21 healthy controls (20-63 yrs.; mean  $43 \pm 12$ ). Depression severity was measured with the Inventory for Depressive Symptomatology (IDS). No group differences in mitogen-induced IL-6 production and glucocorticoid sensitivity in terms of the general capacity of dexamethasone to suppress monocyte IL-6 production over all measurement time points could be observed, controlling for total monocyte count, sex, age and depression severity. However, glucocorticoid sensitivity was significantly affected by medication status. Patients without medication ( $N=15$ ), that were also characterized by a milder depressive symptomatology in terms of significantly lower IDS-scores ( $p=0.002$ ), showed a lower sensitivity towards anti-inflammatory signals ( $p=0.03$ ) compared to patients receiving anti-depressive pharmacotherapy. To conclude, the present findings do not point towards differences in GC signaling in depression subtypes. However, a potentially beneficial effect of anti-depressive medication was observed, that might protect patients against the adverse effects of a sustained expression of inflammatory mediators associated with low GC sensitivity, such as increased cardiovascular disease risk.

**274) Abstract 1468**

**A NEW PARADIGM FOR PSYCHOANALYSIS AS PSYCHOTHERAPY**

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We propose that nowadays psychoanalysis has as its object the study and transformation of intimate human relationships, implicit and explicit, based on the new methodology observation of inter-intentionality and psychotherapeutic intervention of the new relationship.

The epistemological break with classical psychoanalysis results of scientific inadequacy of the mythic-philosophical-scientific meta-psychological model, including the theories of ghosts, infantile sexuality, interpretation of dreams, Oedipus complex and transference-countertransference interpretation.

What characterizes human relations is not the language or behavior but the social capacity of travelling in the mind of another and in time, that is, to understand the implicit and explicit intentions present in the actions of others, developed by experienced contexts, as protentions. The discovery of the mutual intentions raises automatically intuitive responses, emphatic enactments, body metaphors, humor, effective gestures for the implementation of projects. Now, the interpretative analysis is no longer made in the transfer, but it is the interpretation of transference to remove and settle her, in order to enable the development of a new relationship in which the therapist and the patient establish a real lived relationship, with focused spontaneous affection for the future. As a lighthouse, like the a mother with positive bonding, the psychotherapist is interactive and responsive and the patient makes his self-analysis. They create a complementary relationship in freedom, which is the prototype for the daily relationships of the patient, transforms the relational style and expands the identity of them both.

**CONCLUSION**

This new transversal post-multidisciplinary paradigm of psychoanalysis as a science of intimate relationships, integrates the findings of neuroscience and psychosociology in psychoanalysis, and resumes the development of psychoanalysis as a current science. It applies to the study of healthy interpersonal relationships, in ecosystems, and the transformation of pathological relations, with the goal of attainable happiness, evaluated by the enthusiasm, curiosity and creativity, present in thoughts, decisions and actions facing reality, resolve conflicts, create relationships and life projects.

**275) Abstract 1223**

**HIGH NEUROTICISM AND LOW CONSCIENTIOUSNESS ARE ASSOCIATED WITH INTERLEUKIN-6**

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**Background:** Among the five major dimensions of personality (NEO-FFI) high Neuroticism and low Conscientiousness have frequently been linked to worse health-risk behaviours and health outcomes. However, studies on the association between NEO-FFI and biomarkers of chronic inflammation as physiological markers of morbidity and mortality are sparse, therefore the aim of this research was to examine this association.

**Methods:** In a random Swiss population sample of 1529 persons (40-72 years, 43% men), we assessed the five personality traits using a validated semi-structured psychiatric interview, socioeconomic status, traditional cardiovascular risk factors (i.e., body mass index, hypertension, blood glucose levels, total cholesterol/high-density

lipoprotein-cholesterol ratio, smoking), and other major psychiatric diseases (other anxiety disorders, major depressive disorder, drug dependence) which were treated as covariates in linear regression models. Circulating levels of inflammatory markers were also determined.

**Results:** High Neuroticism was significantly associated with high interleukin-6 levels, and for the lowest 10% Conscientiousness was an association the lower conscientiousness the higher interleukin-6 was. Agreeableness showed a significant inverse association with adiponectin.

**Conclusions:** Certain personality traits like high Neuroticism and low Conscientiousness show a relevant impact on chronic low-grade inflammation. Further research is needed to understand this observed link and may help improve prevention.

**276) Abstract 1339**

**KETAMINE USE FOR SUICIDAL IDEATION IN GENERAL HOSPITAL: A CASE REPORT**

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The incidence of suicide in patients of general hospital is estimated to be three to four times higher than in general population. This risk is particularly high in patients admitted in medical settings owing to surgical lesions or medical complications secondary to a suicide attempt. In such patients, preventing measures, notably means restriction, are required and help to decrease risk for suicide. However, securization of the environment can generally not be as high as in a psychiatric setting. Thus, treatments that may contribute to decrease suicide thoughts are of particular interest for consultation-liaison psychiatrists. Recent evidence indicates that ketamine, a glutamate N-methyl-D-aspartate (NMDA) receptor antagonist, may have a rapid anti-suicidal effect.

We report the case of a 47-year-old woman successfully treated with ketamine for suicidal ideation in the context of medical care. The patient was admitted in general hospital following a suicide attempt by poisoning. Although there was a clear indication for a psychiatric hospitalization, she needed medical care in general hospital because of a high suspicion of endocarditis. The patient reported clear suicidal plans and was absolutely determined to kill herself. Initial Beck Scale for Suicidal Ideation (BSSI) score was at 35 on 38. Her suicidal ideation persisted at the same level during the first ten days, requiring continuous physical restraint to prevent suicide. Due to high suicidal risk and the need for further medical care, we decided to treat the patient with ketamine: two infusions of 0.5 mg per kg at day 0 and day 2. This treatment was well tolerated. BSSI scale decreased following ketamine treatment, reaching a score of 16/38 at day 3, 11/38 at day 5 and 0/38 at day 7. Her medical state was then compatible with her transfer in psychiatry ward where she was treated with mirtazapine 30mg a day. The patient did not report any suicidal thoughts anymore. Although further studies are required to support anti-suicidal effects of ketamine, the safety of this product, routinely used in general hospital for anesthesiology or in painful patients, seems to be in favor of ketamine use in medical inpatients at high risk for suicide.

**277) Abstract 1025**

**DOOR-TO-DOOR TO DRIVE PRESCRIBING CHANGE: IMPROVING PTSD CARE FOR RURAL VETERANS THROUGH ACADEMIC DETAILING**

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**Background:** Medications such as benzodiazepines and atypical antipsychotics are not recommended by practice guidelines for the treatment of posttraumatic stress disorder. Prazosin is recommended to reduce the occurrence of trauma-related nightmares. Current prescribing patterns do not appear to be aligned with evidence-based guideline recommendations.

**Methods:** Education and training outreach to help clinicians improve quality of care delivered to Veterans with PTSD at White River Junction, VT VA Medical Center and 7 community-based outpatient clinics. Academic Detailing consists of individualized educational outreach visits to prescribing clinicians at their practice site to promote evidence-based care. The Department of Veterans Affairs Pharmacy Benefits Management Office and the Academic Detailing Program offer a desktop dashboard that identified provider and patient-level prescribing data. Changes in prescribing of pharmacotherapies for PTSD were examined over time as well as referrals to evidence-based psychotherapies for PTSD.

**Key Clinical Messages:** Encourage referral for trauma-focused psychotherapies which are more effective than pharmacological treatment. Increase the use of antidepressants with proven benefit in PTSD: sertraline, paroxetine, fluoxetine, and venlafaxine. Increase the use of prazosin for trauma-related nightmares and titrate to effective dose. Avoid the use of benzodiazepines in PTSD because of lack of efficacy and risk of harm.

**Lessons Learned:** Academic Detailing was associated with positive findings of decreased benzodiazepine use and increased prazosin use in Veterans with PTSD. There was no change in atypical antipsychotic use, however, this clinical topic was not addressed during detailing visits.

**Future Work:** Continue work to reduce benzodiazepine use in PTSD and promote use of prazosin for trauma-related nightmares. Focus on most at-risk Veterans: 65 years and older, taking strong pain medication (Opioids), history of Traumatic Brain Injury (TBI), or history/current diagnosis of Substance Use Disorder (SUD). Deliver new key clinical messages: Increase use of first-line Cognitive Behavioral Therapy (CBT) for Insomnia for PTSD-related sleep disturbances, decrease use of atypical antipsychotics because of metabolic risk and lack of PTSD efficacy, and promote safe prescribing in women of reproductive age.

## 278) Abstract 1581

### THE ASSOCIATION BETWEEN PHYSICIAN BURNOUT AND SATISFACTION ON HEALTH OUTCOMES IN HIV-INFECTED OUTPATIENTS

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#### Background

Patients' health outcomes have been extensively examined in the context of patient factors, and despite research examining the effect of structural-level factors on patients' health and physician burnout on care quality, the existing literature has not reported on how physician burnout impacts objectively-measured patient health outcomes, particularly in the arena of chronic disease typically accompanied by repeated visits with the same healthcare provider. The present study assessed the effect physician burnout and satisfaction in HIV primary care physicians on virological suppression at an inner city clinic.

#### Methods

Physician burnout (Depersonalization, Emotional Exhaustion) and satisfaction (Personal Accomplishment, Satisfaction with Medicine) from the Abbreviated Maslach Burnout Inventory was assessed in 9 HIV primary care physicians; virological suppression (+ 11.6 years; 39.7% female; 63.7% Black; 36.3% Hispanic/Latino).

#### Results

After adjusting for years of experience as an HIV care provider, patient caseload, patients' age, patients' gender, and the lowest CD4 count to control for disease severity, patients were more likely to be virologically suppressed when their provider had lower ratings of depersonalization (OR = 1.30, 95% CI = 1.12-1.50) and emotional exhaustion (OR = 1.08, 95% CI = 1.03-1.13); physicians with higher personal accomplishment (OR = 1.24, 95% CI = 1.05-1.47) and satisfaction with medicine ratings were more likely to have undetectable patients (OR = 1.14, 95% CI = 1.05-1.23).

#### Conclusions

Taken together, these findings implicate physician-related factors as an integral component of health outcomes in HIV-infected patients. Although patient-related factors on both an individual and structural level affect patients' health, the psychosocial characteristics of the physician should not be ignored, particularly in chronic diseases such as HIV that require recurring visits with the same healthcare provider. Further research is needed to assess the strength of patient and provider factors relative to each other on health outcomes in chronic diseases.

## 279) Abstract 1532

### SLEEP HEALTH AND HIV: DAY-LEVEL ASSOCIATIONS WITH NEGATIVE AFFECT, EMOTION DYSREGULATION, AND CORTISOL IN HIV-POSITIVE GAY AND BISEXUAL MEN

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**Background:** Poor sleep quality has been shown to influence subsequent affect, mood, and emotion dysregulation across numerous populations. Daily diary studies have also observed the influence of negative affect, stress, and medication adherence in a variety of chronic conditions. We aimed to explore links between sleep quality and subsequent day affect, emotion regulation, and stress response amongst HIV-positive gay and bisexual men (GBM) using event-level data from an online daily diary study.

**Method:** Daily diary reports over a 21-day online study from 53 HIV-positive gay and bisexual men generated 798 data points. Multilevel logistic modeling tested whether sleep quality (both one's average sleep quality, and one's daily fluctuations around that average) predicted next-day affect and emotion dysregulation. Global links to medication non-adherence were tested at the bivariate level. A subsample of 10 men also completed cortisol testing on a total of 67 days, allowing for additional analyses of sleep quality on cortisol outcomes.

**Results:** The racially diverse sample (75% men of color) had a mean age of 38 years. Overall poor sleep quality and daily sleep disruptions were both significantly associated with negative affect and emotion dysregulation—predicting higher levels of depressive ( $B = -0.08, p < 0.001$ ), anxious ( $B = -0.04, p = 0.02$ ), and angry ( $B = -0.05, p < 0.01$ ) affect, fatigue ( $B = -0.11, p < 0.001$ ), and emotion dysregulation ( $B = -0.04, p < 0.01$ ). A trend ( $B = 0.06, p = 0.20$ ) among the subsample of 10 men suggested that worse sleep was associated with decreased cortisol levels upon waking.

**Conclusions:** Poor sleep quality is associated with increased negative emotionality and emotion dysregulation, among this sample of HIV-positive gay and bisexual men. Indication of sleep's influence on reduced cortisol was also suggested among a subsample of our participants, but requires further investigation.

**Implications:** Interventions targeting sleep hygiene and health could help to improve mood, daily coping, and health outcomes in HIV-positive gay and bisexual men.

## 280) Abstract 1552

### PSYCHOSOCIAL WELLBEING AND IMMUNE HEALTH AMONG HIV-POSITIVE OLDER ADULTS: THE CRITICAL ROLE OF HIV STIGMA

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**Background:** Available evidence suggests a link between psychosocial wellbeing and immune function. For example, depression has been strongly linked to inflammatory processes and this has been shown among individuals with chronic illnesses such as HIV. We sought to explore how a range of psychosocial issues might influence immune health among older adults with HIV.

**Method:** We enrolled 120 substance-using older adults, and utilized a multivariable linear regression predicting log CD4 cell count with depression, loneliness, social support, HIV stigma, alcohol use problems, and drug use problems, adjusting for potential confounders (gender, race, income, age, years since HIV diagnosis, and undetectable HIV viral load).

**Results:** The sample was two-thirds male ( $n = 81$ , 67.5%) and the majority were people of color ( $n = 111$ , 92.5%). The average age was 54.6 ( $SD = 4.1$ ) and participants had been living with HIV for an average of 17.1 years ( $SD = 6.9$ ). In the adjusted multivariable model, we found that the only significant predictor of log CD4 cell count was HIV stigma ( $B = -0.46$ ,  $\beta = -0.26$ ,  $p = 0.03$ ) showing higher levels of stigma associated with lower CD4 levels—depression, loneliness, social support, alcohol use problems, and drug use problems were all unassociated with CD4.

**Conclusions:** In adjusted models, HIV stigma was the only psychosocial condition to show a statistically significant association with CD4 count, such that increased levels of stigma were associated with decreased CD4 count (i.e., poorer immune health). HIV-related stigma appears to be a critical psychosocial factor in considering the immune health of HIV-positive older adults and interventions with this population should focus on reducing stigma and improving coping. Future research is needed to examine the interrelation among these psychosocial conditions and how they may interact in their association with health.

## 281) Abstract 1627

### STIGMA, MEANING-MAKING, AND PUBLIC HEALTH POLICY

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In research on public health concerns, stigma has been described both as an agent of positive health behaviors and as an agent of marginalization and poorer health. Past scholarship has described instances where stigma has positively motivated public health changes, such as among tobacco users. However, in the case of obesity or HIV, stigma has also been associated with shame and discrimination of vulnerable individuals and increasingly poorer health behaviors.

Using the examples of obesity and HIV, we explain how the identity of the communicators of stigma, either within or outside of the target community, might alter the nature of the message communicated. We also discuss how stigma reduction efforts in the areas of obesity and HIV may have provided the foundation for additional stigma within communities. Next, we offer a broader perspective on how public health policy makers can conceptualize the positive and negative functions of stigma in motivating health behaviors by incorporating discussions of meaning and illness. Finally, we describe how future policymakers might leverage support within the target community to selectively motivate positive health behaviors while simultaneously avoiding harming vulnerable populations.

## 282) Abstract 1123

### EPIGENETIC RISK FACTORS FOR OBESITY IN TRAUMA-EXPOSED REFUGEES

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Refugees are at increased risk to develop overweight and obesity once they settle in their new Western host country. Furthermore, trauma exposure increases the likelihood of developing obesity. We have earlier reported of an increase in body mass index (BMI) as well as obesity in a randomly selected group of newly-arrived Iraqi refugees, as compared to immigrant controls, during the first two years in the United States. While increase in weight was not related to prior trauma exposure, it is of note that obesity is a function of gene x environment interactions. Thus, in order to further delineate reasons underlying mechanisms for obesity and non-communicable disorders (NCD) in refugees, DNA methylation was utilized to investigate differential methylation of PPAR $\gamma$  (peroxisome proliferator-activated receptor gamma) in Iraqi refugees with varying degree of trauma exposure and subsequent development of posttraumatic symptoms. This gene is the regulator of adipogenesis and its molecular function is associated with modulation of insulin sensitivity, control of blood pressure, as well as glucose homeostasis.

Self-reported questionnaires and blood samples were collected from refugees in the U.S. Refugees were divided into two groups: those who reported high levels of trauma exposure and high PTSD symptoms scores (HL) ( $n=24$ ) and those reporting low trauma, and low PTSD symptom scores (LH;  $n=10$ ). Genome-wide analysis identified 31,353 CpG sites that were hypermethylated and 48,324 CpG sites that were hypomethylated in the HH group at a significant FDR-corrected  $p$ -value ( $\leq 0.05$ ). At an effect size cut-off of 20% and FDR cut-off of 0.05, we found 583 CpG sites that were hypermethylated and 109 CpG sites that were hypomethylated. This indicates that trauma is a stronger predictor of changes in DNA methylation than PTSD. Gene ontology (GO) analyses of the genes with differential methylation showed that the GO category that had the most differential methylation between the HH vs HL groups was “diabetes mellitus” (FDR-corrected  $P$ -value  $< 0.01$ ). An increase in expression of PPAR $\gamma$  due to decreased DNA methylation of this gene, could be one mechanism that explains the higher obesity rate in trauma-exposed refugees.

## 283) Abstract 1491

### PSYCHOLOGICAL FACTORS, HEALTH BEHAVIORS, AND OBESITY: FINDINGS FROM THE HISPANIC COMMUNITY HEALTH STUDY/STUDY OF LATINO YOUTH (SOL YOUTH)

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**Objective:** Psychological factors such as depression, anxiety, disordered eating (DE), and body image discrepancies (ideal vs. actual) have been associated with insufficient physical activity, unhealthy diet



quality, and obesity, but few studies have evaluated these associations in a national sample of Latino youth.

**Methods:** HCHS/SOL Youth enrolled 1,466 Hispanic/Latino youth (728 boys and 738 girls, 8-16 years) from four cities (Miami, San Diego, Chicago, Bronx). Standardized self-report scales measured depression, anxiety, disordered eating (DE), and body image discrepancy, as well as social desirability; interviewer-administered 24-hour dietary recalls were quantified and scored to provide daily servings of fruits and vegetables (F&V) and sweetened beverages (SB); 7-day accelerometry measured moderate-to-vigorous physical activity (MVPA); height and weight was measured to obtain BMI %iles. Correlational and regression analyses determined relationships of psychological factors to MVPA, F&V and SB intake, and BMI. Analyses used sample and survey-weighting procedures.

**Results:** 52% of youth were overweight or obese, and 11.7% and 13.8% of youth reported elevated depression and anxiety, respectively. Depression was positively associated with BMI ( $\beta=.094$ ,  $p<.001$ ). Controlling for social desirability and gender and, there was an interaction of age and depression in association with BMI ( $\beta=.07$ ,  $p<.035$ ), with the effect of depression on BMI stronger for older youth. Depression and anxiety were unrelated with MVPA, F&V, and SB; anxiety was unrelated to BMI. DE was common: 50.9% reported dieting; 20.1% reported out of control eating; 15.4% reported being afraid they could not stop eating; and 5.1% purged. DE was associated with higher BMI ( $r=.386$ ,  $p<.001$ ), depression ( $r=.147$ ,  $p<.001$ ), anxiety ( $r=.06$ ,  $p<.03$ ), and body image discrepancy ( $r=.175$ ,  $p<.001$ ), but not with MVPA, F&V and SB intake. Greater body image discrepancy was reported by girls ( $r=.085$ ,  $p<.001$ ) than boys and was associated with higher BMI ( $r=.271$ ,  $p<.001$ ).

**Conclusions:** Overweight and obesity are highly prevalent among Latino youth and depression, DE, and body image discrepancy are associated with higher BMI. These psychological factors may be important targets to address in obesity interventions for this population.

#### 284) Abstract 1268

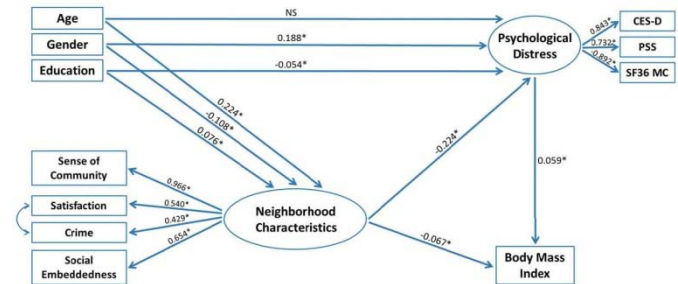
##### ASSOCIATIONS AMONG NEIGHBORHOOD FACTORS, PSYCHOSOCIAL DISTRESS, AND OBESITY IN AN ETHNICALLY DIVERSE SAMPLE

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Neighborhood characteristics are important determinants of obesity. While most studies have focused on the built environment, few have examined perceptions of neighborhood safety and community factors. Further, the pathways by which neighborhood characteristics impact obesity remain unknown, particularly among ethnic minorities. In this study, we aimed to (1) examine associations among neighborhood characteristics, psychological distress and obesity, (2) establish whether neighborhood has an indirect impact on obesity through psychological distress, and (3) determine whether these associations vary by ethnicity. Participants included 2,686 adults (53.50% Hispanic, 34.4% Non-Hispanic [NH] White and 12.1% NH Black) enrolled in the Texas City Stress and Health Study. Neighborhood characteristics were measured using subscales of the Perceived Neighborhood Scale (Sense of Community, Satisfaction with Neighborhood, Perception of Crime, and Social Embeddedness). Psychological distress was measured with the Center for Epidemiological Studies Depression Scale (CES-D), the Perceived Stress Scale (PSS) and the mental composite of the Short Form Health Survey-36 (SF-36). Structural equation modeling was used to examine associations among variables. The model depicted in Figure 1 had good fit with the data (CFI=0.964, RMSEA=0.059, SRMR=0.049). Results indicated that less favorable neighborhood characteristics were associated with greater psychological distress ( $\beta=-$

0.224, 95% Confidence Intervals [CI]: -0.261 to -0.187) and BMI ( $\beta=-0.067$ , 95% CI: -0.104 to -0.031). Psychological distress was also significantly associated with greater BMI ( $\beta=0.059$ , 95% CI: 0.024 to 0.095). The indirect path specified from the neighborhood characteristics to BMI was also significant ( $\beta=-0.013$ , 95% CI: -0.022 to -0.005), indicating that in addition its direct effect, neighborhood characteristics impact BMI through its effect on psychological distress. Associations were independent of age, gender, and education. In multiple group analysis, a model with parameters constrained equal across ethnicities showed adequate fit to the data (CFI= 0.954, RMSEA=0.055, SRMR=0.058) suggesting associations were similar across ethnicity. Our study extends the literature by demonstrating the importance of neighborhood perceptions in predicting obesity via psychological distress across all ethnicities.

Figure 1. Structural equation model linking neighborhood characteristics, psychological distress and obesity.



#### 285) Abstract 1377

##### EXPLORING THE RELATIONSHIP BETWEEN CHURCH LEVEL PREDICTORS OF STATUS AND OBESITY RISK IN AFRICAN AMERICAN WOMEN OF FAITH

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**Background & Significance:** African American (AA) women residing in the Southern region of the United States are more likely to be classified as obese as compared to all other gender, racial, and geographical groups. Given the high church attendance among AAs in the South, scholars have targeted AA churches to implement dietary and physical activity interventions to combat obesity disparities. Despite the numerous interventions that take place in churches, very little is known about the socioeconomic status parameters of church affiliation regarding organizational power, prestige, and hierarchy. Substantial research demonstrates that both objective and subjective markers of status impact health outcomes, but no studies to date have examined the role of church social status (CSS) on obesity outcomes. This study's aim is to examine how markers of CSS relate to total and central measures of adiposity in a sample of Southern, religious, AA females. **Methodology:** Data for the current study comes from a large dietary and physical activity intervention conducted in churches in South Carolina from 2010 to 2014, and data from a 2016 survey measuring church prestige. Participants were 790 AA females, ages 25 to 86 ( $M=57.28$ ,  $SD=11.92$ ). All anthropometric measurements were obtained via bioelectrical impedance assessment. CSS was measured via single item demographic questions. An additional variable, church prestige, was measured in a separate survey conducted in 2016. **Results:** An exploratory factor analysis containing the CSS variables yielded a three-factor solution. These factors were named church prestige (CP), church hierarchy (CH), and church socioeconomic status (CSES). Hierarchical regressions between CSS and obesity measures indicated that CP was negatively related to fat percentage (FP) ( $B=-1.01$   $SE=.39$ ,  $p=.006$ ), and BMI ( $B=-.899$ ,  $SE=.299$ ,  $p=.003$ ), and that CH was positively related to waist

circumference(WC) ( $B=1.6$  SE=.74,  $p=.035$ ). **Discussion:** This correlational study showed that components of CSS impact obesity measures such as BMI, FP, and WC. These results are consistent with literature that suggests that the higher one's status, the better one's health. These results suggest that church components play a role in the health and well-being of its congregations.

#### 286) Abstract 1373

##### ASSOCIATIONS BETWEEN DEPRESSIVE SYMPTOMS AND EATING EXPECTANCIES IN SEVERE OBESITY

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**Background:** Depression is both an obesity risk factor and consequence; yet, the relationships between depressive symptoms and maladaptive eating expectancies are not clear, especially in severe obesity. **Method:** Participants were 308 patients seeking bariatric surgery for severe obesity. Depressive symptoms were measured with the Beck Depression Inventory-II (BDI-II); both the total score and subscale scores (Somatic and Non-somatic) were computed. Eating expectancies were assessed with the Eating Expectancies Inventory (EEI) which has five subscales regarding perceived properties of eating that are unrelated to hunger: To Manage Negative Affect, As Pleasurable Reward, To Lose of Control, To Enhance Cognition, and To Alleviate Boredom. Both measures were administered as part of a pre-surgical evaluation. Regressions were used to examine the relationships between the BDI and EEI scores after adjusting for age, gender, and baseline body mass index. **Results:** Results revealed that a higher total BDI-II score was associated with higher scores on all of the EEI subscales ( $\beta$ s = .13-.51,  $ps \leq .021$ ) in separate models. This effect was driven by the Non-somatic subscale (all  $ps \leq .037$ ); the Somatic subscale was unrelated to all EEI scores (all  $ps \geq .343$ ) in simultaneous models. When predicting each BDI-II score with the EEI subscales simultaneously, the Loss of Control subscale was the only unique predictor of the total score and both subscales (BDI-II Total  $\beta=.28$ ,  $p=.001$ ; Somatic  $\beta=.33$ ,  $p<.001$ ; Non-somatic  $\beta=.36$ ,  $p<.001$ ). The total and Non-somatic scores were also predicted by the Manage Negative Affect subscale (Total  $\beta=.28$ ,  $p=.001$  and Non-somatic  $\beta=.33$ ,  $p<.001$ ) and the Pleasurable Reward subscale (Total  $\beta=-.17$ ,  $p=.009$  and Non-somatic  $\beta=-.18$ ,  $p=.005$ ). **Conclusions:** Among those with severe obesity, greater depressive symptoms, particularly the non-somatic symptom cluster (e.g., anhedonia, sadness), were associated with expectations about eating that were not related to hunger and may promote obesity. Certain eating expectancies were uniquely related: As depression increased, eating was seen as a way to cope with negative emotions. However, the reward value of eating was blunted and feelings of losing control were augmented. Such findings suggest that impaired reward and inhibitory control pathways may be mechanisms between depression and obesity.

#### 287) Abstract 1096

##### HEARTRATER: TOOLS FOR THE EVALUATION OF INTEROCEPTIVE DIMENSIONS OF EXPERIENCE

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Interoception is the body-to-brain axis of sensation concerning internal physiological state and the functioning of visceral organs, including the

heart. There is increasing interest in quantifying interoception to determine its impact on conscious and unconscious experience, with particular reference to emotion and psychopathological symptoms including anxiety. There is consequently a need to standardise measures of interoceptive ability. We present here the *HeartRater* toolbox: a suite of established methods to assess and characterise sensitivity to states of emotional bodily arousal through measures of interoception.

*HeartRater* encompasses: 1) quantified assessment of objective interoceptive accuracy (using heartbeat detection tests derived from Schandry, Katkin/Whitehead), subjective interoceptive sensibility, and metacognitive interoceptive awareness (Garfinkel et al., 2015); 2) standardised questionnaires probing autonomic symptoms; 3) quantified evaluation of cardiac afferent (individual heartbeat) influences on emotional processing (Garfinkel et al., 2014).

Following laboratory experiments, the *HeartRater* toolbox was implemented (field-tested) in normative and selected groups of healthy individuals, and validated across a clinical population (patients accessing secondary mental health services;  $n = 306$ ). This growing database reveals distinct interoceptive profiles related to patient diagnostic group. One example is how 'interoceptive trait prediction error' manifests in patients with a primary diagnosis of anxiety. This measure is also strongly associated with the expression of anxiety in adults with autism (Garfinkel et al 2015) and is now the basis for a targeted biobehavioural intervention. Our interoceptive data also link to psychopharmacological studies in our laboratory that suggest approaches to personalise medicinal treatments. Continued development of *HeartRater* as stand-alone and cross-platform software applications permits dissemination and use of these measures in research, health, occupational and personal settings. Ultimately, the availability of this technology for rapid, accurate and standardised tests of interoceptive abilities will advance understanding of body-to-brain interactions in biobehavioural science and health.

#### 288) Abstract 1496

##### MINDFULNESS INTERVENTION IN PULMONARY ARTERIAL HYPERTENSION (PAH) PATIENTS: OUTCOMES, ISSUES, LESSONS LEARNED

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**Objective:** To examine the feasibility of conducting a full scale randomised controlled trial (RCT) using a mindfulness based stress reduction (MBSR) programme in pulmonary arterial hypertension (PAH) patients.

**Methods:** A pilot, non-medicinal clinician/analyst blinded RCT randomly allocated PAH patients to an 8-week customised MBSR group programme in addition to treatment as usual (TAU), or solely to TAU. Outcome measures assessed at baseline, 6, and 15 months post-randomisation included the Beck Anxiety and Depression Inventories (BAI/BDI), quality of life (SF-36), the Mindfulness Attention Awareness Scale (MAAS), patient use of NHS services; physical health assessment via an echocardiogram, electrocardiogram (ECG), the New

York Heart Association (NYHA) assessment, 6-minute walk test; diurnal salivary cortisol profiling; and semi-structured interviews. Results: From a total potential sample of 1400 PAH patients 776 met criteria for inclusion. 54 patients consented to participate in the study and of these, geographical constraints meant that randomisation was restricted to 32 patients. Participants were able to complete questionnaires (full data n= 22) and all attended clinic for physical assessment. Collection of salivary cortisol proved problematic and was largely limited to pre intervention assessment. A steady attrition rate, partly due to ill health, resulted in only 55% completing the programme. Those attending MBSR sessions reported it as useful, interesting and helpful in managing physical symptoms and minimising anxiety associated with their disease. Semi-structured interviews revealed patients were pleasantly surprised by intervention effects and continued to practice many months later. The study was not powered to demonstrate differences between the two arms of the trial. Conclusions: Employing an in-person group therapeutic approach is difficult in rare diseases such as PAH where participants have significant physical limitations. However, our pragmatic evaluations of effectiveness suggest positive outcomes of MBSR in this population. An on-line intervention, coupled with a trial design that more closely fits the real-world restrictions of this population is recommended. Funded by NHS National Institute for Health Research (NIHR), Research for Benefit (RFPB) Programme: Project Number PB-PG-0711-25145

#### 289) Abstract 1183

##### **A PILOT RANDOMIZED CONTROLLED TRIAL (RCT) OF MINDFULNESS-BASED STRESS REDUCTION AS AN ADJUNCT INTERVENTION TO CARDIAC REHABILITATION: RATIONALE, STUDY DESIGN AND INITIAL FINDINGS**

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**Background.** Exercise-based outpatient cardiac rehabilitation (CR) is the guideline-recommended standard of care for most patients after a major cardiac event or procedure. CR includes individualized exercise training, education and risk factor control but rarely features evidence-based stress reduction or psychosocial risk management, despite documented psychosocial needs of cardiac patients. CR programs have poor attendance and completion rates, possibly due to patients' unmet psychosocial needs. Mindfulness-Based Stress Reduction (MBSR) is an evidence-based stress management program with promise to enhance CR. MBSR reduces depressive symptoms, anxiety, and stress, and may improve blood pressure, immune function, and heart rate variability (HRV), an indicator of sympatho-vagal balance and flexible emotional regulation typically reduced in cardiac patients. Almost no studies have been reported utilizing MBSR to augment CR. **Methods.** The Mindful Heart Study (ClinicalTrials.gov #NCT02722213) is a pilot RCT of MBSR with patients eligible for exercise-based CR (defined by a qualifying cardiac event or procedure and referral to CR within the past 12 months). Inclusion criteria: no prior MBSR experience, no uncontrolled atrial arrhythmias or paced heart rhythm, age  $\geq 21$ . Patients were recruited from a university-affiliated hospital system, stratified by current CR enrollment (yes/no), and then randomly allocated to an 8-week MBSR group intervention or usual care control group with a 2:1 (intervention:control) randomization. Assessments include physical function, stress, depression, anxiety, health-related quality of life, health behaviors, lipids, hemoglobin A1c, C-reactive protein, and 24-hour Holter monitoring to assess HRV pre-treatment (baseline), immediately post-treatment (3 months after baseline) and at follow-up 6 months later. **Results.** Recruitment and baseline assessments are

complete and the intervention is ongoing; 47 patients (38.3% female; 78.7% non-Hispanic white; mean age=58.6 $\pm$ 10.8 years) enrolled. Findings from the 3-month follow-up (complete in early 2017) will be presented. **Conclusions.** The Mindful Heart Study is examining feasibility of recruitment and retention strategies and safety of an MBSR protocol in CR-eligible patients. Findings will inform a Phase III RCT to evaluate psychosocial and cardiovascular benefits of MBSR for cardiac patients.

#### 290) Abstract 1592

##### **CHRONIC STRESS MODERATES LATE PHASE CORTISOL RECOVERY FROM ACUTE STRESS**

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**Background:** Chronic stress has been implicated as a contributing factor to dysregulation of hypothalamic pituitary adrenal (HPA) axis responses to stress and a variety of diseases. Although physiological reactivity to stress is often studied in this context, recovery from stress remains less scrutinized. In this study we examined the relationship between chronic stress and cortisol recovery from an acute stressor. **Methods:** Eighty adults (N=40 female, mean age=37.9 years) completed the Trier Social Stress Test (TSST). Chronic stress was evaluated using the Trier Chronic Stress Inventory (TICS) prior to the TSST. Saliva samples were collected immediately prior and 1, 10, 30, 60, and 120 minutes post TSST. Cortisol concentrations were log transformed to adjust for skewness. Fifty-one (N=19 female, mean age=36.8) participants had baseline to peak increases in log-transformed cortisol concentrations greater than -0.32 nmol/l. These individuals were classified as cortisol responders following the baseline-adjusted increase criterion described by Miller et al. (2013) and are the focus of this study. We used linear regression with baseline-to-peak cortisol increases as the dependent variable to analyze reactivity to stress and multilevel modeling incorporating two slope variables to analyze early (peak to 30 minutes post-TSST) and late (30 minutes to 120 minutes post-TSST) phases of recovery. **Results:** Chronic stress did not predict baseline-to-peak increases in cortisol concentrations ( $\beta = -.12$ ,  $p = .41$ ). The slope of late recovery was significantly less steep than early recovery [ $F(1, 91.275) = 52.451$ ,  $p < .001$ ]. Chronic stress did not moderate early recovery [ $F(1, 51.524) = 2.57$ ,  $p = .12$ ], but did moderate late recovery such that individuals with low chronic stress had steeper slopes [ $\beta = .05$ ,  $F(1, 50.85) = 4.859$ ,  $p = .031$ ]. This effect remained significant after controlling for age, sex, and baseline-to-peak cortisol increases [ $F(1, 50.538) = 4.767$ ,  $p = .034$ ]. **Conclusions:** Chronic stress was associated with flatter slopes in late, but not early, phase recovery. These results suggest that chronic stress may affect the down-regulation of cortisol secretion following exposure to stress and underscore the importance taking into account nonlinear trajectories of cortisol recovery in analyses.

#### 291) Abstract 1387

##### **HOSTILITY AND CARDIOVASCULAR RESPONSES TO ANGER-PROVOCATION WITH AND WITHOUT SLEEP-RESTRICTION**

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Hostility (Ho) is implicated in several psychosomatic models of cardiovascular disease pathogenesis. Nonetheless, Ho is normally distributed, suggesting that its adaptiveness is subject to Yerkes-Dodson principles: in order to be retained in the gene pool, both low and high extremes for Ho must be maladaptive (on occasion) compared to the mid-range. Sleep restriction is associated with poor cardiovascular health although pathogenic disease mechanisms remain unclear. This study considered how Ho might differently affect SBP stress responses after restricted sleep compared to after normal sleep.

119 female participants were exposed to standardized anger-provocation stress task (in which an ordinary visual tracking task was subverted by randomly disabling the computer mouse) during two laboratory visits, one the morning following normal sleep, the other the morning after sleep-restriction (order was counterbalanced). Beat-to-beat cardiovascular function was recorded during pre-stress, stress, and post-stress phases using a Finometer cardiovascular monitor. Ho scores were derived using the Cook-Medley Hostility Inventory. Profiles of SBP responses were examined within an analysis of covariance model, with Ho scores entered as a covariate and tested as part of a mixed-group (Ho x time) interaction.

Visits following normal sleep represent the control condition. During these visits, Ho was significantly positively associated with SBP during stress and post-stress phases, suggesting that Ho typically inflates SBP during and after anger provocation. Visits following sleep-restriction represent the experimental condition. During these visits, Ho was inversely associated with SBP during stress but positively associated with SBP post-stress ( $F(1,116) = 5.638, p = .019$ ). This profile suggests that low Ho exacerbates stress responding while sleep-restricted, implying that low Ho is maladaptive under certain anger-provocation circumstances.

Findings provide confirmatory evidence that Ho is not unidirectionally maladaptive, helping account for its normal distribution across the population. Also, findings support the view that Ho and sleep-restriction contribute individually and in combination to cardiovascular risk.

## 292) Abstract 1504

### AN EXTENSION ON THE ASSOCIATION BETWEEN CARDIAC AUTONOMIC BALANCE AND DIFFICULTIES IN EMOTION REGULATION: A FOCUS ON GENDER DIFFERENCES

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Autonomic balance can be described as an internal equilibrium between the body's sympathetic (SNS) and parasympathetic (PNS) nervous system branches of the autonomic nervous system, allowing for the proper regulation of several vital psychophysiological functions. Conversely, autonomic imbalance is characterized by an overactive SNS and an underactive PNS, which can lead to increased susceptibility to cardiovascular disease and general illness. Our recent work showed that better autonomic balance was associated with fewer self-reported everyday difficulties in emotion regulation (ER). Interestingly, research has shown that the relationship between PNS activity and ER difficulties is stronger in women compared to men. Thus, the current study expands on our previously reported relationship between autonomic balance and self-reported difficulties in ER by including a larger sample size and examining the possible differences between men and women. Using an electrocardiogram (ECG), resting-baseline cardiac data (for 5-minutes) was gathered from 84 undergraduate students (57 female, 22 minorities, mean age = 20.05). Participants then completed the Difficulties in Emotion Regulation Scale (DERS). We indexed pre-ejection period (PEP; measure of SNS activation) and high frequency heart rate variability (HF-HRV; measure

of PNS activation) to derive an index of cardiac autonomic balance (CAB), where lower values reflect a shift towards sympathetic dominance (autonomic imbalance). Pearson's  $r$  correlation tests showed CAB to be inversely related to overall DERS scores (CAB:  $r = -.219, p = .05$ ), such that lower CAB values were associated with higher DERS scores. When the data was split by gender, results showed a disparity in the relationship between CAB and DERS scores (Female CAB:  $r = -.232, p = .041$ ; Male CAB:  $r = -.184, p = .184$ ). These findings replicate our previous work, suggesting that difficulties in emotional control are not only related to PNS activity, but also autonomic imbalance. These data also suggest that this relationship may differ as a function of gender, such that women showed a stronger and significant relationship compared to the weaker and non-significant correlation observed in men. Implications for health, gender differences, and several facets of ER will be discussed.

## 293) Abstract 1195

### BUCCAL TELOMERE LENGTH AND ITS ASSOCIATIONS WITH CORTISOL, HEART RATE VARIABILITY, AND BLOOD PRESSURE RESPONSES TO AN ACUTE SOCIAL EVALUATIVE STRESSOR

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**Background:** Shorter telomeres, a marker of increased cellular aging, have been linked to various chronic conditions and may be affected by stress exposure. Understanding the relationship between stress and telomere length (TL) is of great interest for reducing stress- and age-related disease and death. Physiological reactivity to stressors may underlie the detrimental effects of stress on TL and ultimately health. Thus, the current study tested the relationship between buccal TL and physiological reactivity (salivary cortisol, heart rate variability, and blood pressure) to an acute social evaluative stressor.

**Methods:** A sample of 77 healthy young adults (53% male;  $M_{age} = 19.82 \pm 2.01$ ) provided buccal samples before undergoing a modified Trier Social Stress Test (TSST). Salivary cortisol was collected +40 and +65 minutes post-stressor onset. Systolic and diastolic blood pressures (BP) were recorded at baseline and twice during the modified TSST. Heart rate was recorded continuously throughout the session, and root mean square of successive deviations (RMSSD) was selected as a time-domain measure of heart rate variability (HRV). Relative TL was determined using cycle threshold (Ct) values from qPCR assay. Ct values were then used to compute telomere to single copy gene ratios for each participant. Peak reactivity in each outcome were determined by subtracting baseline values from the peak value.

**Results:** TL was negatively associated with total cortisol exposure (AUCg),  $\beta = -.26, p = .040$ , but not cortisol reactivity,  $p > .14$ . In addition, TL remained a significant negative predictor of cortisol exposure in the presence of BMI and sex,  $\beta = -.25, p < .042$ . TL was associated with RMSSD reactivity, with greater reductions in HRV related to shorter TL,  $\beta = .43, p = .015$ . TL was not associated with BP reactivity  $p > .05$ .

**Conclusion:** Overall, these findings indicate there are mixed associations between stress reactivity and telomere length across physiological systems. Future research should consider multiple stress-responsive systems to fully understand what forms of stress reactivity are related to TL, and ultimately increased risk for cellular aging and disease. Further, telomerase, an enzyme that may respond more rapidly than TL, should be included to better understand responses to stress reactivity and how that may impact cellular aging.

## 294) Abstract 1439

### LOWER HIGH-FREQUENCY HEART RATE VARIABILITY IS ASSOCIATED WITH GREATER NEGATIVE SPOUSAL INTERACTIONS IN DAILY LIFE AMONG WOMEN.

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Porges' Polyvagal Theory proposes that high-frequency heart rate variability (HRV) indexes a neurophysiological system supporting social engagement behaviors. Empirical research also shows that individual differences in HRV are associated with self-regulation processes that are important to manage social relationship conflict. Accordingly, the goal of this study was to evaluate whether HRV would predict negative spousal interactions in daily life. Eighty-two heterosexual couples first completed the Couple Satisfaction Index to assess overall marital satisfaction. Then, the couples underwent a heart rate variability assessment during a structured marital problem-solving task. Subsequently, each member of the couple completed 6 days of daily diary assessing negative spousal interactions, i.e., perception of the partner ignoring them, rejecting them, or being selfish. Actor-Partner Interdependence modeling evaluated whether the participant's own HRV and their partner's HRV during the marital interaction task in laboratory predicted their own daily negative spousal interactions during the following week. The moderating effect of marital satisfaction at baseline was also evaluated. Results indicated that among women lower HRV was associated with greater daily negative spousal interactions. Furthermore, among women reporting low levels of marital satisfaction both their own and their partner's HRV moderated the impact of marital satisfaction on daily negative spousal interactions. In contrast, among men neither their own nor their partner's HRV were associated with daily negative spousal interactions. In conclusion, HRV is associated with daily negative spousal interactions among women, suggesting a potential mechanism through which HRV influences aspect of social relationships quality that influence mental health.

#### 295) Abstract 1355

##### **SOMATIC DECISION MAKING: MAKING SENSE OF SIGNALS FROM THE BODY**

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**Objective:** Somatic decision making determines whether individuals perceive bodily sensations as benign or as a sign of disease. In this decision process, different strategies are possible. A "wait and see"-strategy puts a stronger emphasis on avoiding wrongly classifying a sensation as a symptom, whereas a "better safe than sorry"-strategy is more tolerant for false alarms in order to avoid missing symptoms. Little is known on the relation between somatic decision making and individual differences, as well as changes in decision strategies with repeated exposure to bodily sensations. We examined intensity-based somatic decision making over time in healthy persons differing on habitual symptom reporting.

**Methods:** In two studies, healthy female participants were selected on habitual symptom reporting in daily life, creating groups of high and low symptom reporters (Study 1 N=50; Study 2 N=60). Eight inspiratory resistances (loads; POWERbreathe, International Ltd., Southam, UK) differing in intensity with a constant factor (0.3) were administered. In Phase 1, all loads were presented in a (pseudo)random order while a label was given on a screen and participants were asked to memorize the labels of the loads (A1, A2, A3 and A4, forming a category of low resistances; B1, B2, B3 and B4 forming a category of high resistances). During Phase 2, participants were asked to identify the stimuli by assigning the correct label. Participants of Study 2 were invited to a subsequent experimental session 7-10 days later, in which they were again asked to correctly identify stimuli with their category label.

**Results:** Somatic decision making became more liberal towards the category border in all participants. For high habitual symptom reporters, however, the change towards a "better safe than sorry"-strategy was specific for the ambiguous low-intensity stimuli and stronger than in the low habitual symptom reporters. These effects increased over time with repeated exposure.

**Discussion:** Our results show that individuals high in habitual symptom report exhibit a more liberal somatic decision strategy and that this tendency increases with repeated exposure. This suggests that in the long term, a shift in category border may ensue, resulting in over-inclusive high-intensity sensation categories (such as symptoms).

#### 296) Abstract 1279

##### **C-REACTIVE PROTEIN AND HEART RATE VARIABILITY WITH RESPECT TO DEPRESSIVE SYMPTOMS AND ADVERSE CARDIAC EVENTS IN PATIENTS WITH NON-OBSTRUCTIVE CORONARY ARTERY DISEASE**

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**Background:** Patients with non-obstructive coronary artery disease (NOCAD) may be at risk for repeated health care utilization. High sensitive C-reactive protein (CRP) and heart rate variability (HRV) have been associated with depressive symptoms and adverse outcomes in patients with obstructive CAD. We examined whether decreased HRV and elevated CRP, and the HRV/CRP ratio (reflecting neuro-immunomodulation- NIM) are associated with depressive symptoms and with incidence of emergency department (ED) visits in patients with NOCAD.

**Methods:** Patients with NOCAD (<60% stenosis, N=547, mean age 61.4±9.4 years, 52% women) in the TweekSteden Mild Stenosis (TWIST) observational cohort study, were followed since 2009. Blood samples were analyzed for CRP, with elevated CRP >3mg/ml. Interbeat intervals were assessed from 10 sec electrocardiograms for HRV measurements, and coded into SDNN (standard deviation of normal to normal beat intervals). A decreased SDNN was coded as ≤30 msec.

The ratio of continuous SDNN/CRP was calculated to reflect NIM. Depressive symptoms were measured with the Hospital Anxiety and Depression Scale (cutoff ≥ 8). ED visits and dates were extracted from Medical Records. Logistic regression analysis was used for depression and Cox proportional hazard models were used to predict ED, considering time since diagnosis.

**Results:** In total, 15% (80/547) of the patients with NOCAD had an ED on average 3.5±1.4 years after diagnosis. Elevated levels of CRP were associated with more depressive symptoms (OR= 2.02, 95%CI 1.27-3.21), but not with ED (HR= 1.28, 95%CI 0.77-2.15). No significant associations were found between SDNN and depressive symptoms (OR= 0.97, 95%CI 0.66-1.47) or with ED visits (HR= 0.82, 95%CI 0.53-1.28). An increased SDNN/CRP-ratio was associated with less depressive symptoms (OR= 0.74, 95%CI 0.62-0.90), but not with ED visits (HR= 0.97, 95%CI 0.77-1.20). Adjustment for covariates (age, sex, and lifestyle factors), or using continuous scores for CRP and SDNN did not alter the findings.

**Conclusion:** Among patients with NOCAD, 15% returned to the ED, but this was not predicted by elevated CRP or SDNN at baseline or by the SDNN/CRP ratio. Elevated CRP and a decreased SDNN/CRP ratio were associated with depressive symptoms. Patients with NOCAD are not event free, and identifying other prognostic factors in patients with NOCAD is warranted.



### 297) Abstract 1335

#### LOW FREQUENCY HEART RATE VARIABILITY DUE TO SLOW YOGA BREATHING IS VAGALLY MEDIATED

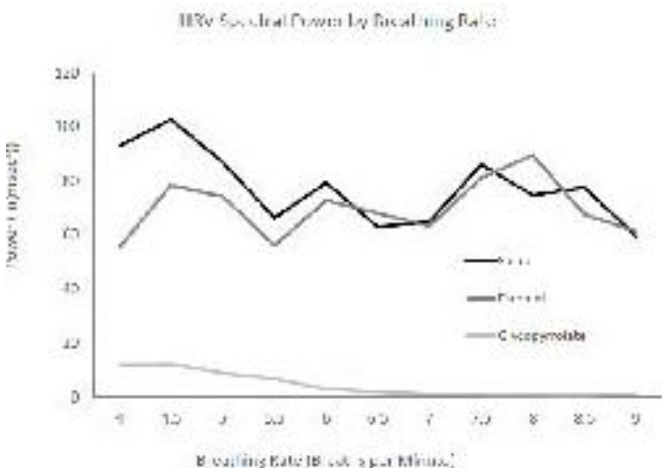
Richard D. Lane, M.D., Ph.D., Psychiatry, University of Arizona, Tucson, AZ, Bryan Kromenacker, B.S.N., Psychology, Anna Sanova, B.S., Psychiatry, John J. Allen, PhD, Psychology, University of Arizona, Tucson, Arizona

**Background:** Breathing interventions aim to reduce stress and induce a state of calm, an effect that may be vagally-mediated. However, the best index of cardiac vagal control is high frequency (HF) heart rate variability (HRV), which captures variance in the inter-beat interval series greater than 0.12 Hz (or sometimes 0.15 Hz) corresponding to breathing rates higher than 7.2 (or 9) breaths per minute (bpm). Since breathing interventions typically involve slower breathing rates closer to 6 bpm, and since low frequency HRV (below 0.12 or 0.15 Hz) can reflect sympathetic contributions that are not seen in HF-HRV, we sought to clarify the autonomic mechanisms of HRV change with slow breathing.

**Method:** Six healthy subjects (2 females, mean age= 22 years) received a continuous intravenous infusion of an anticholinergic agent (glycopyrrolate), a beta blocker (esmolol) or saline for one hour on three separate occasions within a 1-week period in a single blind protocol. In each session there were 11 5-minute trials (order counterbalanced) during which subjects engaged in paced yoga breathing at each of 11 different rates (from 4.0 to 9.0 breaths per minute in 0.5 bpm increments) in a 4-4-6-2 cadence of inspiration, pause, expiration, pause for the first minute, followed by 4 minutes of rest. Heart rate, HRV (power at breathing frequency), and respiratory rate (peak frequency during each trial) were assessed during the first minute of each trial.

**Results:** HRV spectral power was maximal at the frequency corresponding to the paced respiratory rate. Figure 1 demonstrates the significant effect of the drug (Wilks'  $\lambda = .181$ , approximate  $F(2,4) = 9.03$ ,  $p < .05$ ) such that HRV at each breathing rate was virtually absent during glycopyrrolate ( $p = .016$  vs saline) whereas esmolol had a minimal effect on HRV compared to saline ( $p = .671$  vs saline), except at the slowest breathing rates where HRV showed a slight decline with esmolol relative to saline (at 4.0 bpm,  $p < .005$ ) and a slight elevation during glycopyrrolate. Adherence to the paced breathing protocol was confirmed, with peak respiratory frequency during each trial correlating 0.94 ( $p < .01$ ) with the paced frequency.

**Discussion:** These results demonstrate that changes in HRV due to slow yoga breathing are vagally mediated, with only minimal effect of sympathetic influences below 6 bpm.



HRV spectral power at the breathing frequency as a function of paced frequency and drug condition.

### 298) Abstract 1247

#### THE ASSOCIATION BETWEEN WORK-LIFE BALANCE, INFLAMMATORY MARKERS AND DEPRESSIVE SYMPTOMS IN THE WHITEHALL II STUDY

Tahera Razavi, PhD Epidemiology and Pub, Epidemiology and Public Health, University College London, London, England, United Kingdom, Meena Kumari, PhD, Institute for Social and Economic Research, University of Essex, Colchester, Essex, United Kingdom, Yvonne Kelly, PhD, Jessica Abell, PhD, Epidemiology and Public Health, University College London, London, England, United Kingdom  
Work and family are two fundamental aspects of adult life and the conflict between them is considered a source of stress. Work-family conflict (WFC) has been found to be negatively associated with a number of health conditions including depression. Depression has been associated with inflammatory markers. Studies have identified an association between WFC and depression. However, these studies have not examined both work to family interference (WFI) and family to work interference (FWI) in the same population. Furthermore, the association between inflammatory markers and WFC has not been examined.

Data from the Whitehall II study of British civil servants were used to explore the associations between WFC, inflammatory biomarkers (CRP and IL-6) and depressive symptoms (GHQ-30). WFC is assessed using a series of 8 questions, 4 measure WFI and 4 measure FWI. Data was collected at phase 3 of the Whitehall II study (1991-1994).

Regression analysis identified that both WFI and FWI were significantly associated with higher GHQ scores ( $n=6466$ ), the association persisted upon adjustment for health behaviours (WFI:  $\beta$  coefficient=0.778, standard error (S.E): 0.0383,  $p < .001$ ; FWI:  $\beta=0.851$ , S.E 0.0386,  $p < .001$ ). Both WFI and FWI were associated with higher CRP levels (WFI:  $\beta=0.0347$ , S.E: 0.00891,  $p < .001$ ; FWI:  $\beta=0.0212$ , S.E: 0.00907,  $p < .05$ ). However, the association was not robust to adjustment for health behaviours (alcohol dependence, cigarette smoking, BMI and moderate exercise). There was no association between either WFI or FWI and IL-6 ( $n=5911$ ).

In conclusion, findings suggest that experiencing WFC is associated with psychological distress. However, the association between WFC and inflammatory markers is inconsistent. Further research is necessary to determine the temporal associations. These findings could encourage employers to implement work-place policies which minimise conflict between family life, in order to reduce adverse mental health related outcomes.

### 299) Abstract 1403

#### ASSOCIATIONS OF HEART RATE VARIABILITY AND SALIVARY ALPHA AMYLASE UNDER ACUTE PSYCHOSOCIAL STRESS

Ursula Schade, Lecturer, Department of Psychology, University of Erlangen, Erlangen, Bayern, Germany, Myriam V. Thoma, PhD, Department of Psychology, University of Zürich, Zürich, Kanton Zürich, Switzerland, Luke Hanlin, PhD Candidate, Danielle Gianferante, PhD, Xuejie Chen, PhD Candidate, Department of Psychology, Brandeis University, Waltham, MA, Nicolas Rohleder, PhD, Department of Psychology, University of Erlangen, Erlangen, Bayern, Germany

**Rationale:** Acute social stress evokes physiological reactions by the hypothalamus pituitary adrenal (HPA) axis and also by the autonomic nervous system (ANS). These reactions are thought to be adaptive when coping with a specific acute threat, but maladaptive when experiencing frequent stressful situations. Assessing ANS activity by plasma catecholamines limits its use to context in which blood samples can be taken easily, stimulating a search for easier, non-invasive measures. Heart Rate Variability (HRV) as well as salivary alpha-Amylase (sAA) have received attention, but few studies have tested whether HRV and sAA measures of ANS responses to acute stress converge.

**Methods:** In our study we explored the interrelation between sAA and HRV before and after exposure to an acute psychosocial stress situation (Trier Social Stress Test; TSST) in a sample of n=28 healthy participants. RMSSD, which reflects preponderance of parasympathetic activity, was used as a measure of the ANS and extracted from continuous recordings before and after TSST. sAA was measured in samples taken 1 min before as well as 1, 10, 30, and 60 min after TSST.

**Results:** Both sAA and RMSSD showed acute stress responses ( $F_{\text{RMSSD}} = 4.30$ ;  $p < .001$ ;  $F_{\text{log\_amylase}} = 22.8$ ,  $p < .001$ ). We found inverse relationships between sAA and RMSSD responses as computed as Area under Curve with respect to ground (AUCg) when controlling for age and body fat ( $\beta = -.49$ ,  $p = .04$ ), but positive relationships between AUCs of sAA and RMSSD computed with respect to increase (AUCi;  $\beta = .55$ ,  $p = .02$ ).

**Conclusion:** Taken together, results show the expected inverse relationship between HRV and sAA when computed as AUCg. However, the positive relationships between HRV and sAA when computed as AUCi were not in line with our expectations. These findings might point to a positive relationship of sympathetic and parasympathetic signaling pathways in certain acute stress contexts. Future studies will need to confirm and explain these findings.

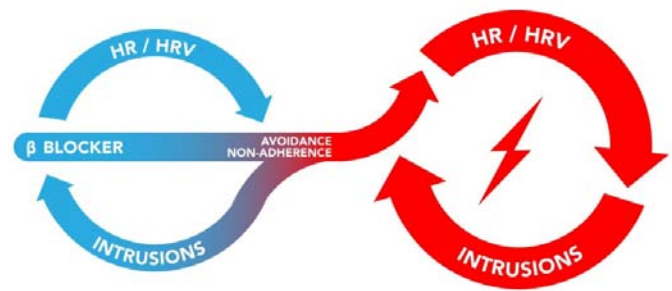
### 300) Abstract 1085

#### A VICIOUS CYCLE OF ENDURING SOMATIC THREAT, MEDICATION NONADHERENCE, AND AUTONOMIC IMBALANCE IN PTSD DUE TO ACUTE CORONARY SYNDROME

Donald Edmondson, PhD, Medicine, Columbia University Medical Center, NEW YORK, NY

In the US, 150,000 patients develop PTSD due to an acute coronary syndrome (ACS; myocardial infarction or unstable angina) every year, which doubles their risk for an ACS recurrence and mortality. The Enduring Somatic Threat model of PTSD due to life-threatening medical events suggests that this type of PTSD is unique. The source of the threat -cardiac (dys)function- is internal, ever present, and nearly impossible to avoid. EST posits that recurrent intrusive thoughts of the past cardiac event and future cardiac risk may cause acute episodes of autonomic dysregulation (a risk factor for ACS recurrence and mortality), which in turn increase the probability of intrusive thoughts. Further, a common avoidance behavior- nonadherence to beta-blockers- exacerbates this vicious cycle. We will present data collected to test the EST model's proposed dynamic relationships among cognition, autonomic function, and behavior in the daily lives of ACS survivors.

We are testing the EST model of the vicious cycle of distressing intrusive thoughts and autonomic dysregulation, exacerbated by nonadherence to beta-blocker medications that could otherwise have dampened this vicious cycle, in an intensive observational study of 100 participants with ACS-induced PTSD and 100 without PTSD in the REactions to Acute Care and Hospitalization (REACH) cohort. Participants are enrolled based on 1-month PCL-S PTSD score, wear a ZioPatch ambulatory ECG monitor to record HR and HRV for 2 weeks, and have their adherence to beta-blockers monitored using electronic pill bottle caps. Over 2 weeks, participants endorse whether they experienced distressing unintended thoughts about their cardiac event/future risk, and how intense those thoughts were, in the 30 minutes prior to each of 5 daily EMA prompts on an Actiwatch Spectrum Pro. We hypothesized that participants with PTSD would experience greater intrusive thoughts and autonomic dysfunction, and poorer adherence, and that intrusive thoughts would be associated with HR/HRV most strongly in those with PTSD and who are nonadherent. We expect that this study will not only inform interventions to reduce risk in ACS patients with PTSD, but will also provide a template for investigating the autonomically influenced cardiovascular consequences of PTSD in survivors of acute life-threatening medical events more generally.



### 301) Abstract 1417

#### THE ASSOCIATION BETWEEN CLINICAL RISK FACTORS AND SUICIDALITY AMONG HIGH RISK INSTITUTIONALIZED YOUTH, IN GUYANA AND SOUTH AFRICA

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**Introduction:** Suicide is the second leading cause of death among youth in the US; but, low-and-middle-income countries (LMIC's) account for 75% of all suicides, worldwide. LMIC, Guyana and South Africa, are ranked 1<sup>st</sup> and 8<sup>th</sup>, respectively, in global suicide rate. However, compared to high-income countries, there is minimal empirical data on suicidal behaviors in LMIC's. Because populations at highest risk for suicide have traditionally been excluded from the scientific literature, due to geographic location, poor health and economic resource, and western research dominance, this study aims to identify clinical risk factors associated with suicide among orphaned Black South African and Guyanese youth.

**Methods:** 190 youths, age 11-21, residing in orphanages in Guyana, South America and South Africa, were administered DSM-5 and Child Behavior Checklist clinical assessments, respectively. We assessed suicide by asking youth if he/she had thoughts of suicide in the past 2 weeks (suicide ideation) and if he/she had a future plan or ever attempted suicide (suicide plan/attempt). Responses yielded scale scores for depression, social stress, atypicality, somatization, anxiety, and attention-deficit/hyperactivity. Using an integrative data analytic technique to combine datasets and examine medical outcomes, clinical scale scores were standardized and used to predict suicidality in binary logistic regression analysis. Odds ratios and 95% confidence interval were estimated with adjustments for age, sex, country, and reason for orphan placement.

**Results:** 20% of Guyanese youth and 22% of South African youth endorsed suicidal ideation. 40% of Guyanese and 26% of South African youth endorsed suicide plan/attempt. In fully adjusted analyses, the odds of atypicality and somatization was 1.96 and 1.67 times greater among youth who endorsed suicidal ideation when compared to those who did not [OR 1.96,  $p = .02$  and OR 1.67,  $p = 0.04$ , respectively]. Yet, youth social stress was significantly associated with suicide plan/attempt, above and beyond model covariates and other clinical risk factors [OR 1.88,  $p = 0.05$ ].

**Conclusion:** Our results suggest that clinical risk factors associated with youth suicide include social stress, atypicality, and somatization and not depression, anxiety, or ADHD, in LMIC's. Research is needed to identify modifiable risk factors to youth suicide.

**302) Abstract 1494**

**LOW SUBJECTIVE SOCIAL STATUS IN THE POLICE IS LINKED TO HEALTH-RELEVANT CHANGES IN DIURNAL SALIVARY ALPHA-AMYLASE ACTIVITY IN SWISS POLICE OFFICERS: A MULTILEVEL REGRESSION ANALYSIS STUDY**

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**Background:** Police work often includes exposure to high levels of occupational stress and an increased physical and mental health risk. Subjective social status (SSS) is a well-established health predictor and we recently identified subjective social status as a particularly powerful predictor of stress-related health outcomes in police officers. The current study aimed at elucidating underlying stress-related mechanisms, particularly the role of sympathetic nervous system dysfunctions assessed by diurnal salivary alpha-amylase (sAA) activity patterns.

**Method:** Fifty-six police officers self-reported their subjective social status and their health status (depression, posttraumatic stress, and physical symptoms) and collected a total of 12 saliva samples over two days for sAA assessment.

**Results:** Multilevel regression analyses revealed that subjective social status in the police ( $\beta_{08} = -7.89$ ;  $p = .044$ ,  $d = .28$ , CI: 14.15-1.63) and physical symptoms ( $\beta_{05} = 2.26$ ;  $p = .021$ ,  $d = .31$ , CI: 0.66-3.83) explained a significant part of the variance in diurnal sAA activity patterns (all other:  $p > .05$ ). However, diurnal sAA activity did not mediate the relationship between subjective social status in the police and physical symptoms.

**Discussion:** The current findings support the idea that more narrowly defined subjective social status may be more closely linked to biological stress mechanisms than subjective social status related to a larger group (i.e., the country, the community, and among friends). Specifically, police officers with lower subjective social status showed higher sAA activity over the day compared to police officers with a higher subjective social status. Importantly, this same pattern was then linked to police officers reporting more physical symptoms. Together, these results suggest that perceiving one's status among co-workers to be lower is linked to health-relevant changes in sympathetic nervous system activity.

## PAPERS

### Adversity: From Community to Genes

Saturday, March 18 from 2:15 - 3:15 pm

#### Abstract 1186

##### **PERCEIVED NEIGHBORHOOD DISADVANTAGE IS ASSOCIATED WITH POORER OBJECTIVELY MEASURED SLEEP EFFICIENCY IN A PROBABILITY SAMPLE OF AFRICAN AMERICAN ADULTS**

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African Americans (AA) and individuals living in disadvantaged neighborhoods have disproportionately high rates of chronic health conditions, yet the mechanisms underlying these links are poorly understood. Sleep is a critical health behavior that may contribute to these health disparities. However, existing research on neighborhood disadvantage and sleep has primarily utilized self-reports of sleep and neighborhood characteristics, and few studies have focused on high-risk populations, including AAs. The current study examines the association between objective and subjective neighborhood characteristics and actigraphy-measured sleep duration and efficiency in a randomly recruited sample of households from two urban neighborhoods [N=825; 77% female; 95% AA; mean (SD) age =55.4 (16.3) years]. Perceived neighborhood characteristics included neighborhood safety, social cohesion, satisfaction, and infrastructure (e.g., presence of sidewalks, street lighting). Objective neighborhood characteristics were assessed by environmental audits of randomly selected street segments and crime data. Average sleep duration and efficiency (SE) were measured via actigraphy over 7 days. Bivariate and adjusted linear regression models examined the association between neighborhood characteristics and sleep. There were no significant associations between perceived or objective neighborhood characteristics and sleep duration. Bivariate analyses revealed significant associations between greater perceived neighborhood safety, social cohesion, satisfaction, and infrastructure, as well as objective measures of land use (e.g., public spaces, services, retail stores) and higher SE. Higher levels of violent crime were associated with lower SE. After adjusting for covariates (e.g., age, sex, education, body mass index), significant associations persisted between subjective neighborhood infrastructure and safety and sleep efficiency ( $\beta = .08$ ,  $p = .03$  and  $\beta = .09$ ,  $p = .02$ , respectively). These findings are among the first to evaluate the association between objective and subjective measures of neighborhood characteristics and objectively measured sleep, in a high-risk sample of African Americans. Consistent with prior studies focused on subjective sleep, perceived neighborhood safety and infrastructure were the most robust correlates of objectively-measured sleep efficiency.

#### Abstract 1540

##### **RETROSPECTIVE RECALL OF CHILDHOOD ABUSE AND MIDLIFE SUBCLINICAL CARDIOVASCULAR DISEASE: CROSS-SECTIONAL AND LONGITUDINAL ASSOCIATIONS**

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Childhood abuse confers risk for poor physical health in adulthood; however, it is still unclear whether childhood abuse relates to the

progression of subclinical cardiovascular disease (CVD) in midlife or whether such a relationship is moderated by age. Among otherwise healthy adults, we thus tested for cross-sectional, longitudinal, and age-moderated associations of retrospective reports of childhood abuse with carotid artery intima-media thickness (cIMT), a marker of subclinical CVD.

Participants were 316 un-medicated, community volunteers free of clinical CVD and other chronic illnesses (age 30-51 yrs,  $M = 40.2$  yrs, 51% male; 70% Caucasian). A subsample ( $N = 215$ ) were assessed again ( $M$  follow-up = 2.9,  $SD = 0.6$  yrs). Childhood abuse was assessed by the Childhood Trauma Questionnaire. Individuals who exceeded established reporting thresholds for the emotional, physical, or sexual abuse subscales were coded as experiencing childhood abuse. cIMT was assessed by B-mode ultrasonography.

Approximately 31% of participants reported emotional, physical, or sexual abuse in childhood. A linear regression analysis of cross-sectional data showed that experiencing childhood abuse related to increased cIMT, after controlling for age, sex, race, cardio-metabolic risk factors (waist circumference, blood pressure, fasting glucose and lipids), childhood socioeconomic status (highest parental education), and recent negative life events ( $\beta = 0.106$ ,  $p = 0.027$ ).

In longitudinal analyses that adjusted for initial cIMT, abuse did not relate to follow-up cIMT ( $\beta = 0.010$ ,  $p > 0.8$ ). However, age significantly interacted with abuse to predict follow-up cIMT ( $\beta = 0.087$ ,  $p = 0.039$ ). Here, older adults (over the age of 41) who reported abuse exhibited a faster progression of cIMT than younger adults.

These results extend cross-sectional evidence on childhood abuse and midlife CVD risk, and they provide provisional evidence that childhood abuse may relate to premature cardiovascular aging.

Supported by R01HL089850-08 and 5T32HL007560-33.

#### Abstract 1254

##### **MULTIMODAL ASSOCIATIONS OF CHILDHOOD MALTREATMENT WITH THE STRIA TERMINALIS AND ITS BED NUCLEUS**

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The bed nucleus of the stria terminalis (BNST) is a central visceral hub, integral to a network of stress-control regions including the paraventricular nucleus of the hypothalamus (i.e., the apex of the HPA axis) and the amygdala, which are all connected by the white matter of the stria terminalis (ST). Childhood maltreatment is known to dysregulate later stress reactivity, yet how it alters the neural correlates of stress responses is virtually unknown. Here, our goal was to examine childhood maltreatment-related differences in ST structural integrity and BNST stress reactivity in a mixed adult sample. We hypothesized that higher maltreatment would correspond to both greater ST structural integrity and BNST stress reactivity. Participants had a range of depression and anxiety symptoms and a history of moderate to severe childhood abuse on average. Preliminary analyses were performed on data from 50 participants (27 females, 1 transgender M to F, mean age = 27). The Childhood Trauma Questionnaire (CTQ) provided an assessment of childhood maltreatment (i.e., emotional and physical abuse (EA, PA) and neglect (EN, PN), and sexual abuse (SA)). Participants underwent a 271-direction diffusion spectrum imaging sequence and performed a mild cognitive stress task (i.e., the multisource interference task) in the MRI scanner. Structural integrity (i.e., normalized quantitative anisotropy, QA) measures were extracted from a ST tract of interest defined by tractography using Human Connectome Project data. Parameter estimates from the contrast between task control and stress conditions were extracted from a hand-drawn BNST region of interest. CTQ total (cumulative maltreatment), EN and PA were correlated with left ST QA (CTQ total: .236,  $p = .050$ ,

EN:  $r = .312$ ,  $p = .014$ , PA:  $r = .256$ ,  $p = .036$ ). EN was also significantly correlated with right ST QA (EN:  $r = .280$ ,  $p = .024$ ). CTQ total, EA, PA and SA significantly correlated with left BNST stress reactivity (CTQ total:  $r = .262$ ,  $p = .033$ , EA:  $r = .242$ ,  $p = .045$ ; PA:  $r = .304$ ,  $p = .016$ ; SA:  $r = .267$ ,  $p = .031$ ). Thus, adults with higher levels of childhood maltreatment displayed greater ST structural integrity (suggesting overuse) and greater BNST stress reactivity, indicating that a “structure-function” relationship may exist within BNST-related circuits that could contribute to higher physiological stress reactivity.

#### Abstract 1112

##### TRAUMA-ASSOCIATED MECP2 GENE METHYLATION IN REFUGEES: IMPLICATION FOR HPA-AXIS REGULATION

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Trauma-related disorders are associated with dysregulation of the HPA axis with long-term consequences for the person's ability to combat stress. Prior work also suggests that individuals suffering from PTSD exhibit changes in blood levels of glycerophospholipids, indicating increased break-down of cellular membranes in the central nervous system. In the current study, we determined whether there were trauma-related changes in the methylation of the MECP2 gene, which regulates production of MECP2 protein and related epigenetic marks. The MECP2 protein regulates stress-dependent epigenetic programming of genes (CRH, AVP and POMC) controlling HPA axis activity.

Within one month of arrival in the U.S., 66 male and female refugees from Syria were interviewed by an Arab-speaking research assistant using a validated structured Arab-language survey. The survey included questions on socioeconomic, trauma and stressor exposures, resilience, and PTSD symptoms. Refugees with PTSD Checklist-Civilian (PCL-C) scores above 30 were classified as PTSD and were compared to those with lower scores.

Results show that refugees with PTSD symptoms have decreased methylation of MECP2 (11 probes with an average decrease of 6.1% [4.3% to 9.0%];  $p$ -values  $< 0.001$ ). They also had a significant increase in methylation of a number of probes that assess methylation of genes related to the regulation of the aminophospholipid transporters ATP9B, ATP9A, ATP10A, ATP11B, ATP10D, ATP11C, ATP8B4, and ATP8A1. There was also increased methylation in a probe for the CRP gene, but no significant differences in probes related to AVP and POMC.

These results suggest dysregulation in molecular pathways regulating the expression of MECP2 with downstream consequences for an individual's ability to cope with stressor exposures.

Acknowledgement: Supported by R01MH085793 from NIMH/NIH and NIEHS/NIH CURES grant P30ES020957.

#### Cohorts of Cardiovascular Disease

Thursday, March 16 from 3:30 - 4:30 pm

#### Abstract 1508

##### OCCUPATIONAL STATUS MODERATES THE ASSOCIATION BETWEEN DEPRESSIVE SYMPTOMS AND PREDICTED 10-

##### YEAR RISK OF CORONARY HEART DISEASE IN PARTICIPANTS OF THE FRENCH CONSTANCES COHORT

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**Background:** A growing body of evidence suggests that the association of psychological variables with cardiometabolic risk might depend upon socioeconomic status. Here, we examined the moderating effect of occupational status (OS) on the association between depressive symptoms and predicted 10-year risk of coronary heart disease (CHD) in working participants from the population-based CONSTANCES cohort.

**Methods:** A total of 34,059 participants (15,736 men, mean age:  $44.0 \pm 10.4$  years) without a history of cardiovascular disease completed the Center of Epidemiologic Studies Depression scale (CES-D). The presence of depressive symptoms was defined as a CES-D score  $\geq 19$ . The 10-year French CHD risk equation model included age, gender, age x gender interaction, current smoking status, diabetes status, systolic blood pressure, total and HDL cholesterol (Empana JP *et al.* Predicting CHD risk in France: a pooled analysis of the D.E.S.I.R., Three City, PRIME, and SU.VI.MAX studies. *Eur J Cardiovasc Prev Rehabil.* 2011;18:175-85). OS was categorized in 3 classes: (1) high (e.g., managers); (2) medium (e.g., clerks or first-line supervisors); (3) low (e.g., blue collar workers). Associations between depressive symptoms and CHD risk were estimated with coefficients (b) and 95% confidence intervals (CI) computed in linear regressions.

**Results:** Overall, the predicted 10-year risk of coronary heart disease was 17.1% in men and 1.8 % in women. In men, there was an interaction between depressive symptoms and OS ( $p=0.048$ ). Significant associations with depressive symptoms were found among participants of medium OS [b (95% CI): 1.45 (0.33;2.57)] and low OS [b (95% CI): 3.05 (1.15;4.95)] but not in participants of high OS [b (95% CI): 0.33 (-0.09;1.61)]. In women, the interaction between depressive symptoms and OS was not significant ( $p=0.091$ ). Sensitivity analyses using the CESD-D score as a continuous variable yielded similar results.

**Conclusions:** The association between depressive symptoms and predicted 10-year risk of CHD could depend upon OS among men. A lower risk of CHD in women at this mean age could explain the lack of such a moderating effect. This study suggests that OS should be considered when evaluating the risk of CHD in depressed individuals, at least in men.

#### Abstract 1199

##### THE HOSTILE, THE TENSE AND THE DISTRESSED - DETERMINANTS OF MULTIDIMENSIONAL PSYCHOSOCIAL RISK PROFILES IN PATIENTS WITH CORONARY HEART DISEASE - THORESCI STUDY

Eveline van Montfort, MSc, Johan Denollet, PhD, Medical and Clinical Psychology, Tilburg University, Tilburg, Noord-Brabant, the Netherlands, Jos Widdershoven, MD PhD, Cardiology, Elisabeth-TweeSteden Hospital, Tilburg, Noord-Brabant, the Netherlands, Nina Kupper, PhD, Medical and Clinical Psychology, Tilburg University, Tilburg, Noord-Brabant, the Netherlands

**Background:** Single psychosocial factors have been associated with cardiovascular outcomes, but these factors often co-occur, e.g. depression, anxiety, negative affectivity (NA). However, it is still unclear how other psychosocial factors cluster, and whether the

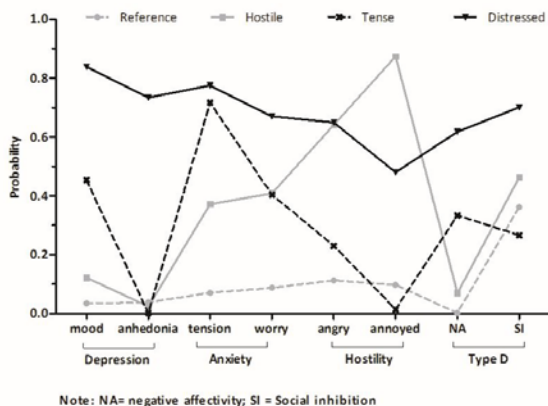


prognostic effects of clustered factors differ from the effects of single factors. Therefore, we examined whether latent multidimensional psychosocial risk profiles could be identified and whether these profiles were associated with specific determinants.

**Method:** 681 percutaneous coronary intervention patients (65y±10.6;80%men) completed the European Society of Cardiology psychosocial screening interview, comprising 15 items with 7 predefined components: low socioeconomic status, work-family stress, social isolation, depression, anxiety, hostility, Type D personality. Multiple self-report questionnaires were administered (depression: PHQ-9, anxiety: GAD-7, negative affectivity and social inhibition: DS14, coping: CISS, optimism: LOT-R, resilience: DRS-15, early adverse life-events and psychiatric history: LES). Clinical information was extracted from patients' medical records.

**Results:** Latent class analysis identified 4 psychological clusters (Figure 1): 1. Low psychological distress (n=424), 2. High hostility (n=128) 3. High tension (n=77), 4. High psychological distress (n=51) and 2 social clusters: Low (n=554) and High (n=127) work stress. Wald statistics showed that characteristics increasing the odds to be in the "High hostility" cluster, were male sex, NA, and psychiatric history. "High tension" membership was associated with female sex, being single, a sedentary lifestyle, seeking social support, NA, early adverse life-events, depression and anxiety and psychiatric history. "High distress" characteristics were younger age, smoking, sedentary lifestyle, NA, depression and anxiety, early adverse life-events and psychiatric history. Being single, concomitant cardiac diseases, hypercholesterolemia, alcohol use, and seeking social support and avoidance-oriented coping increased the odds to be in the "High work stress" cluster.

**Conclusion:** This study revealed 4 psychological and 2 social latent risk profiles, all associated with specific determinants. This indicates the importance of a multidimensional psychosocial screening instrument, covering multiple cognitive-emotional and chronic stress factors.



#### Abstract 1206

#### PREVALENCE AND RISK MARKERS OF EARLY PSYCHOLOGICAL DISTRESS AFTER ICD IMPLANTATION IN THE EUROPEAN REMOTE-CIED STUDY COHORT.

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**Background:** Evidence on psychological distress in patients living with an implantable cardioverter defibrillator (ICD) is inconclusive. The current study is the first to examine the prevalence and risk

markers of anxiety and/or depression in a large international cohort of European ICD patients.

**Method:** Heart failure patients (N=595) from France, Germany, Spain, Switzerland and the Netherlands participating in the REMOTE-CIED study completed a set of questionnaires 1-2 weeks post ICD-implantation, including the 7-item Generalized Anxiety Disorder scale and the 9-item Patient Health Questionnaire to assess anxiety and depressive symptoms, respectively. Patients' clinical data were obtained from medical records.

**Results:** The prevalence of anxiety was 19% and that of depression 22%, with 29% of patients reporting one or both types of distress. Multivariable logistic regression analysis showed that younger age (odds ratio (OR)=2.2 [95% confidence interval =1.1-4.4]), having a threatening view of heart failure (OR=4.0 [2.3-6.8]), a high level of ICD-related concerns (OR=2.9 [1.7-4.9]), Type D personality (OR=2.5 [1.4-4.4]), poor patient-reported health status (OR=2.2 [1.3-3.8]) and receiving psychological treatment (OR=3.5 [1.2-10.4]) or medication (OR=2.7 [1.4-5.1]) were positively associated with distress, while attending cardiac rehabilitation (OR=0.3 [0.2-0.7]) was negatively associated with distress.

**Conclusion:** A significant subset of European ICD patients reports anxiety and/or depression in the first weeks post ICD-implantation. Patients' psychological characteristics, especially negative perceptions about their illness and treatment, were the strongest associates of distress. Timely identification of these patients is essential as they may benefit from psychological interventions and cardiac rehabilitation in terms of improved quality of life and prognosis.

#### Abstract 1397

#### ALEXITHYMIA WAS NOT ASSOCIATED WITH THE RISK OF INCIDENT CARDIOVASCULAR DISEASES IN THE SUPPLEMENTATION EN VITAMINES ET MINÉRAUX ANTIOXYDANTS (SU.VI.MAX) COHORT

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**Background:** Alexithymia is a personality construct defined by difficulties in identifying and labelling one's own emotional state. Although it has been suggested to be associated with cardiovascular diseases and mortality, studies are scarce and a causal relationship is questionable. For instance, no study examined the association of alexithymia with the incidence of cardiovascular diseases among a nonclinical population. The aim of this study was to explore this prospective association in participants without cardiovascular history at baseline.

**Methods:** The 26-item Toronto Alexithymia Scale (TAS-26) was completed by 5,586 participants of the French Supplémentation en Vitamines et Minéraux Antioxydants (SU.VI.MAX) cohort (41.4 % of men, mean age ± SD: 52.2 ± 6.3 years). All participants were free from cardiovascular history at baseline. Covariates measured at baseline were age, occupational status, depressive symptoms, smoking status, body mass index, hypertension, diabetes, hypercholesterolemia and hypertriglyceridemia. The cardiovascular events were recorded using self-reported information or clinical visits, and were validated by an independent expert committee. Associations between alexithymia as well as covariates at baseline and cardiovascular events at follow-up

were estimated with hazard ratios (HR) and 95% confidence intervals (CI) computed in Cox regressions.

**Results:** A total of 173 first cardiovascular events were recorded and validated during an average of 11.4 years of followup. After an initial adjustment for age and occupational status, the association between baseline alexithymia and cardiovascular events at follow-up was not significant among men (HR [95% CI] 1.00 [0.99-1.02]) or among women (HR [95% CI] 1.00 [0.97-1.03]). Similar results were found after further adjustment for all covariates. Likewise, exploratory analyses based on TAS-26 subscores showed no association.

**Conclusion:** In this large prospective study, alexithymia and incident cardiovascular events were not associated among a nonclinical population. Greater CV mortality previously associated with alexithymia might result from poorer outcome in individuals with CV diseases rather than from increased incidence. The association between alexithymia and CV diseases in cross-sectional studies might result from the psychological impact of CV diseases.

### Conflict, Support and Optimism

Thursday, March 16 from 3:30 - 4:30 pm

#### **Abstract 1425**

#### **NOREPINEPHRINE REACTIVITY TO MARITAL SUPPORT: AGE MAKES A DIFFERENCE FOR SYMPATHETIC RESPONSES**

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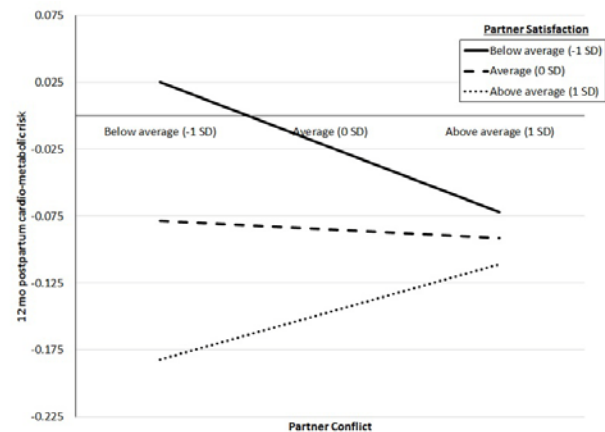
Autonomic responses to stressors become dysregulated with age. However, emotion theories of aging suggest that older adults maintain well-being by proactively avoiding stressors and positively reframing challenges. Studies of couples' age-graded autonomic responses have focused almost exclusively on marital conflict, with mixed results. The present study examines age differences in couples' sympathetic and mood reactivity to a novel interaction, support. A sample of 42 married couples ages 22 – 77 engaged in separate discussions regarding 1) an issue that required support from the partner, and 2) the partner's issue that required their support. Spouses reported the quality of the interaction; affect ratings and plasma norepinephrine samples were obtained before and after each interaction. Accounting for baseline norepinephrine, older partners had higher norepinephrine than their younger counterparts after receiving poor-quality support ( $p = .04$ ). Older adults also exhibited a stronger sympathetic response than younger adults to giving high-quality support ( $p = .04$ ). However, older adults' post-support positive affect did not depend on support quality. Research has shown that marital support becomes increasingly important in older age as social networks shrink and chronic health problems emerge. Consistent with theory, our older adults' positive mood did not vary with support quality. In contrast, their physiological responses diverged from their mood ratings. These results point to discrepancies between affect and physiology that clearly merit exploration, to inform theories of aging and better understand support's health implications. In particular, older couples who receive low-quality support or give high-quality support may face heightened health risks. Indeed, norepinephrine responsiveness has downstream consequences for proinflammatory signaling through NF- $\kappa$ B activation, and thus foreshadows older adults' increased vulnerability to inflammation-based "diseases of aging" and functional decline.

#### **Abstract 1275**

#### **PARTNER CONFLICT AND SATISFACTION ARE ASSOCIATED WITH HIGH STABLE CARDIO-METABOLIC RISK AT 6 AND 12 MONTHS POSTPARTUM**

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Partner relationships characterized as relatively low in both positive and negative qualities (i.e., support and conflict) have been associated with greater inflammatory markers toward the end of pregnancy, in a manner consistent with preterm birth risk. This work suggests that partner relationships low in positive and negative features may adversely affect a woman's physiology during pregnancy, and it is likely that effects extend to physiological profiles after birth. The purpose of this study was to assess whether commonly studied positive (satisfaction) and negative (conflict) relationship features, and their interaction, predict cardio-metabolic risk 12 mo after birth. **Methods.** Women were recruited in 5 US communities by the NIH Community Child Health Network following a birth. Analyses focused on 778 women who were in an intimate relationship and had not had a pregnancy metabolic disorder. Partner conflict and satisfaction were assessed by the Dyadic Adjustment Scale (Spanier 1976) at 6 mo postpartum. A cardio-metabolic risk index was calculated using biomarkers collected at 6 and 12 mo postpartum: Mean arterial pressure, waist-hip ratio, glycosylated hemoglobin and total cholesterol:HDL ratio. Linear regression models were used to predict 12 mo postpartum cardio-metabolic risk controlling for 6 mo values. Covariates were weeks between assessments, age, poverty status, pre-pregnancy BMI, parity, alcohol health behaviors, breastfeeding and employment status. **Results.** Higher partner satisfaction predicted lower 12 mo postpartum cardio-metabolic risk. Partner conflict was not independently associated with 12 mo postpartum cardio-metabolic risk. These results were qualified by a significant conflict x satisfaction interaction. Simple slope analyses revealed that when partner satisfaction was low, lower partner conflict was significantly associated with higher 12 mo postpartum cardio-metabolic risk, controlling for 6 mo values and covariates (Fig 1). **In sum,** partner relationships relatively low in both conflict and satisfaction 6 mo after birth were associated with higher cardio-metabolic risk 1-year after birth. These findings extend past work linking a similar partner relationship pattern with greater inflammation during pregnancy and may have implications for future cardiovascular health in mothers. Future research is required to understand mechanisms.



**Figure 1.** The interaction between partner conflict and partner satisfaction predicting cardio-metabolic risk at 12 mo postpartum, independent of 6 mo postpartum values, weeks between assessments, age, race/ethnicity, poverty status, parity, and pre-pregnancy BMI.

#### Abstract 1537

#### POSITIVE AND NEGATIVE FEATURES OF SOCIAL RELATIONSHIPS IN MOTHERS RELATED TO TELOMERE LENGTH 3 YEARS LATER

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**Background:** Positive social relationships are beneficial for health, with more social support predicting reduced disease. Shorter telomere length (TL), which indicates cellular aging, is a valuable biomarker of aging and health risk. Limited research has examined the role of social relationships in cellular aging, though some evidence suggests that more social support is associated with longer telomeres in older adults. Less clear is whether social support may be related to cellular aging in diverse samples. We sought to examine frequency and quality of support from two sources, perceived available support, and negative couple interactions as they relate to buccal cell TL in a multi-ethnic sample of mothers of young children.

**Methods:** Women were recruited following the birth of a child in 5 sites across the U.S. by the Community Child Health Network (CCHN). Analyses were conducted on an majority non-white subsample of 45 mothers (67% Non-White). Interviews during the year after the birth included multi-item scales of frequency and quality of support from the baby's father and from family/friends, negative interactions, and perceived available support, categorized as high or low. Mother's buccal cell TL (bTL) was determined using standard qPCR techniques. bTL values were categorized as short (bottom quartile) and longer (top three quartiles) telomere length.

**Results:** Age-adjusted logistic regression analyses found that mothers with low perceived available support were more likely to have shorter bTL, OR [95%]=8.85[1.2,65.1],  $p=.03$ . Father support, whether measured as frequency or satisfaction, was unrelated to mother's bTL. Further analyses suggested that low available support and high negative interactions with the baby's father interacted to predict an increased likelihood of mother's having short bTL ( $B(SE)=-1.45$ ,  $p=.05$ ).

**Conclusion:** In this sample of mothers, low perceived available support was related to an increased likelihood of greater cellular aging, as indicated by short TL. These findings suggest that social support during child-rearing years may be protective against cellular aging, while conflictual relationships with the baby's father may be detrimental particularly among women with limited support. The findings highlight the importance of looking at multiple sources of support and both positive and negative social interactions in cellular aging.

#### Abstract 1611

#### DISPOSITIONAL OPTIMISM PREDICTS INFLAMMATION IN CROSS-SECTIONAL AND LONGITUDINAL ANALYSES

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Optimism is associated with better health, and inflammatory activity has been proposed as a potential biological pathway. However, the

evidence implicating inflammation has been adduced largely by cross-sectional studies, and the directionality of the optimism-inflammation relationship has remained unclear. The present analyses therefore tested if optimism predicts inflammatory activity or whether inflammation predicts optimism.

Participants ( $N=6,890$ ; 59% Female; Mean age 57 years; Range 18-90) were recruited among unselected patients attending GP practices throughout Germany, as part of a larger nation-wide study on cardiovascular risk factors in primary care (DETECT study). Data were collected in 2003, 2004, and 2007. Health and life style data were provided by clinical examination and patient self-reports. Self-report questionnaires were used to assess dispositional optimism (LOT-R) and depression (DSQ). Plasma C-Reactive Protein (CRP) was used as a marker of inflammation.

Cross-sectional analyses replicated prior reports of an inverse relation between optimism and inflammation ( $\text{Beta} >0.057$ ;  $p<.001$ ), adjusting for age, gender, SES, life style (smoking, alcohol, BMI), and depression. Longitudinal analyses showed that optimism also predicted lower inflammation at one year (applying the same adjustments, as well as inflammation at baseline;  $p<.01$ ). Optimism still predicted inflammation 4 years later, adjusting for age, gender, SES, and depression ( $p<.05$ ). Further adjustment for life-style, in particular smoking, rendered this association non-significant. Conversely, inflammation at baseline did not predict optimism measured 1 or 4 years later ( $p>.40$ ).

The present analyses showed stable longitudinal associations between optimism and inflammation. The results suggested that optimism is a determinant of inflammation, but analyses provided no support for a reverse association.

#### Daytime Field Research

Thursday, March 16 from 5:00 - 6:00 pm

#### Abstract 1269

#### IS FATIGUE AT WORK DUE TO RESOURCE DEPLETION OR REDUCED MOTIVATION? A REAL-TIME INTENSIVE EMA STUDY OF WORKING NURSES.

*Derek W. Johnston, PhD, Psychology, Julia Allan, PhD, Cheryl Bell, MSc, Health Psychology, University of Aberdeen, Aberdeen, Aberdeenshire, UK, Barbara Farquharson, PhD, Nursing, Edinburgh Napier University, Edinburgh, MidLothian, UK, Martyn C. Jones, PhD, Nursing and Health Sciences, University of Dundee, Dundee, Angus, UK, Marie Johnston, PhD, Health Psychology, University of Aberdeen, Aberdeen, Aberdeenshire, UK*

**Background.** One of the striking regularities of human behaviour is that a prolonged period of demanding physical, cognitive or emotional activity leads to feelings of fatigue. There are essentially two long standing types of explanation for such fatigue. One emphasises the depletion of a finite resource of physical and psychological energy needed to maintain performance (e.g., Baumeister's ego depletion theory) while the other focuses on motivation and emotion, goal setting and effort (e.g., Hockey's motivational control theory). There are few modern studies of fatigue with frequent comprehensive real time measurement. We examined whether fatigue increased in most people over a prolonged work period and tested predictions from the contrasting theories in a study of subjective fatigue in nurses over two 12 hour shifts.

**Method.** Using electronic diaries, 100 ward nurses rated fatigue, stress, demand, control and reward every 90 minutes during two work shifts using a mixture of analogue and binary scales. Energy expenditure was measured objectively using the well validated Actiheart system. The determinants of fatigue were tested by predicting fatigue from a) the accumulated values of energy expended, demand, stress, control and reward over the shift and b) from distributed lag models of the same variables at Lag1 (90 minutes prior to the fatigue rating being

predicted).

**Results.** Virtually all participants showed an increase in fatigue over the work period. Fatigue was typically stable for the first 4 hours at work then increased steadily for the remainder of the shift. Fatigue was not dependent on the energy expended nor the work demands experienced by the nurses. However it was related to the stress experienced earlier in the shift, the control the nurses had over their work and the degree to which they found their work rewarding.

**Conclusion.** This real-time study using valid and intensive measurement offers little support for the resource depletion model of fatigue as neither directly measured energy expenditure nor perceived demands of the work predicted fatigue in nurses over the course of a 12 hour shift. In contrast, the finding that perceived stress, perceived control and perceived reward all predicted fatigue over time, supports a motivational account of fatigue.

#### **Abstract 1566**

##### **THE RELATIONSHIP BETWEEN WORK SOCIAL SUPPORT AND AMBULATORY BLOOD PRESSURE**

*Lori Wadsworth, PhD, Romney Institute of Public Management, Wendy C. Birmingham, PhD, Erin Kaseda, N/A, Tyson Wade, N/A, Psychology, Brigham Young University, Provo, Utah*

**Background:** Individual social support in the work place is the perception of support and aid that can come from supervisors and coworkers. Organizational social support is the employees' perceptions that they are valued by the organization. Research has demonstrated that such work social support and assistance can aid in reducing stress, and increasing work-related communication and productivity. However, less is known about the specific health benefits of such support, specifically as it relates to cardiovascular-risk-reducing indicators such as ambulatory blood pressure. The current study is an examination of the relationship of these three sources of work social support on ambulatory blood pressure (ABP), which is directly related to cardiovascular health. ABP offers a large number of readings across the day, chronicling daily fluctuations, providing a more complete picture of cardiovascular (CV) functioning.

**Methods:** 92 participants completed work social support questionnaires and wore ambulatory blood pressure monitors for 24 hours. ABP was assessed randomly twice an hour during wake hours and once an hour during sleep. Participants completed diary readings measuring posture, activity level, temperature, location and other factors that impact ABP via Survey Monkey after each ABP reading during the wake hours. These factors were included in our analysis as control variables.

**Results:** Analysis found greater perceived social support received from coworkers was significantly associated with both decreased systolic blood pressure ( $p = .0008$ ) and diastolic blood pressure ( $p = .07$ ). In addition, greater perceptions of supervisor social support were significantly associated with decreased systolic blood pressure ( $p = .02$ ); no significant relationship with diastolic blood pressure was found. Additionally, no significant relationship was found for either systolic or diastolic blood pressure and organizational social support.

**Conclusions:** Participants demonstrated physical benefits in terms of ABP from both coworker and supervisor social support; we did not find similar associations for organizational social support. Supportive relationship with coworkers and supervisor rather than a perception of the organizations' concern for their well-being may be an important factor associated with reduced cardiovascular risk.

#### **Abstract 1171**

##### **THE IMPACT OF HOSTILITY REDUCTION TREATMENT ON AFFECTIVE RESPONSES TO STRESSORS THROUGHOUT THE DAY**

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**Objective:** Daily stressors are known to be adversely associated with short-term physiological changes that might be related to disease. Affective reactivity has been identified as a possible mechanism by which daily stressors influence health outcomes. We test the hypothesis that there is a direct relationship between negative affect and stressors on a momentary basis and that this relationship can be altered by exposure to a CBT-based hostility reduction program.

**Method:** 158 healthy adults, aged 20-45 and high in hostility were randomized into two groups; one enrolling a 12 week CBT-treatment program, the other assigned a waitlist control condition. Prior to randomization, subjects completed a burst of ecological momentary assessments (EMA) approximately every 20 minutes for 24 hours. At each EMA participants reported on exposure to stressors and current negative affect. After the CBT program an identical burst of 24-hour EMAs took place. Multilevel models (assessments nested in persons) were used to examine whether stressor exposure and affective reactions to momentary stressors changed from pre- to post-treatment in the CBT group. All models controlled for demographic characteristics and trait hostility.

**Results:** Initial t-tests confirmed randomization. The treatment and control groups did not differ on age, gender, ethnicity, or trait hostility (all  $p$ 's > .49). Participants completed a total of 7,186 surveys across the two EMA bursts. Stressor exposure did not differ across the two conditions ( $OR = .836$ ; 95%  $CI: .546-1.280$ ) but was significantly lower at the second burst of EMA assessments ( $OR = .593$ ; 95%  $CI: .455-.774$ ). This trend did not differ across treatment groups ( $p = .743$ ). Exposure to a current stressor was associated with higher negative affect ( $b = 3.609$ ,  $SE = .224$ ,  $p < .01$ ) across groups and bursts of EMA. The treatment group demonstrated significantly smaller changes in negative affect in response to stressors at the second burst of EMA compared with the first ( $p = .026$ ) while this was not true for the control group ( $p = .606$ ).

**Conclusion:** Negative affect was higher during exposure to stressors than at other times. A CBT-based hostility reduction program reduced this negative affect reactivity, suggesting that this intervention may reduce the risk associated with elevated affective responses to stressors experienced throughout the day.

#### **Abstract 1530**

##### **INDIVIDUAL DIFFERENCES IN DAILY STRESS PROCESSES AND COGNITIVE HEALTH IN OLD AGE: A MEASUREMENT BURST APPROACH**

*Robert S. Stawski, PhD, School of Social and Behavioral Health Sciences, Oregon State University, Corvallis, OR, 97330, Stuart W. MacDonald, PhD, Psychology, University of Victoria, Victoria, BC, Canada*

Daily stress has been identified as an important modifiable risk factor for health, and more recently cognitive health, in later life. Previous research shows that daily stress predicts poorer performance across multiple cognitive domains including working memory, attention, and episodic memory. However, comparatively little research has considered daily stress effects on response time inconsistency (RTI), trial-to-trial fluctuations in response time latencies. RTI is suggested to be a behavioral indicator of central nervous system (CNS) integrity and

a potentially early marker of normal and pathological cognitive aging. Although RTI may be modulated by both durable (e.g., CNS) and labile (e.g., stress) processes, it is unclear whether both exposure and reactivity to daily stressors are associated with RTI in old age. Using data from a measurement burst design, 111 older adults ( $M_{age}=80$  years, Range=66-95) completed a processing speed task on 6 occasions over a 14-day period, repeating this protocol every 6 months for 2.5 years. Participants also completed measures of daily stressful experiences, positive and negative affect, and pain at each assessment occasion. Adjusting for average levels of daily affect (negative and positive) and pain, results indicated that: 1.) individual differences in daily stressor exposure were negatively associated with RTI ( $p<.001$ ), such more frequent stressor occurrence was associated with lower RTI; 2.) individual differences in affective reactivity to daily stressors, both larger stressor-related increases in negative affect and decreases in positive affect, were associated with increased RTI ( $ps<.001$ ); and 3.) individual differences in stressor-related increases in pain were associated with decreased RTI ( $p=.02$ ). These findings suggest that emotional reactivity to daily stressors is an important risk factor for compromised cognitive health among older adults, and may be a candidate target for intervention and prevention efforts. Discussion will focus on the importance of different dimensions of daily stress processes for understanding cognitive health during old age, and the utility of measurement burst designs for examining stress-RTI links.

## Depression and the Heart

Saturday, March 18 from 3:30 - 4:30 pm

### Abstract 1477

#### THE ASSOCIATION BETWEEN VISUAL, HEARING AND DUAL SENSORY IMPAIRMENT WITH DEPRESSION AND ANXIETY OVER SIX YEARS : FINDINGS FROM THE TROMSO STUDY

Suzanne Cosh, PhD, Lifelong exposures and healthy aging team, University of Bordeaux, Bordeaux, Aquitaine, France, Therese von Hanno, PhD, Department of Ophthalmology, UiT the Arctic University of Norway, Tromsø, Nordland, Norway, Catherine Helmer, PhD, Lifelong exposures, health and aging team, University of Bordeaux, Bordeaux, Aquitaine, France

background: Due to a narrow focus on depression, anxiety has been largely overlooked in the sensory impairment literature. Few studies have examined multiple and single impairments concurrently and there remains an ongoing need to better differentiate the relative impact of single and dual impairments in relation to mental health, especially longitudinally.

Aim: To examine anxiety and depressive symptoms over six years in those with visual, hearing or dual impairments.

Method: A subsample of 2890 adults aged 60 or above from the Tromsø study (surveys 5 and 6), a population-based study in northern Norway. Depression and anxiety symptoms were assessed via the HSCL 10 at baseline and six year follow up. Linear mixed models examined the impact of baseline presenting-correction visual impairment, self-reported hearing impairment or dual sensory impairment on anxiety and depression symptoms at baseline and six year follow up.

Results: After adjustment for socio-demographic and physical health covariates, vision impairment was associated with an increase in depression symptoms after six years ( $b = 0.0218$ , SE = 0.01,  $p = .034$ ). Hearing impairment showed cross-sectional associations with both depression ( $b = 0.1813$ , SE = 0.07,  $p = .015$ ) and anxiety ( $b = 0.1816$ , SE = 0.08,  $p = .022$ ), although these were not significant at six years. Dual impairment did not pose an additive risk beyond single impairments.

Conclusion: Older adults with vision and hearing impairments have different mental health profiles and thus varying treatment and intervention needs.

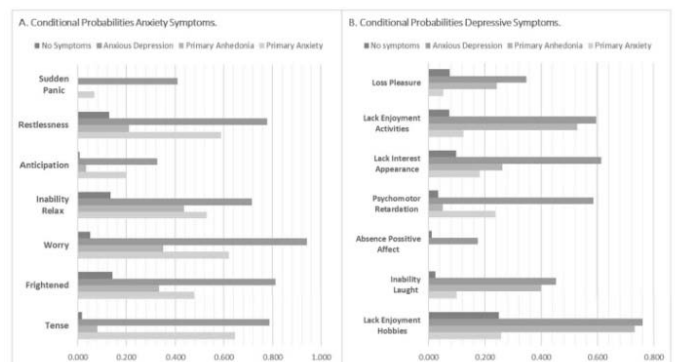
### Abstract 1178

#### ANXIETY AND DEPRESSIVE SYMPTOMS PROFILES ASSOCIATED WITH SUBCLINICAL ATHEROSCLEROSIS AMONG HISPANICS: RESULTS FROM THE PREVENCIÓN STUDY

Diana A. Chirinos, Ph.D., Luz M. Garcini, Ph.D., M.Ph., Christopher A. Fagundes, Ph.D., Psychology, Rice University, Houston, TX, Julio A. Chirinos, M.D., Ph.D., Medicine, University of Pennsylvania, Philadelphia, PA, Josefina Medina-Lezama, M.D., Research Institute, Santa Maria Catholic University, Arequipa, Arequipa, Peru

Depression and anxiety are both important predictors of atherosclerosis and overall cardiovascular risk. The presentation of symptoms, however, can be highly heterogeneous and few studies have examined the impact of comorbid anxiety and depressive symptoms on atherosclerosis. In this study, we used latent class analysis (LCA) to provide (1) a comprehensive characterization of anxiety and depressive symptom profiles in a community-based sample of South-American Hispanic adults, and (2) examine their association with subclinical atherosclerosis, measured by carotid intima-media thickness (IMT). Participants included 445 adults (58.20% female) enrolled in the population-based PREVENCIÓN study. We used LCA to derive symptom profiles using individual items of the Hospital Anxiety and Depression Scale (HADS). Four anxiety and depressive symptom profiles were identified. The "No symptoms" subgroup (43.60% of the sample) was comprised of individuals who did not endorse symptoms of anxiety or depression. The "Anhedonia" subgroup (23.15%) included individuals who endorse primarily symptoms of anhedonia, such as lack of enjoyment in activities or hobbies, inability to laugh and see the funny side of things as well as lack of interest in appearance. The "Primary Anxiety" subgroup (22.02%) included individuals endorsing primarily anxiety symptoms such as restlessness, worry as well as feeling frightened and tense. Finally, the "Anxious Depression" subgroup (11.24%) included individuals endorsing comorbid anxiety and depressive symptoms. Both the "Anhedonia" ( $\beta=0.176$ ,  $p=0.001$ ) and the "Anxious Depression" ( $\beta=0.162$ ,  $p=0.002$ ) subgroups were significantly associated with increased carotid IMT. After controlling demographic characteristics, as well as cardiovascular risk factors including smoking, waist circumference, blood pressure, lipids and fasting glucose levels, the association between the "Anhedonia" subgroup and carotid IMT was attenuated, while the association for the "Anxious Depression" subgroup ( $\beta=0.076$ ,  $p=0.040$ ) remained significant. This is the first study to empirically derive anxiety and depressive symptom profiles in a community-based sample of Hispanics and link them to subclinical atherosclerosis. Future work should examine potential pathways to increased cardiovascular risk, and the impact of tailored interventions on atherosclerosis.

Figure 1. Conditional probabilities of endorsement of anxiety and depressive symptoms across subgroups.





**Abstract 1124**  
**DEPRESSIVE SYMPTOMS IN PATIENTS WITH AN IMPLANTABLE CARDIOVERTER DEFIBRILLATOR: IS IT ALL ABOUT TREATMENT EXPECTATIONS?**

Susanne Pedersen, PhD, Psychology, University of Southern Denmark & Odense University Hospital, Odense, Southern Denmark, Denmark, Johan Denollet, PhD, Medical and Clinical Psychology, Tilburg University, Tilburg, Noord-Brabant, The Netherlands, Barbara van Veen, MSc, Psychology, University of Southern Denmark, Odense, Southern Denmark, Denmark, Mirela Habibovic, PhD, Medical and Clinical Psychology, Tilburg University, Tilburg, Noord-Brabant, The Netherlands

Depressive symptoms are prevalent in 20-25% of patients with an implantable cardioverter defibrillator (ICD). ICD Patients with depression have a higher risk for impaired quality of life and premature death, despite state-of-the art treatment. Little is known about the influence of patients' treatment expectations on depression. Hence, we examined whether treatment expectations is as important a correlate as known correlates of depression in this population (i.e., gender, personality, heart failure, and ICD shock) at 12 months follow-up. A subset of first-time implant patients from the WEBCARE study (n=177; 83.1% men: mean age = 59±10) completed the 10-item EXPECTations towards ICD therapy (EXPECT-ICD) questionnaire, the Patient Health Questionnaire (PHQ-9) and the Type D Scale at baseline and the PHQ-9 at 12 months follow-up. The EXPECT-ICD questionnaire taps into both negative (e.g. "the device will make me feel more anxious") and positive treatment expectations (e.g. "the device will make me feel more confident"). Using hierarchical linear regression analysis entering the variables of interest in three blocks: (1) baseline depression, negative and positive treatment expectations, (2) Type D personality, and (3) gender, heart failure, shocks at 12 months follow-up, the models accounted for the following variance (adjusted R-squared) in depressive symptoms: Model 1 = 22.2%; Model 2 = 24.1%; and Model 3 = 23.3%, with a statistically significant change (p=.042) between models 1 and 2 but not between models 2 and 3 (p=.652) in terms of explained variance. Table 1 displays the unstandardized and standardized beta coefficients and significance level for each of the models and its correlates. These results show that patients' expectations towards ICD treatment is an important correlate of depression, even when adjusting for baseline depressive symptoms and other factors known to influence depression outcomes in ICD patients. These results suggest that it is important to assess patients' treatment expectations at the time of implant with a view to a dialogue between patients and health care professionals if these expectations are generally negative in order to prevent depression.

**Table 1.** Treatment expectations as correlate of depressive symptoms at 12 months post implant

Model		Unstandardized Coefficients		Standardized Coefficients	
		B	Std. Error	Beta	p
1	(Constant)	.934	.913		1.023
	Negative expectations	.188	.079	.202	2.365
	Positive expectations	.020	.088	.018	.222
	Baseline depression	.345	.076	.376	4.526
					.000
2	(Constant)	.872	.903		.966
	Negative expectations	.157	.080	.169	1.967
	Positive expectations	.029	.087	.027	.336
	Baseline depression	.322	.076	.350	4.228
	Type D personality	1.802	.879	.162	2.050
3	(Constant)	.112	1.301		0.86
	Negative expectations	.167	.081	.180	2.048
	Positive expectations	.025	.088	.023	.283
	Baseline depression	.325	.077	.353	4.207
	Type D personality	1.670	.904	.150	1.847
	Heart failure	.062	.635	.008	.098
	Gender	.524	.843	.049	.622
	Shocks during 12 months FU	1.459	1.254	.090	1.163
					.247

**Abstract 1556**  
**ASSOCIATION OF DEPRESSIVE SYMPTOMS WITH HEART RATE VARIABILITY DENSITY IN VETERAN TWINS**

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**Introduction:** Depression is a known predictor of adverse CVD events, and one proposed mechanism is autonomic dysfunction. Heart Rate Variability Density (Dyx) is a new prognostic biomarker based on multipole/density analysis of the Poincaré plot. Recent studies have shown superior prognostic value compared with traditional time and spectral series metrics for arrhythmia and death. We hypothesized that depressive symptoms are independently associated with reduced Dyx. **Methods:** The sample included 443 male veteran twins from the Emory Twins studies, recruited from the Vietnam Era Twin Registry. Depressive symptoms were measured with the Beck Depression Inventory-2 (BDI-2), and primarily examined as a continuous exposure. Twins underwent 24-hours of ambulatory ECG monitoring and a Dyx value was calculated for each hour, and the mean value was evaluated as the primary outcome. Multivariate analyses were used to adjust for potential traditional CVD risk factors and generalized estimating equations evaluated familial/genetic confounding and derived within-pair effects. **Results:** The mean (SD) age was 56 (3) years, and 14% of the twins had a BDI-2 score of 14 or higher, indicating at least mildly elevated depressive symptoms. The BDI score was inversely associated with the mean Dyx score in a dose-response relationship (see figure, p for trend <0.0001). Each 10-point increase in BDI-2 associated with a 0.18 unit decreased Dyx (p<0.0001). This effect size was reduced to 0.13 when adjusting for traditional CVD risk factors, but still statistically significant (p<0.0001). Further adjustment for familial factors by analyzing depression-discordant twin pairs further reduced the effect size to 0.12 units Dyx per 10-point increase in BDI-2, but it was still significant in adjusted models (p<0.0001). No interaction with zygosity was noted, denoting no genetic confounding.

Conclusion: In veteran twins, we found a highly significant, dose-response association between depressive symptoms and Dyx. This supports an autonomic mechanism by which depression may increase risk of death and arrhythmia.

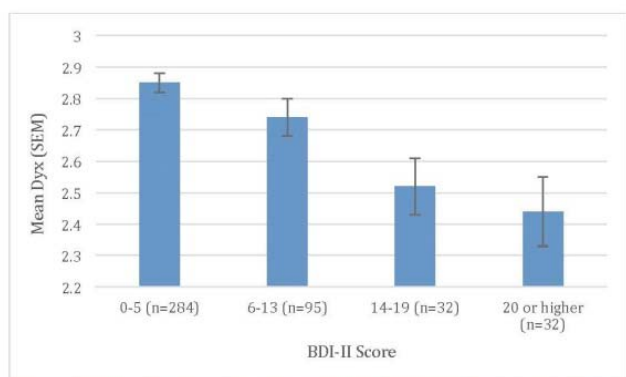


Figure - Association of Depressive Symptoms with Dyx in Male Veteran Twins. Trend  $p < 0.0001$

## Drugs and Placebos

Saturday, March 18 from 3:30 - 4:15 pm

### Abstract 1245

#### DO ANTIDEPRESSANT SMOKING CESSATION TREATMENTS PRODUCE THE BEST OUTCOME FOR DEPRESSED SMOKERS?

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**Background:** In a prior systematic review and meta-analysis (Hitsman et al. 2013 Addiction), past major depression (MD) was associated with 17% and 19% lower odds, respectively, of short- and long-term abstinence. Using the same database, this study examined whether antidepressant smoking cessation treatments produce the best outcome for past MD smokers. **Methods:** For each study in our 2013 meta-analysis (N=42), we coded the highest-level experimental arm and the lowest-level placebo/alternative control arm for psychological and pharmacological components. Four factors were coded: 1) standard behavioral treatment (none, self-help, face-to-face); 2) cognitive behavioral mood management (CBMM; none, self-help, face-to-face); 3) standard cessation pharmacotherapy (none, placebo, nicotine replacement therapy [NRT], other); 4) and antidepressant cessation pharmacotherapy (none, placebo, varenicline, serotonergic, catecholaminergic). We used Generalized Estimating Equations, with study ID as the cluster identifier, to predict short- ( $\leq 3$  months) and long-term abstinence ( $\geq 6$  months) using the coded treatment components. For the analysis of long-term abstinence, we included separate terms to distinguish standard ( $< 12$  weeks) vs. extended ( $\geq 12$  weeks) treatment length. Analyses controlled for type of MD assessment. **Results:** Short-term abstinence (N=30, n=2,604) was significantly increased by CBMM face-to-face (6 arms; odds ratio [OR]=2.04), NRT (21 arms; OR=2.86), catecholaminergic medication (11 arms; OR=1.36), and varenicline (2 arms, OR=2.92). For long-term outcomes (N=35, n=2,836), only catecholaminergic medication (14

arms; OR=1.49) and varenicline (2 arms, each 12-week duration; OR=2.49) improved abstinence. Neither CBMM (6 arms) nor NRT (22 arms) had an effect on long-term abstinence. **Conclusion:** Varenicline was shown to provide the greatest long-term benefit for smokers with past MD, more than doubling long-term abstinence rates. However, a novel, targeted behavioral treatment model may be needed to produce sustained smoking cessation among these high-risk smokers.

### Abstract 1502

#### GENETICS, SHARED, OR NON-SHARED ENVIRONMENT? AN EXPERIMENTAL TWIN STUDY ON PLACEBO ANALGESIA

Katja Weimer, PhD, Psychosomatic Medicine and Psychotherapy, University Hospital Tübingen, Tübingen, BW, Germany, Nils J. Mönnikes, -, Andreas Stengel, MD, Medical Department, Division of Psychosomatic Medicine, Charité - Universitätsmedizin, Berlin, Berlin, Germany, Paul Enck, PhD, Psychosomatic Medicine and Psychotherapy, University Hospital Tübingen, Tübingen, BW, Germany The prediction of patients who could be "placebo responders" is crucial to minimize placebo effects in clinical trials and to maximize them in treatments. Recent studies show that individual experiences, social observational learning as well as genetics influence placebo effects. To investigate the effects of genetics, social as well as individual learning, an experimental pilot study with mono- and dizygotic twins was performed for the first time.

This study employed 48 healthy participants comprising 16 monozygotic (MZ) and 8 dizygotic (DZ) twin pairs ( $29 \pm 8$  years; MZ: 12 female, 4 male pairs; DZ: 4 female, 2 male, 2 mixed pairs). To induce an individual learning experience, participants were conditioned on the efficacy of an inert ointment by manipulation of heat pain temperatures on the non-dominant forearm, but were told that it is a potent treatment. After a short period, the conditioned analgesic placebo effect was tested on the dominant forearm, and compared to a control ointment. Pain ratings and expectations about the efficacy of the ointments were rated on a visual analog scale, and psychological questionnaires were assessed.

MZ as well as DZ twins reported significant placebo analgesia through lower pain ratings when the "potent" compared to the control ointment was applied on the dominant forearm (MZ:  $p=.003$ ; DZ:  $p=.021$ ). Pain ratings during conditioning and placebo test were significantly related in MZ twins ( $r=.556$ ,  $p=.001$ ), but not in DZ twins ( $p>.05$ ). However, the extent of placebo analgesia was neither significantly related within MZ nor within DZ twin pairs. Assessed expectations and psychological variables partially influenced pain ratings, but not placebo analgesia.

Due to the missing relationship in placebo analgesia between MZ and DZ twins, neither genetics nor shared environmental influences seem to affect placebo responses. The partial relations found between conditioning and placebo response as well as between psychological variables and pain ratings point to an impact of individual learning experiences.

This study was supported by a grant of the German Research Foundation (DFG; WE5658/2-1).

### Abstract 1503

#### SOCIAL LEARNING OF PLACEBO EFFECTS THROUGH OBSERVATION IN CHILDREN: UNFAMILIAR MODELS ARE MORE EFFECTIVE THAN THE MOTHER

Katja Weimer, PhD, Nazar Mazurak, MD, Christina Wolf, -, Rebekka Meyer, -, Psychosomatic Medicine and Psychotherapy, University Hospital Tübingen, Tübingen, BW, Germany, Marco D. Gulewitsch, PhD, Department of Psychology, Clinical Psychology and Psychotherapy, University of Tübingen, Tübingen, BW, Germany, Paul Enck, PhD, Psychosomatic Medicine and Psychotherapy, University Hospital Tübingen, Tübingen, BW, Germany

Studies showed that placebo effects can be elicited through live observation as well as through video-based observation of an effective

treatment in adults. This social learning effect could be important in children as they have fewer own experiences in medical settings. Furthermore, video-based learning would be a practical and efficient application to enhance placebo effects and treatments.

We employed 88 children ( $11.5 \pm 2.6$  years, 42% girls) and their mothers ( $44.3 \pm 5.7$  years) who were randomized to four interventional and one control group. In a 2x2 study design, children observed a manipulated, effective intervention to reduce heat pain in their mother or an unfamiliar woman (a trained model), either live or in a video. Afterwards, this intervention was conducted with the child: the same inert ointment was applied to two areas on the forearm, and the information was given that one is a control ointment and the other is a pain killer. On both areas, similar heat pain stimuli were applied and rated on a visual analog scale by the child. Placebo analgesia was investigated as the difference in pain ratings between those two areas. Furthermore, heart rate variability (HRV), expectations and psychological questionnaires were assessed.

A 2x2x2 ANOVA (area x model x observation mode) revealed a significant placebo analgesia effect when an unfamiliar model was observed compared to the own mother ( $F=6.194$ ,  $p=.015$ ), independently of the mode of observation ( $F=0.026$ ,  $p>.05$ ). The control group, which was only told that the ointment is effective, reported a significant placebo analgesia, too ( $t=2.902$ ,  $p=.012$ ). First analyses of HRV revealed that in children in the mother-live condition (worst placebo analgesia), parasympathetic parameters (e.g. the high frequency power) were significantly positive correlated with pain ratings, whereas there were no such correlations in children in the unfamiliar-live condition (best placebo analgesia).

Our results show that placebo effects can be induced in children and adolescents through social observational learning as well as verbal suggestions only, whereas observation of unfamiliar persons could be more effective. Relationships between HRV, social aspects of learning and pain ratings will be further explored and presented.

This study was supported by a grant of the German Research Foundation (DFG; WE5658/2-1).

### **From Rumination to PTSD**

**Saturday, March 18 from 2:15 - 3:15 pm**

#### **Abstract 1450**

#### **RESTING HEART RATE VARIABILITY AND ITS RELATION TO MALADAPTIVE AND ADAPTIVE FACETS OF RUMINATION AND TRAIT ANXIETY**

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The current study explores the relationships between resting vagally mediated heart rate variability (vmHRV), rumination, and trait anxiety. Perseverative cognition – defined as the repetitive or sustained activation of cognitive representation of a stressor – is a primary mechanism linking psychological vulnerability with poor health and disease. This is outlined in the perseverative cognition hypothesis (PCH). Resting vmHRV is an important indicator of self-regulatory abilities, stress vulnerability, and overall health. Individuals with lower resting vmHRV are more vulnerable to stress, and thus more likely to engage in perseverative cognition. These individuals also experience subsequent negative mental health outcomes such as anxiety. Recent research suggests that rumination – a core mechanism underlying

perseverative cognition – contains (at least) two maladaptive (depressive and brooding) and one adaptive (reflective) facets. However, to date, research has not examined how the association between resting vmHRV may differ between these three facets of rumination, in addition to the role of these facets in linking lower resting vmHRV with greater trait anxiety. These relationships were explored in the current study in a sample of 203 subjects (112 females, mean age = 19.43). Resting vmHRV was assessed via electrocardiogram during a 5-minute-resting period. Self-report scales of trait rumination and anxiety were collected. Significant negative associations were found between resting vmHRV and maladaptive, but not adaptive, forms of perseverative cognition (depressive:  $r = -.273$ ,  $p < .001$ ; brooding:  $r = -.175$ ,  $p < .05$ ). Similarly, mediation analyses showed a significant indirect relationship between resting vmHRV and anxiety through maladaptive, but not adaptive, facets of rumination (depressive:  $B = -3.70$  (1.09),  $[-6.09, -1.80]$ ,  $p < .05$ ; brooding:  $B = -1.01$  (0.49),  $[-2.29, -0.25]$ ,  $p < .05$ ). Our findings support the PCH such that those with stress vulnerability, as indexed by lower resting vmHRV, are more likely to engage in maladaptive perseverative cognition and thus experience negative outcomes such as anxiety. Our data also lend a novel outlook on the PCH in that resting vmHRV is not related to reflective rumination and thus, not all forms of perseverative cognition play a role in the link between stress vulnerability and psychological well being.

#### **Abstract 1292**

#### **CHALLENGE AND THREAT IMAGERY MANIPULATES HEART RATE AND ANXIETY RESPONSES TO STRESS**

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**Background:** Mental imagery is often used to reduce responses experienced from psychological stress such as elevations in anxiety and heart rate. However, recent research suggests that instead of lowering these stress responses, it may be more beneficial to help individuals view the symptoms as facilitative or helpful. Previous research demonstrates that imagery encompassing responses to stress alongside feeling confident and in control leads to a challenge state and the imagined stress responses are perceived to be facilitative. In contrast, imaging the same stress responses without feeling confident and in control evokes a threat appraisal and debilitative evaluation of these responses. However, research has yet to examine the effects of challenge and threat evoking imagery on the subsequent stress response. **Aim:** Investigate the influence of three types of imagery (i.e., challenge, threat, and neutral) on anxiety and heart rate responses to a speech preparation task. **Methods:** Using a within-subject design, twenty-five females ( $M_{age} = 23.24$ ;  $SD = 4.19$ ) imaged three scripts (challenge, threat, and neutral) to manipulate appraisal of a speech preparation task. Following each script, participants completed a speech preparation task. Cognitive and somatic anxiety and self-confidence were assessed prior to the imagery and again prior to each speech preparation trial (immediately following imagery). Heart rate was recorded continuously during resting baseline and speech preparation for each condition. **Results:** Each speech preparation task induced an increase in heart rate and anxiety. Following threat imagery, the speech preparation task was reported as significantly more stressful and threatening than the challenge and neutral conditions ( $p$ 's  $< .01$ ). Participants experienced lower levels of confidence ( $p < .001$ ), more negative interpretations of cognitive and somatic anxiety symptoms ( $p$ 's  $< .01$ ), and a greater increase in heart rate ( $p < .05$ ) following threat imagery compared with challenge and neutral imagery. **Conclusions:** Findings demonstrate that imagery can alter stress appraisal and the accompanying cardiovascular and psychological responses to standardized stress tasks. Imagery

interventions, acknowledging the stressful nature of events, but emphasising feelings of confidence and control (i.e., challenge imagery) may lead to more adaptive coping.

#### **Abstract 1586**

##### **POST-TRAUMATIC STRESS DISORDER IN PRIMARY CARE**

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Post-traumatic stress disorder (PTSD) is associated with comorbid health conditions, poor functioning, and increased health care utilization. This presentation combines results from two studies: A review of the empirical literature on PTSD in primary care settings; and a systematic review of the utility of case-finding instruments for PTSD among primary care and high risk populations.

We obtained relevant studies by means of: 1. Electronic search using MEDLINE and PsycINFO (1980--December 2014) databases, and a secondary search through the bibliographies and citations of the studies returned from the electronic search. 2. Electronic search using MEDLINE and the National Center for PTSD's Published International Literature on Traumatic Stress (PILOTS) databases. Study quality was rated using Quality Assessment of Diagnostic Accuracy Studies (QUADAS) criteria.

Current PTSD prevalence in primary care patients ranged widely between 2% to 39%, with significant heterogeneity in estimates explained by samples with different levels of trauma exposure. Six studies found detection of PTSD by primary care physicians ranged from 0% to 52%. High comorbidity was reported between PTSD and other psychiatric disorders and with functional impairment or disability.

Two screens, the PC-PTSD and the PTSD Checklist (PCL) were the best performing instruments. The 4-item PC-PTSD has a positive likelihood ratio of 7.1 (95% CI=5.5-9.2) and a negative likelihood ratio of 0.28 (95% CI= 0.21-0.37) using the same score indicating a positive screen as used by the Department of Veterans Affairs in all of its primary care clinics. The 17-item PCL has a positive likelihood ratio of 9.0 (95% CI=6.2-13) and a negative likelihood ratio of 0.38 (95% CI=0.30-0.38) using scores of around 40 as indicating a positive screen. Clinical implications: Primary care clinics are important locations for detection of PTSD. The finding that PCPs were not successful at detecting PTSD suggests that there should be a more active and consistent screening process in primary care. Administering brief and sensitive screening tools, such as the PC-PTSD or the PCL to trauma-exposed patients, is likely to identify individuals with undiagnosed PTSD. Raising PCPs' awareness of common correlates of PTSD, such as comorbid mental health problems, somatic complaints and functional impairment, may also improve detection.

#### **Abstract 1599**

##### **ECOLOGICAL MOMENTARY ASSESSMENT OF DAILY VARIATION IN POSTTRAUMATIC STRESS SYMPTOMS**

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Assessments of post traumatic stress symptoms (PTSS) and associated disorders (e.g., PTSD) have traditionally been done retrospectively with paper and pencil assessments. Retrospective assessment methods are susceptible to biases in memory, errors in reporting, and do not account

for daily symptom changes. Ecological momentary assessment (EMA) methods involve repeated sampling of current symptoms and experiences while respondents are engaged in their normal daily routines. EMA methods are adaptable to smart technology devices and may provide the most detailed, reliable, and up-to-date assessments. This study used EMA methods to assess PTSS and examined the daily variation in PTSS in individuals with and without PTSD. Forty current or former U.S. military service members completed PTSS assessments four times daily for 15 consecutive days. PTSS were measured with eighteen items from the PCL-5. Daily variation in PTSS was examined using linear mixed models with daily assessments (level-1) nested within subjects (level-2). Day of week, PTSD group, and the day of week x PTSD group interaction term were included in the model. Analyses tested how PTSS varied across seven days and by weekday versus weekend within each PTSD group. PTSS varied across the seven days among participants with PTSD ( $p < .001$ ), but not among those without PTSD ( $p = .354$ ). In pairwise comparisons adjusted for multiple comparisons, PTSS was lower on Saturday than Monday through Thursday among participants with PTSD. There was no significant pairwise comparisons among participants without PTSD. Similarly, when comparing weekdays and weekends, PTSS were lower on weekends than weekdays among participants with PTSD ( $p < .001$ ), but not among those without PTSD ( $p = .085$ ). EMA of PTSS was well tolerated and many participants reported personal benefits from repeated assessment. Understanding the daily variation of PTSS will help us better assess and treat individuals with PTSD. Interventions may be targeted to days/times when symptoms are most critical. These findings suggest that changes in PTSS are related to daily activities. Further study using EMA methods to examine the temporal relationship between daily activities and changes in PTSS is indicated.

#### **Health Behaviors**

**Saturday, March 18 from 4:45 - 5:30 pm**

#### **Abstract 1396**

##### **PERSEVERATIVE COGNITION AND HEALTH BEHAVIORS: A SYSTEMATIC REVIEW AND META-ANALYSIS**

*Daryl B. O'Connor, PhD, Clancy Faye, MSc, Andrew Prestwich, PhD, Psychology, Lizzie Caperton, MSc, Health Sciences, University of Leeds, Leeds, West Yorkshire, UK*

Recent developments in stress theory have emphasized the significance of perseverative cognition (worry and rumination) in furthering our understanding of stress-disease relationships. Substantial evidence has shown that perseverative cognition (PC) is associated with somatic outcomes and numerous physiological concomitants have been identified (i.e., cardiovascular, autonomic and endocrine nervous system activity parameters). However, there has been no synthesis of the evidence regarding the association between PC and health behaviors. This is important given such behaviors may also directly and/or indirectly influence health and disease outcomes (triggered by PC). Therefore, the aim of the current review was to synthesise available studies that have explored the relationship between worry and rumination and health behaviors (health risk: behaviors which, if performed, would be detrimental to health; health promoting: behaviors which, if performed, would be beneficial for health). A systematic review and meta-analyses of the literature were conducted. Studies were included in the review if they reported the association between PC and health behavior. Studies identified in MEDLINE or PsycINFO ( $k = 7504$ ) were screened, of which 19 studies met the eligibility criteria. Random-effects meta-analyses suggested increased PC was generally associated with increased health risk behaviors but not health promoting behaviors. Further analyses indicated that increases in rumination, ( $r = .122$ ), but not reflection ( $r = -.080$ , or worry,  $r = .048$ ) were associated with health risk behaviors. In conclusion, these results

showed that increases in PC are associated with increases in health risk behaviors (substance use, alcohol consumption, unhealthy eating and smoking) that are driven primarily through rumination. These findings provide partial support for our hypothesis that in Brosschot and colleagues (2006) original perseverative cognition hypothesis, there may be scope for additional routes to pathogenic disease via poorer health behaviors.

#### **Abstract 1338**

##### **APPEARANCE CONCERNS BUT NOT HEALTH PROMOTION MOTIVATES FITBIT-ASSESSED PHYSICAL ACTIVITY BEHAVIOR IN MIDDLE-AGED AND OLDER WOMEN.**

*William K. Goodman, M.A., Ashley M. Geiger, M.A., Claire Elling, M.A., Reena Corvil, B.A. in progress, Eliana Bernstein, B.A. in progress, Jutta M. Wolf, Ph.D., Psychology, Brandeis University, Waltham, MA*

In western culture, emphasis is placed on a woman's appearance. Pursuing these societal ideals, women often exercise for physical attractiveness benefits. However, while primarily studied in younger women, little is known about exercise motivations in older females, nor how those motivations translate into physical activity (PA). Similarly, recent findings emphasize the mental health benefits of exercise behaviors, but little is known whether actual and/or self-reported PA is linked to depressive symptoms in middle and particularly older age.

80 women (59.16 +/-6.54 years) were assessed for PA motivations (physical appearance, weight management, health pressures, positive health / ill-health avoidance), depressive symptoms (CESD-R), physical activity (1 week Fitbit measurements), and self reported activity levels.

Cluster/correlation analysis identified physical appearance, weight management and health pressures as motivators to PA across all ages. Regressions (controlled for age) revealed appearance concerns motivated actual PA ( $B=134.38$ ,  $p=.034$ ), while self-reported PA was higher in those reporting more health pressures ( $B=-125.68$ ,  $p=.042$ ). Interestingly, at no age were health promotion and ill-health avoidance linked with Fitbit-measured or self-reported PA ( $p's>.57$ ). Lastly, neither actual ( $p=.52$ ) nor self-reported PA ( $p=.73$ ) predicted depressive symptom severity in middle or older age women. Instead, more weight management concerns was significantly linked with higher depressive symptoms independent of physical activity ( $B=-0.74$ ,  $p=.04$ )

Extending findings in younger adults, we observed that appearance, weight management and health pressures are important PA motivators in older female adults as well. However, only physical appearance predicted actual PA behaviors consistently across ages, while pro-health motivations were not significantly linked with actual PA at any age. These findings emphasize the dichotomy between health-related and appearance-related motivations for PA prevalent in western cultures, and negate the popular idea that appearance becomes less health relevant in older age. Interestingly, neither self-reported nor Fitbit-assessed PA were linked to depressive symptom severity. Instead, weight concern-related exercise motivation was linked with depressive symptoms, thus presenting a second age-independent health risk factor for women.

#### **Abstract 1490**

##### **WHICH EXERCISE OR BEHAVIORAL INTERVENTIONS ARE MOST EFFECTIVE FOR TREATING FATIGUE IN PEOPLE WITH MULTIPLE SCLEROSIS (MS)? A DETAILED SYSTEMATIC REVIEW WITH NETWORK META-ANALYSIS**

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**Background:** Fatigue is one of the most common and disabling symptoms of Multiple Sclerosis (MS). There are no recognised biomedical treatments for MS fatigue. Most patients' fatigue remains untreated. The aim of this study was to determine the most promising exercise and behavioral treatments for MS fatigue using a network meta-analysis of all relevant trials conducted to date.

**Methods:** All randomised and quasi-randomised controlled trials of exercise and behavioral interventions for MS with self-reported fatigue as outcomes were included. 17 databases were searched, papers hand-searched, and relevant authors contacted. Studies were screened and assessed for eligibility by two independent reviewers. Information was extracted according to Cochrane and TIDieR guidance and statistical data were double extracted. Effect sizes were expressed as standardised mean differences (SMD) between groups at the post-intervention assessment calculated as hedge's g. Statistical heterogeneity between study effect sizes was quantified using the I<sup>2</sup> statistic and funnel plots with Eggers test. The network meta-analysis was estimated using restricted maximum likelihood by the mvmeta command and network packages.

**Results:** 1880 abstracts and 227 full text articles were screened. 82 studies with a total of 179 treatment arms were included in the meta-analysis. Categories of similar interventions were created and compared (5 exercise, 6 behavioral, and 2 combined). SMD ranged from -0.07 (-0.33, 0.47) for resistive exercise to -0.61 (-0.85,-0.37) for exercise with more than one overload component and -.91 (-1.37, -0.45) for balance exercise. Cognitive behavioural therapy (CBT) was the most effective behavioral treatment (SMD=-.61; 0.85, -.37) with CBT for fatigue having higher estimates SMD=-.77 (-1.21, -.33) than CBT for distress SMD=-.56 (-.88, -.23). Combining behavioural and exercise programs showed no added benefits SMD=-.38 (-0.63,-0.13). Energy conservation studies had the highest level of evidence but SMD was small .26 (-0.54,0.02).

**Discussion:** Balance and exercise programmes with more than one overload/progression component and CBT for fatigue are the most promising interventions for MS fatigue. There was substantial heterogeneity within most groupings. Large clinical and cost effectiveness trials of these interventions are needed. (PROSPERO 2016:CRD42016036671).

#### **Irritable Bowel Syndrome and the Brain**

**Saturday, March 18 from 4:45 - 5:30 pm**

#### **Abstract 1498**

##### **RESTING STATE FUNCTIONAL CONNECTIVITY IN IRRITABLE BOWEL SYNDROME**

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**Introduction:** Resting-state functional magnetic imaging (rs-fMRI) investigates synchronous activations between regions of the brain that are spatially distinct and may provide the functional architecture in



health and diseases. The aim of the study was to characterize the resting-state functional connectivity in irritable bowel syndrome (IBS) using graph theoretical analysis.

**Methods:** The study included sex and age matched 35 IBS patients and 35 controls. The rs-fMRI data was pre-processed using SPM8. Forty five ROIs were defined based on the pain matrix and default mode network previously demonstrated. The time series of each ROI was extracted and partial correlations between the ROIs were calculated. Using graph analysis based on the Fisher r-to-z transformed partial correlations with a weighted network, the following network measures were computed: (1) node strength, which is number of the connections the node has. (2) the clustering coefficient, which is related to the connectedness of neighbouring nodes, (3) the average path length; a measure of global connectedness, which is the average length of the shortest connection between all pairs of nodes, (4) global efficiency, which is the inverse of the average shortest path, (5) between centrality, which is the fraction of shortest paths within the graph that pass through a node.

**Results:** There was a significant difference in IBS and controls in the partial correlation coefficient between right amygdala and left precuneus ( $p < 0.047$ , FDR corrected). The averaged node strength, normalized clustering coefficient, normalized path length, normalized global efficiency, and normalized between centrality were 8.985, 1.148, 0.778, 0.959, 1.03 for controls, and 8.89, 1.17, 0.567, 0.963, 1.002 for IBS group. Permutation test did not show significant difference between controls and IBS in any of the graph measures.

**Conclusion:** The global network measures by graph analysis were very similar between IBS and controls. However, local connectivity is significantly different between IBS group and controls. Studies indicate that the people with stress-related disorders (anxiety disorders and/or depression) show strong rsfMRI connectivity between amygdala and precuneus. Comorbidity of tendency of stress-related anxiety trait and depression may contribute to the stronger rsfMR partial connection in IBS group.

#### Abstract 1500

### IMPAIRED TOP-DOWN REGULATION TO HYPOTHALAMIC-PITUITARY-ADRENAL AXIS FROM THE PREGENUAL ANTERIOR CINGULATE CORTEX IN PATIENTS WITH IRRITABLE BOWEL SYNDROME

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**Introduction:** Stress is a known trigger of irritable bowel syndrome (IBS) and hyper-responsiveness of the Hypothalamus-pituitary-adrenal (HPA) axis has been reported in IBS patients. The aim of this study is to investigate the brain function associated with HPA axis responsiveness between controls and patients with IBS.

**Methods:** This study included age and sex matched 29 healthy controls and 26 IBS patients of non-constipated subtype. In the first experiment, corticotropin-releasing hormone (CRH) 2µg/Kg was administered intravenously during rectal barostat measuring gut motility. Plasma adrenocorticotrophic hormone (ACTH) and cortisol were examined from blood samples just before (0) and 15, 30, 60, and 120 min after CRH administration. In the second experiment, the blood oxygen level dependent (BOLD) signal response to mechanical rectal distension was measured among the same subjects by functional magnetic resonance imaging (fMRI). A whole-brain voxel-based analysis was conducted at a voxel-level threshold of  $p$  (FWE-corrected)  $< 0.05$ , which was adopted for the between-group regression analysis with individual area under the curve of ACTH response (ACTH-AUC).

**Results:** The increase in ACTH relative to pre-infusion time point was significantly higher in IBS patients compared to healthy controls subjects at 30 min after infusion ( $p = 0.04$ ). In cortisol response to CRH, a significant difference between groups in male subjects and male IBS patients had lower basal cortisol levels ( $p = 0.012$ ). In the brain fMRI study, a significantly greater negative association between ACTH-AUC value and BOLD response during rectal distention was observed in the bilateral pregenual anterior cingulate cortex (pACC) and right superior frontal gyrus in the control group versus the IBS group ( $p < 0.05$ , FWE-corrected).

**Conclusion:** Greater ACTH reactivity in IBS patients than in controls is consistent with previous reports. The hyper-reactivity may be related to upregulation of CRH receptor 1 in the anterior pituitary of IBS patients. Human neuroimaging studies and animal studies demonstrated that the medial prefrontal cortex (mPFC) and adjacent pACC regulate the function of the HPA axis in a top-down fashion. Our results suggest that mPFC/pACC top-down inhibitory regulation of the HPA axis is impaired in IBS.

#### Abstract 1337

### ALEXITHYMIC FAMILIES? HIGHER LEVELS OF ALEXITHYMIA IN ADOLESCENTS WITH INFLAMMATORY BOWEL DISEASE VS ADOLESCENTS WITH CYSTIC FIBROSIS

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**Introduction:** Several psychosomatic hypothesis have contributed on considering the Inflammatory Bowel Disease as psychosomatic diseases in which specific patterns of personality (alexithymia, symbolic poorness, negative affectivity, social inhibition, tendency to perfectionism), specific defense mechanisms and coping strategies (aimed at the removal and avoidance of emotional experience) (McCombie A.M., 2013). Some trigger events, associated with certain personality characteristics, could cause a difficulty of symbolic processing and the activation of neurophysiological circuits of the intestinal inflammation (Wood et al, 1987 and 1989).

**Aim:** The finality of the study is to compare the levels of alexithymia in adolescent patients (14-18 years), diagnosed with IBD (Inflammatory Bowel Disease), both Crohn's disease and Ulcerative Colitis, and their parents vs a control group of adolescent patients with cystic fibrosis (CF), matched for age and gender.

**Material and methods:** We used medical chart to collect meaningful clinical data of the patients such as CCDAI (Crohn's Disease Activity Index) PUCAI (Pediatric Ulcerative Colitis Activity Index), ongoing therapy, complications, comorbidities, etc. Furthermore we used BFQ-1 (Big Five questionnaire-1), CISS (Coping Inventory for stressful Situations), PSI (Parenting Stress Index) and TSIA (Toronto Structured Interview for Alexithymia). We enrolled a total of 232 subjects so divided: for the sample group, 41 patients with IBD diagnosis and 78 parents, and 39 patients with CF and 74 parents.

**Results:** We have found significant differences between the two group. Patients with IBD and their parents have higher levels of alexithymia than patients with CF and their parents. In the scores of the BFQ-1 we have found higher levels in the scale of *Scrupulousness* in the patients with IBD and higher levels of *Impulse Control* in the IBD's parents in comparison with CF' parents. Furthermore the levels of parent's stress are higher in IBD's parents. In the two groups there are not significant differences in the use of coping strategies.

**Conclusion:** The results show a strict link between alexithymia of IBD adolescents and their parents and specific psychological characteristics that could contribute to figure out the etiopathology of IBD.

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## Let's Be Positive

Thursday, March 16 from 5:00 - 6:00 pm

### Abstract 1323

#### THE INTERACTION BETWEEN STRESS AND POSITIVE AFFECT IN PREDICTING MORTALITY

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Objective: There are two mechanisms by which positive affect might influence mortality risk. Positive affect could impact directly on physiological and behavioural processes associated with good health; additionally, positive affect could protect against the health harming effects of psychological stress. If this second mechanism plays a role, then the association between high positive affect and longevity should be most apparent among individuals also reporting higher levels of stress. Here, we test this stress-buffering hypothesis.

Methods: The sample consisted of 8,542 participants aged 32-86 from the National Health and Nutrition Examination Survey Epidemiological Follow-up Study (NHEFS). We used Cox proportional hazards regression to test for an interaction between positive affect and stress in predicting mortality risk over a 10 year follow up period.

Results: the interaction between positive affect and stress was significant ( $p < 0.001$ ), we found a stronger association between positive affect and mortality risk in people reporting higher levels of subjective stress. This interaction remained significant following adjustment for demographic variables, health behaviours and depressive symptoms. In the fully adjusted model, a standard deviation increase in positive affect score was associated with a 16% (HR = 0.84; 95% CI = 0.75, 0.95) reduction in mortality risk among participants that reported high levels of stress. The association between positive affect and mortality risk was not significant among participants that reported low levels of stress (HR = 0.98; 95% CI = 0.89, 1.08).

Conclusion: Our results support the stress-buffering model of the association between positive affect and health. Positive affect may have the greatest impact on health among individuals that experience higher levels of stress.

### Abstract 1102

#### POSITIVE EMOTION VARIABILITY IS ASSOCIATED WITH CIRCULATING INFLAMMATORY MARKERS

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Emotional variability (EV; the extent to which individuals vary in emotional states over time) is associated with health-related indicators (e.g., global subjective health, diurnal cortisol, heart rate variability). EV has broadly been related to worse health indicators, with some indications that associations are stronger for men, older individuals, and positive emotion variability (PEV). Moreover, previous research has suggested a curvilinear relationship between EV and health, with both very high and very low EV relating to worse health indicators. In a diverse sample of participants (N=251; aged 25-65; 65% female; 62% Black; 25% Hispanic), we examined if PEV and negative emotion variability (NEV) exhibited linear or curvilinear associations with circulating inflammatory markers (IL-1 $\beta$ , IL-6, TNF- $\alpha$ , IFN- $\gamma$ , and CRP), and if age or gender moderated these associations. Emotional states were assessed using ecological momentary assessments (EMA) five times per day for two weeks, with a blood draw at the end of the EMA burst to assess inflammatory markers. Person average standard deviations of emotional states assessed in the second week of EMA were used to index EV. As emotion assessments proximal in time to the blood draw appear more robustly associated with inflammatory biomarkers, only week two emotion data was utilized. Marital status, income, ethnicity, BMI, and grand-mean centered emotion were covariates. There were no significant linear or curvilinear associations between NEV and biomarkers ( $p > .16$ ). PEV exhibited curvilinear (but no linear) associations with TNF- $\alpha$  and IFN- $\gamma$  ( $p < .05$ ), such that those with lower PEV and higher PEV exhibited higher TNF- $\alpha$  and IFN- $\gamma$ . Gender did not moderate NEV or PEV relationships. Age, however, interacted with linear PEV; for older adults, greater PEV was more robustly associated with greater IL-1 $\beta$ , IL-6, and TNF- $\alpha$  ( $p < .05$ ), and marginally greater IFN- $\gamma$  and CRP ( $p < .09$ ). These data are the first to our knowledge to suggest that PEV is associated with inflammation, and are consistent with emerging evidence that PEV, but not NEV, may be associated with indicators of poor health. These associations may be stronger for older participants. Because inflammation can contribute to and exacerbate chronic illnesses, future research should examine if PEV causally relates to inflammation and health outcomes.

### Abstract 1618

#### DISPOSITIONAL OPTIMISM AND DEPRESSIVE SYMPTOMS SHOW INDEPENDENT AND INTERACTIVE ASSOCIATIONS WITH INFLAMMATION

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Although low optimism is a diagnostic feature of depression, theory and clinical observation emphasize important distinctions. If indeed partly separable, this may imply that depression and low optimism could independently impact biology. A further implication is the possibility of interactive effects, e.g., whereby the biological impact of depression could be modified by optimism. To address these questions, the present study aimed to determine the independent and interactive effects of depressive symptoms and optimism on inflammation.

Analyses drew on a cross-sectional sample of 6,980 unselected primary care patients (41% male; mean age 57 years; range 18-90) attending GP practices throughout Germany (the DETECT-study). Health and life style data were collected through clinical examination and patient self-report. Dispositional optimism (LOT-R) and depression (DSQ) were also assessed. Plasma C-Reactive Protein (CRP) was used as a marker of inflammation. Regression models were adjusted for age, sex, SES, life style (alcohol, smoking, BMI), and physical health.

Depression and optimism showed the expected moderate association ( $B = -0.39$ ,  $p < .001$ ). Also in line with prior research, depression and optimism were each associated with inflammation, whereby patients in the highest depression or optimism quartile had, respectively, 23% higher or 18% lower CRP levels (as compared to the lowest quartile;  $p < .001$ ). Although mutual adjustment attenuated these associations, each parameter remained significantly ( $p < .005$ ) associated with inflammation: when added together the variance explained (delta-R<sup>2</sup>) was approximately 50% higher than the delta-R<sup>2</sup> for each parameter separately. Subsequently adding the interaction term to the model, which already included both main effects, contributed an equal amount of delta-R<sup>2</sup> ( $p < .001$ ) as the main-effects, i.e., cumulatively doubling the variance explained by depression and optimism.

In summary, higher depression and lower optimism independently accounted for individual differences in inflammation. Moreover, to our knowledge the present study is the first to demonstrate an additional interactive effect, whereby hopeful future expectations moderated inflammation among individuals with elevated depressive symptoms.

#### Abstract 1327

#### POTENTIAL MECHANISMS LINKING POSITIVE EMOTIONS AND HEALTH: IS PSYCHOLOGICAL WELL-BEING RELATED TO THE ADOPTION OF A HEALTHIER LIFESTYLE OVER TIME?

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**Methods:** Women from the Nurses' Health Study cohort who were free of chronic conditions at the time they reported levels of well-being were included in the analytic samples. Well-being was assessed in 1992 (happiness  $N = 38,054$ , mean age 56.7 years) and in 2004 (optimism  $N = 34,700$ , mean age 68.4 years). Health-related behaviors (i.e., exercise, body mass index, diet, alcohol consumption, smoking) were self-reported in 1992, and every 4 years until the last assessment available (2010). A composite measure of lifestyle was derived from these 5 health-related behaviors; the endorsement of recommended levels for  $\geq 4$  out of 5 healthy behaviors was categorized as a healthy lifestyle. Logistic regressions estimated the odds ratio (OR) and their 95% confidence intervals (CI) of reporting a healthy lifestyle at the end of follow-up. Models were adjusted for potential confounders (i.e., demographics, recent physical exam, anxiety and depression symptoms). Secondary analyses were stratified by baseline level of lifestyle (healthy vs. unhealthy).

**Results:** Compared to women with low levels of happiness, those with moderate and high levels had a 12% and 33% greater likelihood,

respectively, of reporting a healthy lifestyle 18 years later (OR=1.12, 95% CI=1.04-1.20 and OR=1.33, 95% CI=1.25-1.41). Similarly, women with moderate and high (vs. low) levels of optimism were 19% and 38% more likely, respectively, to report a healthy lifestyle 6 years later (OR=1.19, 95% CI=1.13-1.26 and OR=1.38, 95% CI=1.31-1.45). No interaction between baseline lifestyle and psychological well-being was evident ( $p_{\text{interaction}} > .05$ ), suggesting that the relationship of happiness and optimism with future lifestyle was similar regardless of women's baseline set of health behaviors. Associations remained significant, although somewhat attenuated, after controlling for anxiety and depression symptoms in the models.

**Conclusions:** In midlife women, both happiness and optimism were related to a greater likelihood of having a healthy lifestyle 6 to 18 years later, independent of levels of psychological distress and other potential confounders. Future clinical studies should investigate whether enhancing psychological well-being may truly lead to healthier lifestyles, in order to contribute to strategies aimed at preventing the development of cardiometabolic or other chronic diseases.

#### Metabolic Syndrome, Diabetes and Mental Health

**Friday, March 17 from 2:45 - 3:45 pm**

#### Abstract 1166

#### SOCIOECONOMIC STATUS AND PREVALENCE OF METABOLIC SYNDROME AND RISK FACTORS: THE HISPANIC COMMUNITY HEALTH STUDY/STUDY OF LATINOS (HCHS/SOL)

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Little is known about factors that contribute to Hispanics/Latinos having a disproportionately higher risk of the metabolic syndrome (MetSyn) than other race/ethnicity groups. Given that socioeconomic status (SES) has been inversely linked to MetSyn in other groups, we examined the association of SES with MetSyn and its components among Hispanic/Latino individuals of diverse backgrounds living in the US.

Participants were 14,029 individuals, comprising a community based cross-sectional probability sample derived from four U.S field centers [mean age: 41 years, 51% female]. SES proxy variables, income (income brackets), education (years of school completed), and employment status (full-time employed versus unemployed) were examined as individual independent variables, and as indicators of a latent variable. MetSyn was defined using 2009 harmonized guidelines. MetSyn components, waist circumference (cm), triglycerides (mg/dL), HDL-cholesterol (md/dL), systolic and diastolic blood pressure (mmHg), and fasting plasma glucose (mg/dL) were also examined individually as continuous dependent variables.

Multivariate regression analyses (adjusted for age, sex, field center, Hispanic/Latino background, nativity/length of residence in the U.S, and health insurance) revealed that higher income ( $OR = 0.96$ , 95% CI = 0.93-0.98,  $p < .001$ ), higher education ( $OR = 0.97$ , 95% CI = 0.96-0.98,  $p < .001$ ), and full-time employment versus unemployment ( $OR = 0.76$ , 95% CI = 0.67-0.85,  $p < .001$ ) were associated with decreased odds of having MetSyn, as was SES when examined as a latent variable

(OR = 0.91, 95% CI = 0.85-0.96,  $p < .001$ ). SES proxy and latent variables were associated in the expected directions with all MetSyn components ( $ps < .007$ ) except diastolic blood pressure. The association of income with MetSyn was found for women but not men ( $p = .002$ ), and those with but not without current health insurance ( $p = .003$ ), while the association of education with MetSyn was also found among women but not men ( $p = .009$ ).

Overall, higher SES is associated with a 4-24% decreased odds of having MetSyn among Hispanics/Latinos, with effect modification by sex and by health insurance status. Public health research and policy should increase focus on relationships among SES, women's health, health insurance, and improved diabetes prevention and cardiometabolic health.

#### **Abstract 1092**

##### **ETHNICITY AND EXCESS MORTALITY IN SEVERE MENTAL ILLNESS: A COHORT STUDY**

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**Background:** Excess mortality in severe mental illnesses [SMI] (schizophrenia-spectrum and bipolar disorders) is well described however little is known about this inequality in ethnic minorities.

**Objective:** To establish cause-specific mortality in an ethnically diverse cohort of individuals with SMI.

**Methods:** We identified a cohort of 25871 individuals with a valid SMI diagnosis (1st January 2007 to 31 December 2014), using a case-registry from a secondary mental healthcare provider covering 1.36 million people in the UK. All-cause and cause-specific mortality by ethnicity, standardised by age and gender to the population of England & Wales in 2012, was determined. Risk factors for mortality in SMI were assessed using regression methods.

**Findings:** There were 1,767 deaths within the cohort (14.6%). Compared to the general population, age and gender-standardised mortality ratios [SMRs] in the SMI population were high; Suicide: (SMR 7.65, 95% confidence interval [CI]:6.43-9.04), non-suicide unnatural-cause mortality: (SMR 4.01, 95%CI: 3.34-4.78), respiratory disease: (SMR: 3.38, 95%CI:3.04-3.74), cardiovascular disease: (SMR 2.65, 95%CI:2.45-2.86), neoplasms: (SMR 1.45, 95%CI:1.32-1.60). SMRs were broadly similar by ethnicity, although a lower SMR for neoplasm-mortality in the South Asian SMI group (SMR 0.49, 95%CI:0.21- 0.96) was evident.

Within the SMI cohort, Hazard Ratios for all-cause mortality were lower in most ethnic minority groups relative to the White British group; (taking the White British group with SMI as reference) adjusted Hazard Ratios (HRs) for mortality were: 0.67(95% CI 0.56, 0.81) (Black Caribbean); 0.43(95% CI: 0.30, 0.64)(Black African); 0.73(95% CI 0.51, 1.04) South Asian and 0.88(95% CI 0.62, 1.25)Irish ( $p < .001$ ) at 7 years+ follow up. There were similar trends by ethnicity for natural-cause and unnatural-cause mortality and associations persisted despite taking into account the possibility that ethnic minorities were more likely to migrate out of the cohort.

**Interpretation:** Relative to the general population, people with SMI experience excess mortality, irrespective of ethnicity. Within a cohort of people with severe mental illness, some ethnic minorities experienced reduced mortality compared to the reference White British

population. This may be due to socio-environmental factors which require further exploration.

#### **Abstract 1030**

##### **SPECIFIC SYMPTOMS OF DEPRESSION AND INCIDENT TYPE 2 DIABETES: RESULTS FROM THE EMOTIONAL WELL-BEING, METABOLIC FACTORS, AND HEALTH STATUS STUDY**

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Though depression is a well-established risk factor for type 2 diabetes (T2D), depression is a multifaceted construct and there is substantial heterogeneity in the reported strengths of association between depression and incident T2D. Examining individual depressive symptoms has recently been suggested as a way to better understand depression heterogeneity and health outcomes. For instance, individual depressive symptoms differ in their associations with functional impairment and inflammatory biomarkers. The goal of the present study was to explore the independent associations between specific depressive symptoms and the risk of incident T2D. This study was a secondary data analysis of the Emotional Well-Being, Metabolic Factors and Health Status Study and included 2521 adults aged 40-69 years without diabetes at baseline. Depressive symptoms were assessed with the Patient Health Questionnaire-9 (PHQ-9) and data on metabolic risk factors (hypertension, impaired glycaemic control, low high-density lipoprotein cholesterol, elevated triglycerides, and central obesity) were collected. Participants were queried about diagnosed T2D by telephone interview approximately 4.6 years after baseline. Analyses adjusted for age, sex, education, and marital status. A series of logistic regression analyses were first conducted to examine associations between each PHQ-9 item (range=0-3) and incident T2D in separate models, followed by analyses that additionally adjusted for the sum of the remaining PHQ-9 items. A final set of analyses additionally adjusted for metabolic factors. Results showed that although most symptoms were associated with incident T2D, the only association that remained after adjusting for overlap with other depressive symptoms was fatigue ("feeling tired or having little energy") (OR=1.50, 95% CI=1.17-1.92). This association also remained after additionally adjusting for metabolic risk factors (OR=1.34, CI=1.03-1.76). These results suggest that, although depression syndrome is a risk factor for T2D, fatigue seems to independently contribute most to this association. This effect does not seem to be solely due to metabolic risk factors. A better understanding of which symptoms contribute most to the depression-diabetes association can help identify who is at greatest risk and highlight which symptoms should be primary targets of preventive interventions.

#### **Abstract 1237**

##### **TYPE 2 DIABETES MELLITUS IN SEVERE MENTAL ILLNESS; INEQUALITIES BY ETHNICITY AND AGE. CROSS-SECTIONAL ANALYSIS OF 588,408 RECORDS FROM THE UK**

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**Aims:** The prevalence of type 2 diabetes mellitus (T2DM) is elevated in severe mental illness (SMI) however the nature of this association by ethnicity is less clear. The aim of this study is to investigate whether the association of SMI with T2DM varies by ethnicity and age.

**Methods:** Cross-sectional analysis of data from an ethnically diverse sample of 588408 individuals aged 18+years, registered to 98% of general practices (primary care) in London, United Kingdom. Outcome was prevalent T2DM.

**Results:** Relative to people without SMI, relative risk (RR) of T2DM in people with SMI was greatest in the youngest age groups. In the White British group this was RR: 9.99 (95% CI: 5.34, 18.69) at 18-34 years, 2.89 (95% CI: 2.43, 3.45) at 35-54 years and 1.16 (95% CI: 1.04,

1.30) at 55+ years, with similar trends across all ethnic minority groups. Additional adjustment for antipsychotic prescriptions only marginally attenuated associations. Assessment of estimated prevalence of T2DM in SMI by ethnicity (absolute measures of effect) indicated that the association between SMI and T2DM was more marked in ethnic minorities

**Conclusions:** Relative risk of T2DM is elevated in younger populations. Most associations persisted despite adjustment for antipsychotic prescriptions. Ethnic minorities had a higher prevalence of T2DM in the presence of SMI. Future research and policy, particularly with respect to screening and clinical care for T2DM in SMI populations, should take these findings into account.

#### NeuroImmunology

**Saturday, March 18 from 3:30 - 4:15 pm**

#### **Abstract 1235**

##### **ELEVATED THREAT-SENSITIVITY AND REDUCED REWARD-SENSITIVITY ASSOCIATED WITH INCREASED PERIPHERAL INFLAMMATION AMONG YOUNG ADULTS**

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**Objectives:** Elevated threat-sensitivity (i.e., neuroticism) and dampened reward sensitivity have both been linked with elevated inflammation – a known risk factor for mental and physical and health related problems. Research has yet to examine the nature of the relationship between threat and reward sensitivity in predicting inflammation. Drawing on existing research, the present study predicted that individuals with elevated threat sensitivity and attenuated reward sensitivity would be most likely to display elevated inflammation.

**Method:** One hundred and fifty-two participants aged 18 to 19 (female = 92) were drawn from an ongoing study of the relationship between threat- and reward-sensitivity and mental and physical health. Recruitment strategies were designed to maximize variance in both threat and reward sensitivity. Threat-sensitivity was assessed using the Eysenck Personality Questionnaire Neuroticism subscale, and reward sensitivity by the Behavioral Activation System (BAS) Total scale. To measure circulating inflammatory proteins, aspirated serum from an antecubital venipuncture was assayed in duplicate with MSD Meso Scale Discovery Human ProInflammatory 7-Plex Base Kits, and an inflammation composite score was computed from levels of IL-6, IL-8, IL-10, and TNFa. Age, gender, and ethnicity were included as covariates.

**Results:** In line with prediction, there was a significant interaction between self-reported threat- and reward-sensitivity in predicting inflammation ( $b = -1.27$ ,  $t = -1.95$ ,  $p < .05$ ), such that individuals with elevated neuroticism and reduced reward sensitivity displayed the highest levels of inflammation as indexed by a composite score.

**Conclusions:** The present study is the first to examine the relationship between threat- and reward-sensitivity in modulating peripheral inflammation. Results show that individuals with both elevated threat-sensitivity and reduced reward sensitivity display the greatest levels of peripheral inflammation. These results are in line with the recently developed Neuroimmune Network (NIN) model which proposes that elevated threat-sensitivity and attenuated reward-sensitivity facilitate self-medicating behaviors typically associated with elevated inflammation. Specific patterns across different domains of reward seeking patterns as well as changes in neuroticism over time will be discussed.

#### **Abstract 1374**

##### **EXPOSURE TO AN INFLAMMATORY CHALLENGE ENHANCES NEURAL SENSITIVITY TO NEGATIVE AND POSITIVE SOCIAL FEEDBACK**

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Inflammation, part of the body's innate immune response, can lead to "sickness behaviors," as well as alterations in social and affective experiences. Elevated levels of pro-inflammatory cytokines have been associated with increased neural sensitivity to social rejection and social threat, but also decreased neural sensitivity to rewards. However, recent evidence suggests that inflammation may actually enhance sensitivity to certain social rewards, such as those that signal support and care. Despite a growing interest in how inflammation influences neural reactivity to positive and negative social experiences, no known studies have investigated these processes in the same participants, using a similar task. To examine this issue, 107 participants were randomly assigned to receive either placebo or low-dose endotoxin, which safely triggers an inflammatory response. When levels of pro-inflammatory cytokines were at their peak, participants were scanned using fMRI while they received positive, negative, and neutral feedback from an "evaluator" (actually a confederate) about how they came across in an audio-recorded interview. In response to negative feedback (vs. neutral), participants in the endotoxin condition showed heightened neural activity in a number of threat-related neural regions (i.e., bilateral amygdala, dorsal anterior cingulate cortex) and a key mentalizing-related region (i.e., dorsomedial PFC), compared to placebo participants. Interestingly, when receiving positive feedback (vs. neutral), endotoxin (vs. placebo) led to greater neural activity in the ventral striatum and ventromedial PFC, regions often implicated in processing reward, as well as greater activity in dorsomedial PFC. Together, these results reveal that individuals exposed to an inflammatory challenge are more "neurally sensitive" to both negative and positive social feedback, suggesting that inflammation may lead to a greater vigilance for both social threats and social rewards.

#### **Abstract 1521**

##### **PRO- AND ANTI-INFLAMMATORY CHALLENGES DIFFERENTIALLY MODULATE AMYGDALA EMOTIONAL REACTIVITY AND PREDICT DEVELOPMENT/AMELIORATION OF DEPRESSIVE SYMPTOMS**

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**Background:** Inflammation is increasingly implicated in the aetiology of major depressive disorder (MDD). One in three patients receiving cytokine (Interferon- $\alpha$ : IFN- $\alpha$ ) based therapies for hepatitis-C develop depression. Conversely, cytokine blockade (with anti-TNF therapies) shows efficacy in MDD. Heightened amygdala reactivity to negatively valenced emotions is a hallmark of MDD. However, whether pro- (IFN- $\alpha$ ) and anti-inflammatory (anti-TNF) therapies predispose/ameliorate depressive symptoms through opposing actions on amygdala emotional-reactivity is currently unclear.

**Methods:** Utilising a prospective study design, we recruited 32 patients initiating IFN- $\alpha$  based therapy of Hepatitis-C and 32 patients initiating



anti-TNF therapies for inflammatory arthritis. All patients completed an emotional face-processing task during fMRI and blood sampling before and after initiating therapy (4 hours after their first IFN or 48 hours after first anti-TNF injection). All were then followed up with psychiatric assessments for 3-months of treatment.

**Results:** IFN- $\alpha$  significantly increased depression symptoms (HAMD) from 4 to 12 weeks ( $p < 0.001$ ) but not 4-hours after first dose ( $p > 0.1$ ). Conversely, anti-TNF was associated with a significant reduction in depressive symptoms ( $p < 0.002$ ) by 12 weeks of treatment. As anticipated, emotional face stimuli robustly activated the ventral visual stream, including bilateral fusiform face areas and amygdala regions of interest (ROI). Neither IFN- $\alpha$  nor anti-TNF had a significant effect on the visual processing pathway. However both significantly modulated amygdala reactivity with IFN- $\alpha$  selectively enhancing right amygdala responses to sad (compared to neutral) face stimuli (ROI FWE  $p = 0.037$ ) and anti-TNF conversely reducing right amygdala reactivity (ROI FWE  $p = 0.05$ ). Furthermore, acute changes in right amygdala reactivity to IFN- $\alpha$  additionally predicted increases in HAMD depressive symptoms at 4 weeks ( $p = 0.038$ ).

**Conclusions:** IFN- $\alpha$  and anti-TNF rapidly reorient amygdala reactivity to emotionally valenced information, an action that predicts the subsequent development of depressive symptoms following IFN- $\alpha$ . Together, these data identify a common brain-based mechanism through which peripheral inflammation and anti-inflammatory predispose to or ameliorate depressive symptoms.

#### Neuroscience

Saturday, March 18 from 4:45 - 5:30 pm

##### Abstract 1525

#### CROSS-SECTIONAL AND LONGITUDINAL ASSOCIATIONS BETWEEN BLOOD PRESSURE AND HIPPOCAMPAL VOLUME.

Annie T. Ginty, PhD, Psychology and Neuroscience, Baylor University, Waco, Texas, Peter J. Gianaros, PhD, Matthew Muldoon, MD, MPH, Psychology, Howard Aizenstein, MD, PhD, J. Richard Jennings, PhD, Psychiatry, University of Pittsburgh, Pittsburgh, PA

**Background:** Both hypertension and hippocampal atrophy have been associated with cognitive deterioration and the development of Alzheimer's disease. However, the association between hypertension and hippocampal atrophy is complex. Some studies have found hypertension, or high blood pressure (BP), to associate with reduced hippocampal volume, while others have found no relationship. Longitudinal research suggests hypertension itself is a risk factor for hippocampal atrophy, yet there is little direct evidence that changes in BP over time predict changes in hippocampal volume. **Aim:** Test whether increased BP relates to reduced hippocampal volume both cross-sectionally and longitudinally. **Methods:** Participants were midlife adults meeting the criterion of untreated pre-hypertension ( $N = 154$ , mean age = 49 years, 45% male). At enrollment and 2 years later (time 1, time 2), participants had resting, seated systolic (SBP) and diastolic (DBP) BP measured (4 readings over 2 days and the average derived) and underwent a structural magnetic resonance imaging scan. Grey matter volumes were processed and calculated using semi-automated methods (Wu et al., 2006). Cross-sectional analyses tested whether mean SBP and/or DBP over 2 days related to hippocampal volume. Analyses controlled for age, gender, income, body mass index, and whole brain volume at the given time. Longitudinal analyses examined if the change in SBP and/or DBP over the 2-year period predicted hippocampal volume at time 2 and controlled for the same covariates with the addition of hippocampal volume at time 1. **Results:** There were no associations cross-sectionally between SBP or DBP and hippocampal volume at either time 1 or time 2. However, the change in SBP between time 1 and time 2 was significantly related to hippocampal volume at time 2 (standardized  $\beta = -.082$ ,  $p = .030$ ), as were DBP changes, (standardized  $\beta = -.155$ ,  $p = .048$ ). Specifically, an

elevation in BP over a 2-year period was associated with a greater decrease in hippocampal volume over the same time. **Conclusions:** While previous research has focused on whether or not a participant has a diagnosis of hypertension, this work suggests the actual magnitude of BP change may be related to hippocampal atrophy. Future research should examine the functional consequences of these BP-brain tissue associations on cognitive and other age related outcomes.

##### Abstract 1546

#### EMOTIONAL PROCESSING IN SUPPORTIVE MARRIAGES: INCREASED AMYGDALA ACTIVATION IN AN FMRI INVESTIGATION

Erin Kaseda, N/A, Neuroscience, Wendy C. Birmingham, PhD, Christopher B. Kirwan, PhD, Spencer J. Nielson, BS, Psychology, Malia Anderson, PhD, Neuroscience, Zachary Blackhurst, BS, Sean Aaron, BS, Scott R. Braithwaite, PhD, Psychology, Brigham Young University, Provo, UT

**Background:** Marital relationships are not always specifically positive or negative but may contain both high levels of positivity and high levels of negativity (ambivalent). Such relationships may not have the same positive influence on health as those which are high in positivity and low in negativity (supportive). Vagal pathways which dampen the fight/flight response of the limbic system may react differentially in supportive and ambivalent relationships. The current study examined the impact of perceived supportiveness or ambivalence in marital quality on the responsiveness of the neural pathways of the limbic system.

**Method:** 22 married participants aged 22-39 ( $M = 28$ ;  $N = 10$  female, 12 male) completed surveys and participated in a video-recorded discussion conflict task with their spouse. Within 48 hours, structural and functional MRI images were obtained as each participant watched a rotating video of the discussion task (30 seconds) spliced with neutral stimuli (30 seconds). Functional data was analyzed for amygdala and hippocampus activation. Exclusionary criteria included health factors that may have altered neural activation patterns.

**Results:** Participants were mostly educated, middle-income, and white (82%). Defining the amygdala as our ROI, we quantified activation and dichotomized individuals into supportive and ambivalent groups based on self-reported responses. We found a significant difference in functional activation ( $p = 0.01$ ) in the right amygdala while viewing the conflict task in individuals with supportive relationship quality versus those with ambivalent relationship quality, such that amygdala activation during the conflict task was higher for those reporting supportive relationship quality. Right hemisphere amygdala activation is associated with control over emotion.

**Conclusions:** Previous studies have implicated increased amygdala activation in the emotional processing of complex stimuli, and that emotional conflict leads to amygdala activation. Our finding of reduced amygdala activation in individuals who perceive their spouse as ambivalent could indicate attenuation to spousal conflict and decreased emotional conflict resolution which could impact marital processes such as intimacy and disclosure. This decreased activation may have long term health consequences from emotional numbing, including an increased risk for depression and anxiety.

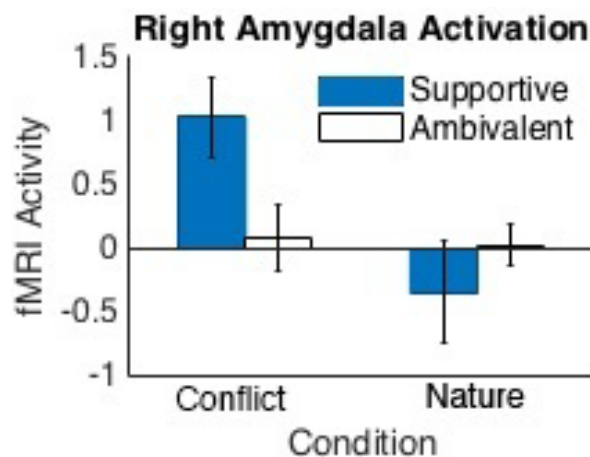
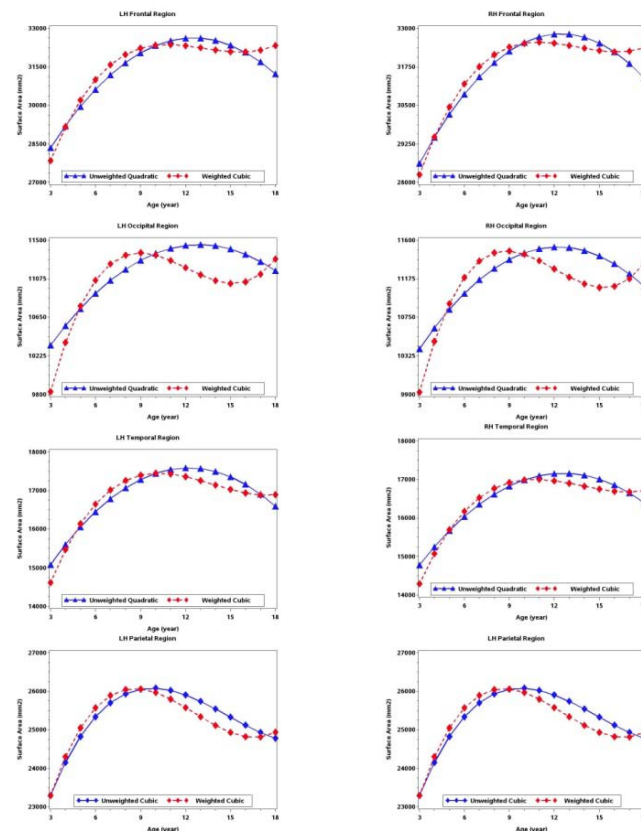


Table 1. Age at peak volume and cortical surface area for each model in the unweighted and weighted data, and the difference in peak age between the two models.

	Age at peak (Unweighted)	Age at peak (Weighted)	Difference in age at peak (unweighted - weighted)
<b>Total Cortical Surface Area Measures</b>			
Total Surface Area	11.0	9.7	1.3
Total Surface Area (L)	11.0	9.7	1.3
Total Surface Area (R)	11.0	9.7	1.3
<b>Cortical Surface Area Measures by Lobe</b>			
Occipital Lobe (L)	12.9	9.0	3.9
Occipital Lobe (R)	12.3	8.8	3.5
Parietal Lobe (L)	9.8	8.6	1.2
Parietal Lobe (R)	9.7	8.6	1.1
Temporal Lobe (L)	12.2	10.2	2
Temporal Lobe (R)	12.6	10.7	1.9
Frontal Lobe (L)	12.5	10.8	1.7
Frontal Lobe (R)	12.5	11.0	1.5
<b>Total Cortical Volume Measures</b>			
Total Cortical Volume	6.8	6.8	0
Total Cortical Volume (L)	6.8	6.8	0
Total Cortical Volume (R)	6.9	6.8	0.1

(L) - Left hemisphere  
(R) - Right hemisphere  
\*Thickness areas not included because best fitting models in both datasets were effectively linear and declining over time consistent with prior research.

Figure 1. Predicted values for cortical surface area in unweighted (blue) and weighted (red) models.



## Abstract 1404

### THE REPRESENTATIVE DEVELOPING BRAIN: DOES SAMPLING STRATEGY MATTER FOR NEUROSCIENCE AND WHAT ARE THE IMPLICATIONS FOR STUDIES INTEGRATING THE SOCIAL AND BIOLOGICAL?

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Introduction: Most neuroimaging studies rely on small, non-representative samples. Samples that do not represent a target population (e.g., sampling undergraduates when the target population is healthy adults) can introduce bias and limit generalizability of findings. We examine whether sample composition influences how brain structure varies with age. Methods: Structural MRI data from a large sample of typically developing children aged 3-18 (N=1,208) were analyzed to generate cortical area and thickness measures for the frontal, parietal, occipital, and temporal lobes, as well as for total cortical thickness, area, and volume. To approximate associations of age with brain structure in a representative sample, we applied an epidemiologic method called raking to weight the sample according to the distributions of socioeconomic status (SES), race, and sex in the U.S. Census. We compared associations between age and brain structure in this weighted sample to those in the unweighted original sample, adjusting for sex, race, SES, and scanner type. The modeling strategy applied to both samples was identical and used AIC to determine whether a linear, quadratic, or cubic term for age provided the best fit. We graphed predicted values for each final model and calculated age at peak area where applicable. Results: The unweighted sample had higher SES than the U.S. population. Compared to unweighted models, we observed pronounced differences in the relationship between age and cortical surface area indicating a more complex functional form (cubic versus quadratic- Figure 1) and an earlier age at peak area (0-3.9 years) in weighted models (Table 1). The largest differences were observed for the occipital and temporal lobes. Notably, weighted models more closely reflected broad understanding of brain development progression, which generally follows a back-to-front pattern of maturation. Conclusion: Our results suggest even large, community-based studies are unlikely to reflect the distributions of socio-demographic characteristics of the U.S. population if no explicit sampling strategy is applied. Our empirical study indicates that sample composition is likely to have a meaningful impact in many cognitive neuroscience studies. We explore broader implications for studies of biological mechanisms linking psychosocial factors and health in community-based samples.

## Obesity, the Brain and the Environment

Thursday, March 16 from 3:30 - 4:30 pm

## Abstract 1636

### OBESITY IS ASSOCIATED WITH AGE-RELATED HIPPOCAMPAL VOLUME REDUCTION

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**Background:** Recent research in rodents has shown that, over time, obesity may lead to impairments in hippocampal function, which are linked to cognitive deficits. However, little is known about these effects in humans. We sought to understand how obesity might affect hippocampal volume and cognitive function in a sample of Veterans. **Methodology:** Hippocampal volumes were obtained from structural MRI images using Freesurfer segmentation processing. Using multiple regression models, we regressed the volume of the hippocampus and its subfields on an interaction between age and body mass index (BMI), while adjusting for intracranial volume and the presence of post-traumatic stress disorder and depression. **Results:** The sample consisted of predominantly male Veterans with a range of ages ( $N=110$ , mean age = 45.32, SD = 10.04, 94 males). Findings revealed that hippocampal volume was predicted by an interaction between age and BMI ( $p<.05$ ). Follow-up analyses showed reduced left hippocampal volume among older individuals in the obese group. Similar effects were found in left hippocampal subfields including the CA4, DG, subiculum, and pre-subiculum (all  $p's<.05$ ). Expected deficits in hippocampal-dependent delayed memory task performance were observed in older adults ( $p<.05$ ). However, these cognitive deficits were not related to obesity. **Conclusion:** Obesity may be associated with an accelerated volume reduction in hippocampal structures with age, although the implications for cognitive function remain unclear.

#### Abstract 1349

##### **THE RELATIONSHIP OF FOOD INSECURITY WITH OBESITY AND DIABETES IN A LOW-INCOME, MIGRANT COMMUNITY ON THE U.S.-MEXICO BORDER**

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Prevalence of obesity and type 2 diabetes are increasing rapidly worldwide. Food insecurity, the limited or uncertain access to adequate nutritious food, is associated with obesity in women in the U.S. and Mexico. Migrants and other low-income individuals living near international borders are at elevated risk for both food insecurity and chronic cardiometabolic conditions due to poor access to medical care, disrupted employment, psychological stress, and lack of family and social support. This study explored associations of self-reported food insecurity with clinically measured diabetes and obesity prevalence in a convenience sample of individuals seeking free medical care in Tijuana, Mexico in 2016. Participants were 140 Hispanic/Latino adults  $\geq 18$  years old who spoke Spanish or English. Overweight and obesity were defined as a body mass index (BMI) of  $\geq 25$  and  $\geq 30$ , respectively. Diabetes status was determined by point-of-care hemoglobin A1c (HbA1c) test value over 6.5%. Participants were categorized as food secure, mildly food insecure, or severely food insecure during the prior year, per the validated U.S. Department of Agriculture (USDA) 6-item scale. Participant mean age was 46.7 years (SD = 12.3) and 72.3% were male. The majority (73%) reported history of migration to the U.S., 57.4% reported at least one experience of deportation out of the U.S., and 36.2% reported intent to migrate to the U.S. in the next year. Prevalence of diabetes was 14.3%; 41.4% of participants were overweight, and 17.1% were obese. Prevalence of mild and severe food insecurity was 27.7% and 58.9%, respectively. Adjusting for age and sex, participants with severe food insecurity were over 2.5 times as likely to be obese (AOR = 2.7; 95% CI: 1.1 – 7.1) compared to those who were food secure or mildly food insecure.

Women with severe food insecurity were over 7.5 times as likely to have diabetes (AOR = 7.8; 95% CI: 1.0 – 58.1) versus women with mild or no food insecurity. Food security is a prevalent and potentially modifiable determinant of cardiometabolic risk in migrants living along the U.S.-Mexico border. Interventions that increase access to regular and nutritious foods in migrants, especially women, may reduce risk for obesity and diabetes and decrease individual and public health costs in migrants' home and destination countries.

#### Abstract 1180

##### **PARENT PERCEPTION AND CHILDHOOD WEIGHT GAIN: PSYCHOLOGICAL, BEHAVIORAL, AND PHYSIOLOGICAL MECHANISMS**

*Angelina R. Sutin, PhD, Behavioral Sciences and Social Medicine, Florida State University College of Medicine, Tallahassee, FL*

Many children who measure in the overweight body mass index (BMI) category are perceived by their parents to be of normal weight. This misperception is thought to contribute to the prevalence of childhood overweight and obesity because it is argued that parents first need to be aware of their child's weight status to intervene effectively. Parental perceptions of their child as overweight or obese, however, may be more damaging than protective. Using a large longitudinal sample ( $N=3,557$ ), we show that parent perception of child overweight at age 4 was associated with greater child weight gain between the ages of 4 and 12, an association that replicated in an independent sample of children ( $N=5,886$ ) measured at ages 9 and 13. In both samples, this association was mediated by the child's own perception of weight and dieting behavior: Children whose parents perceived them as overweight were subsequently more likely to perceive themselves as overweight and engage in more weight loss attempts, which partly explained the association between parent perception and childhood weight gain. In a large cross-sectional sample ( $N=4,988$ ), we further show that parent perception of overweight was associated with higher child c-reactive protein (CRP), an inflammatory marker associated with weight gain. The association between parent perception and child CRP was independent of the child's BMI, waist circumference, and relevant socio-demographic factors and suggests a physiological mechanism may also contribute to the relation between parent perception and childhood weight gain. Overall, the present research suggests that parent perception of child overweight is more harmful than protective and that psychological, behavioral, and physiological mechanisms may contribute to this association.

#### Abstract 1458

##### **WHEN KNOWING HURTS: SELF-PERCEIVED OVERWEIGHT PREDICTS FUTURE PHYSICAL HEALTH AND WELL-BEING**

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Large scale personalized weight feedback programmes have been designed to increase awareness of overweight and prompt weight loss. However, self-identification as being 'overweight' may be counter-intuitively associated with adverse health outcomes. Here we sought to identify whether perceived overweight is prospectively associated with worse health 7 years later. Participants were 3,582 adults drawn from the US National Longitudinal Study of Adolescent to Adult Health (Add Health) and followed up from 2001/2002 to 2008/2009. Health status was evaluated using a measure of self-reported health and a measure of overall physiological dysregulation derived from a set of well-established clinical indicators of cardiovascular, inflammatory and metabolic functioning. Depressive symptoms were assessed using the Center for Epidemiological Studies Depression Scale (CES-D). Perceived overweight predicted longitudinal declines in subjective

health ( $d = -0.22$ ,  $p < .001$ ), increases in depressive symptoms ( $d = 0.09$ ,  $p < .05$ ), and raised levels of physiological dysregulation ( $d = 0.24$ ,  $p < .001$ ) 7 years later. Weight gain partially mediated the long-term prospective association between self-identification as overweight and health status as gauged by physiological dysregulation and participant perceptions of physical health (see Table 1). These effects remained strong after controlling for a range of potential confounders including baseline body mass index (BMI) and were observed irrespective of whether self-perceptions of overweight were accurate or inaccurate. The present research suggests that self-identification as overweight may act independently of BMI to contribute to unhealthy profiles of physiological functioning and impaired health over time. These findings underscore the importance of evaluating whether weight feedback interventions may have unforeseen adverse consequences.

*Table 1. Self-Perceived Overweight Predicting Subsequent Physiological Dysfunction and Changes in Self-Rated Health and Depressive Symptoms.*

	Physiological Dysfunction (z-score)	Self-rated health (z-score)		Depressive symptoms (z-score)	
		+ Weight gain	+ Weight gain	+ Weight gain	+ Weight gain
Perceived overweight	.24*** (.04)	.13*** (.03)	-.22*** (.04)	-.18*** (.04)	.09* (.04)
Age	.03*** (.01)	.04*** (.01)	-.02* (.01)	-.02** (.01)	.03*** (.01)
Sex (female)	-.52*** (.03)	-.49*** (.03)	-.06 (.03)	-.07* (.03)	.16*** (.03)
White	.01 (.03)	.06* (.03)	.18*** (.03)	.16*** (.03)	-.12*** (.04)
Education	-.04*** (.01)	-.03*** (.01)	.07*** (.01)	.07*** (.01)	-.07*** (.01)
Income	-.00 (.00)	.00 (.00)	-.00 (.00)	-.00 (.00)	-.00 (.00)
Limiting condition	.07* (.04)	.09** (.03)	-.05 (.04)	-.06 (.04)	.07 (.04)
BMI baseline	.07*** (.00)	.07*** (.00)	-.01*** (.00)	-.02*** (.00)	-.00 (.00)
Weight gain <sup>a</sup>	—	.10*** (.00)	—	-.04*** (.00)	-.00 (.00)
Self-rated health	—	—	.39*** (.02)	.38*** (.02)	—
Depressive symptoms	—	—	—	.10*** (.00)	.10** (.00)

*Note.* There were 3,582 participants, 2,017 women & 1,565 men. Standard errors are included in parentheses. <sup>a</sup>Weight gain is BMI at baseline subtracted from BMI at follow-up. \*  $p < .05$ . \*\*  $p < 0.01$ . \*\*\*  $p < .001$ .

## Psycho-oncology

Friday, March 17 from 2:45 - 3:45 pm

### Abstract 1328

#### BEING HAPPY AND EXPECTING THE BEST: IS PSYCHOLOGICAL WELL-BEING ASSOCIATED WITH FUTURE CANCER RISK?

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**Methods:** Women from the Nurses' Health Study cohort who were free of cancer (except non-melanoma skin cancer) at the time they reported levels of well-being were included in the analytic samples. Well-being was assessed with a measure of happiness in 1992 ( $N=67,358$ , mean age 58.1 years) and a measure of optimism in 2004 ( $N=58,867$ , mean age 69.3 years). Relevant cancer-related risk factors, including demographics, health status (e.g., body mass index, oral contraceptive use), and health behaviors (e.g., smoking) were self-reported or taken

from medical records. A study physician, blinded to the study aims, reviewed medical records of women who reported a cancer diagnosis to confirm new cases. Cox proportional hazards regression models were used to estimate hazard ratios (HR) and 95% confidence intervals (CI) of incident cancer risk over the course of follow-up (until 2012; 8 to 20 years of follow-up) and included adjustment for baseline potential confounders. Sensitivity analyses also controlled for symptoms of anxiety and depression. Secondary analyses will investigate the same models in relation to specific cancer sites (e.g., breast, colorectal, gynecological, lung).

**Results:** There were 11,752 and 4,756 new cancer cases documented over the course of follow-up in the happiness and optimism samples, respectively. Women who reported moderate or high levels of happiness did not have a significantly lower cancer risk, compared to those with a low level ( $HR_{\text{moderate}}=1.03$ , 95% CI=0.99-1.07;  $HR_{\text{high}}=1.02$ , 95% CI=0.95-1.10). Similar results were obtained with levels of optimism ( $HR_{\text{moderate}}=1.06$ , 95% CI=0.99-1.14;  $HR_{\text{high}}=1.06$ , 95% CI=0.99-1.14). Associations remained null after further adjustment for anxiety and depression symptoms.

**Conclusions:** In midlife women, happiness and optimism were not significantly related to risk of developing cancer up to 8 to 20 years later. This may reflect a true null association; it is also possible that the influence of well-being on cancer risk occurs earlier in life. In fact, 15,062 and 29,963 women were diagnosed with cancer before the 1992 and 2004 baselines, respectively, and were thus excluded from these analyses. Other facets of well-being, such as life satisfaction, should also be considered in relation to cancer risk. Finally, studying specific cancer sites may provide further insight given the heterogeneity of this disease.

### Abstract 1410

#### NIGHTTIME DISTRESS AND INTERLEUKIN-6 IN EXPLAINING THE RELATIONSHIP BETWEEN ADJUVANT CHEMOTHERAPY AND SLEEP LATENCY IN MALIGNANT POST-SURGICAL GYNECOLOGIC ONCOLOGY PATIENTS

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**Introduction:** Sleep disturbances (e.g. prolonged sleep latency, wake after sleep onset) are prominent concerns for oncology patients, particularly those obtaining chemotherapy. Studies have examined psychological (e.g. distress, depression) and biological factors associated with sleep, yet few have examined potential mechanisms between adjuvant chemotherapy and objective sleep in patients with gynecologic malignancies. Part of a larger randomized controlled trial, the current study sought to examine whether greater post-surgical nighttime distress and greater interleukin-6 (IL-6) mediated a potential relationship between receipt of adjuvant chemotherapy and longer sleep latency among gynecologic oncology patients.

**Methods:** Participants consisted of 48 women ( $M\text{ age}=59.06\text{yrs}$ ,  $SD=11.42$ ) with clinically significant sleep disturbances, who underwent surgery for confirmed gynecologic malignancy. Receipt of adjuvant chemotherapy was abstracted via medical records. Nighttime distress was captured through sleep diaries. Inflammation was measured via post-surgical blood draw assayed for serum concentration of IL-6. Sleep latency was assessed via one-night home polysomnography.

**Results:** Path analysis, controlling for age, was conducted examining relationships among chemotherapy, nighttime distress, IL-6, and sleep latency using IBM® SPSS® Amos 24.0. The final path displayed good model fit ( $\chi^2(4)=.690$ ,  $p=.953$ ,  $NFI=.980$ ,  $CFI=1.000$ ,  $RMSEA=.000$ ), explaining 33% of variance in sleep latency. Standardized direct effects of chemotherapy on IL-6, distress, and sleep latency were  $-.19^a$ ,  $.36^b$ , and  $.19^a$ , respectively. Direct effects of distress on IL-6 and sleep

latency were .48<sup>b</sup> and .33<sup>b</sup>, respectively. The direct effect of IL-6 on sleep latency was .15<sup>a</sup>. Significance could not be calculated due to missing data.

**Conclusion:** Results aid in understanding the complex relationship between receipt of adjuvant chemotherapy and prolonged sleep latency among gynecologic oncology patients, highlighting both direct (chemotherapy) and indirect (distress and IL-6) effects. Given the medium-large effect between distress and IL-6 and the relatively strong relationship with prolonged sleep latency, psychological interventions should consider targeting nighttime distress in improving sleep and inflammation in gynecologic oncology patients.

<sup>a</sup> Small-medium effect size.

<sup>b</sup> Medium-large effect size.

#### Abstract 1151

##### AN INDEX OF VAGAL NEUROIMMUNO-MODULATION PREDICTS LONGER SURVIVAL IN TWO FATAL CANCERS

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**Purpose:** The vagus nerve may slow tumor progression possibly since it inhibits inflammation. This study examined the relationship between a vagal neuroimmuno-modulation (NIM) index and survival in two fatal cancers.

**Method:** Sample 1 included 202 patients with advanced pancreatic cancer (PC), while sample 2 included 71 patients with non-small cell lung cancer (NSCLC). We retroactively derived markers of vagal activity indexed by heart-rate variability (HRV), specifically RMSSD, from patients' electrocardiograms near diagnosis. In sample 1 we examined overall survival while in sample 2, we focused on survival time in deceased patients. The NIM-index was the ratio of RMSSD to C-reactive protein levels (RMSSD/CRP).

**Results:** In a multivariate cox regression, controlling for confounders (e.g., metastasis location), the NIM-index had a protective relative risk (R.R) and 95% confidence interval (95% CI) of R.R = 0.65, 95% CI: 0.52-0.80,  $p < 0.001$  in PC. PC patients with higher NIM survived 106.6 days compared to those with lower NIM (51.05 days,  $p < 0.001$ ). In NSCLC patients, the NIM-index was positively correlated with survival time ( $r = 0.32$ ,  $p < 0.01$ ), independent of confounders (e.g., age, treatments). Again, patients with higher NIM survived more days (475.2) than those with lower NIM (285.1;  $p < 0.05$ ).

**Conclusion:** These results show that a NIM-index, which considers vagal modulation of inflammation, predicts longer survival in patients with two fatal cancers. The results help to understand neuro-modulation of tumors, provide a new estimation of prognosis and propose testing the effects of vagal nerve activation methods on cancer patients' prognosis.

#### Abstract 1156

##### WEB-BASED STEPPED COLLABORATIVE CARE INTERVENTION IN THE ONCOLOGY SETTING: LESSONS LEARNED FROM THE PILOT STUDY AND ADVANCES IN TECHNOLOGY

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**Background:** According to the NIH consensus statement the three most common and debilitating cancer related symptoms are pain, fatigue, and depression. Several barriers exist for socioeconomically disadvantaged patients in the palliative care setting to reduce these symptoms and improve quality of life at the end of life.

**Methods:** A total of 271 advanced cancer patients and their spousal/intimate partners were enrolled in the pilot study and 450 advanced cancer patients and spousal/intimate partner dyads are currently being enrolled in the larger scale multisite trial at six sites. Patient outcomes included pain, fatigue, depression, quality of life, and cytokines (i.e., Interleukin (IL)-1 alpha IL-1 beta, IL-2, TNF alpha, IFN gamma, IL-10), and survival. Caregiver outcomes included stress, depression, quality of life as well as biomarkers of inflammation and cardiovascular risk factors.

**Results:** Large effect sizes were observed in patients with clinically significant levels of symptoms on measures of depression, pain, and quality of life in the pilot study. Small to medium effect sizes were observed for biomarkers of inflammation as a result of the pilot study. Although not statistically significant, patients in the intervention arm survived four months longer when compared to patients in the usual care arm. Patient quality of life and depressive symptoms predicted caregiver stress and depression over time. We will describe how the findings of the pilot study and advances in technology are integrated in the new trial. Changes in the website (e.g., layout, interactive CBT tools, use of text-to-voice, audio-visual platforms); inclusion of a web-based trials management system (RedCap); the use of electronic progress notes to assess intervention fidelity (ACCESS); and the use of Vidyo, a HIPAA complaint videoconferencing tool, will be employed to the next iteration of this collaborative care intervention in the oncology setting.

**Conclusions:** Stepped collaborative care interventions are beginning to be employed in the oncology setting. The use of technology complements and extends the scalability of these interventions.

#### Racial Discrimination

Thursday, March 16 from 3:30 - 4:30 pm

#### Abstract 1411

##### PROSPECTIVE HEALTH CONSEQUENCES OF SOCIOECONOMIC DISADVANTAGE ACROSS THE LIFE SPAN: THE MEDIATING ROLES OF DISCRIMINATION AND UNFAIR TREATMENT

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**Background:** Gradients in health as a function of social class or socioeconomic disadvantage are a well-documented phenomenon, evident in most societies around the world (Adler & Rehkopf, 2008). Several explanations for the link between socioeconomic disadvantage and health have been examined, including neighborhood quality, health literacy, and subjective social status (Matthews & Gallo, 2011). However, unfair treatment and discrimination have received considerably less attention. This is surprising given that elitist mentalities and pervasive negative stereotypes about the poor are well documented and play a central role theories of social stratification (Bourdieu, 2003; Fiske, 2010; Sennett & Cobb, 1993). Focusing on a national sample of adults, the objective of the current study was to examine the mediating roles of unfair treatment and discrimination in the prospective association between socioeconomic disadvantage and self-rated health.

**Methods:** Participants in the third wave of the Midlife in the United States (MIDUS) study were included in longitudinal analyses



considering the role of unfair treatment in the association between socioeconomic disadvantage and self-rated health over an 17-19 year period (N=2720; 55% female; Mean Age at T1=46 years, SD=11). Two measures of unfair treatment—everyday discrimination and perceived inequality in work—were considered as mediators, and age was considered as a moderator.

**Results and Conclusions:** Socioeconomic disadvantage at the baseline assessment was associated with self-rated health 17-19 years later, controlling for self-rated health at T1 and demographic covariates ( $B = -.15, p < .001$ ). Both measures of unfair treatment significantly mediated this longitudinal association, in total explaining 25% of the effect. With respect to age moderation, partial support was found for the hypothesis that, at younger ages, socioeconomic disadvantage is more strongly associated with unfair treatment, and unfair treatment is more strongly associated with self-rated health. Overall, findings suggest that unfair treatment is an important explanatory variable in the link between socioeconomic disadvantage and health. Furthermore, age moderation findings suggest that future efforts to mitigate the harmful effects of social class discrimination may be most effective if focused on the first half of the life span.

#### **Abstract 1526**

#### **POSITIVE ASSOCIATION BETWEEN SELF-REPORTED DISCRIMINATION AND HEART RATE VARIABILITY DURING A RACISM RECALL TASK: PRELIMINARY EVIDENCE FOR THE COMPENSATION HYPOTHESIS**

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Researchers have long hypothesized that the autonomic nervous system is an important pathway connecting the experience of racial discrimination to poorer health among African Americans. Recent evidence suggests that heart rate variability (HRV), an important biomarker of both physical and mental health, may play an important role in buffering the deleterious effects of racial discrimination. In the current study we present preliminary data supporting the hypothesis that higher HRV among African Americans, and other non-US Black populations, may reflect a compensatory mechanism arising from more frequent exposure to racial discrimination. Blood pressure (BP) and heart rate (HR) data were obtained for N=63, healthy African American young adults (mean age =  $21.9 \pm 5.5$ , 66% female) during completion of 5-minute resting baseline, a laboratory-based racism recall task, and a recovery period. Participants also provided demographic information and completed the Perceived Ethnic Discrimination Questionnaire-Community Version (PEDQ-CV). HRV was assessed using the time domain measure, root mean square of the successive differences between adjacent R-R intervals (RMSSD). Relative to baseline, there were significant increases in BP and RMSSD, as well as a significant decrease in HR during the racism recall task (all  $p$ 's  $< .05$ ). In regression models, adjusted for age, gender, body mass index and physical activity, lifetime discrimination emerged as a significant inverse predictor of HR ( $b = -.35$ ,  $se = 13$ ,  $p = .008$ ) and positively predicted RMSSD during the racism recall task ( $b = .02$ ,  $se = .01$ ,  $p = .024$ ). To our knowledge these are the first data to demonstrate that HRV may actually *increase* during *in vivo* exposure to discriminatory stimuli. Although preliminary, these observations corroborate the putatively compensatory association between the higher HRV observed among African Americans and other non-US Black populations and experiences of racial discrimination. While further research and replication are needed, these findings may have significant implications for efforts aimed toward eliminating racial health disparities in the US and beyond.

#### **Abstract 1643**

#### **RACIAL DISCRIMINATION AND PHYSIOLOGICAL REACTIVITY: THE MODERATING ROLES OF RACIAL COMPOSITION AND RELIGIOUS ATTENDANCE**

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Previous work has highlighted the relationship between racial discrimination and negative health outcomes (Williams and Mohammed 2009). Though many studies have examined the *physical* health impacts of racial discrimination, far fewer have examined its *physiological* impacts. Several studies have suggested that factors such as worry and anticipatory stress may exacerbate the association between racial discrimination and physiological stress responses (Brosschot et al, 2006), yet few studies have focused on factors that may *protect* individuals from the negative impacts of racial discrimination. The present study examined the moderating roles of racial composition and religious attendance in the association between racial discrimination and physiological reactivity (pre-ejection period [PEP] and respiratory sinus arrhythmia [RSA]). Two hundred and eleven African American students attending a southeastern U.S. university listened to subtle, blatant, and neutral racism analogues (Vrana and Rollock, 2002; Jones et al., 1996), in which “perpetrators” were described as either Black or White, and cardiovascular psychophysiology data were acquired continuously. Findings indicated a statistically significant three-way interaction,  $F(8, 1680.20) = 5.11, p = .02$ , between racial discrimination, perpetrator race, and racial composition. Specifically, participants who grew up in neighborhoods comprised of almost all people of other races evidenced greater parasympathetic withdrawal ( $M = -.80$ ) while listening to the blatant vignette as compared to participants who grew up in predominantly Black, half Black, or mixed race communities ( $M$ s =  $-.10 - .12, ps = .00 - .04$ ), when the perpetrator was White. Findings also indicated a statistically significant two-way interaction,  $F(24, 243.45) = 3.46, p < .001$ , between racial discrimination and religious attendance such that participants who attended church services 2-3 times per month experienced greater sympathetic activation ( $M = 12.01$ ) to blatant discrimination, as compared to sympathetic withdrawal exhibited by less frequent attendees ( $M = .88, p = .02$ ). These findings highlight the complex ways in which racial composition and religious attendance may shape health consequences of racial discrimination.

#### **Sex, Mood and the Heart**

**Thursday, March 16 from 5:00 - 6:00 pm**

#### **Abstract 1424**

#### **SEX DIFFERENCES IN PSYCHOPATHOLOGICAL PROFILE AND RISK OF ISCHEMIA AMONG YOUNG PATIENTS WITH RECENT MYOCARDIAL INFARCTION**

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**Background.** Women with early-onset myocardial infarction (MI) have worse outcomes than men but reasons are unclear. We hypothesized that, among young survivors of an MI, women, more than men, have a higher psychosocial burden when compared with community controls without MI, and are more likely to develop abnormal myocardial perfusion (ischemia) with a mental stress test than men with MI.

**Methods.** We studied 314 patients  $\leq 60$  yrs who were hospitalized for MI in the previous 8 months and 112 community controls matched for sex and age to the MI patients. Patients received  $^{99m}\text{Tc}$ sestamibi myocardial perfusion imaging at rest, with mental (speech task) and with conventional (exercise/pharmacological) stress. A summed difference score (SDS), the difference between stress and rest scores, was used to quantify ischemia under both stress conditions. Clinically significant mental stress-induced ischemia (MSIMI) was defined as an SDS  $\geq 3$ , and conventional stress ischemia (CSIMI) as an SDS  $\geq 4$ .

**Results.** The sample was 50% female, 59% black, with mean age of 50 yrs for both men and women. Compared with their respective controls, both women and men with MI were more often black, less educated, and with more cardiovascular risk factors. However, women with MI had twice the rate of major depression, four times the rate of PTSD and higher levels of childhood adversities compared with control women, while among men these differences were small and nonsignificant. These factors were also more frequent in women with MI compared with men with MI. In contrast, there were no sex differences in MI-related severity indicators and procedures, and women had actually less severe coronary artery disease. The rate of both MSIMI and CSIMI was twice as high in women with MI as in men with MI (22% vs 11%,  $p=0.009$ , and 31% vs 16%,  $p=0.002$ , respectively). In multivariable analysis, psychosocial and clinical risk factors did not substantially influence sex differences in rate of inducible ischemia.

**Conclusions.** The disproportionate rate of stress-related emotional factors among young women with MI may signal either women's vulnerability to these factors as triggers of MI, or women's enhanced emotional response to the MI itself. However, these factors (as well as clinical factors) do not explain the excess risk of ischemia in young women with MI, which likely plays a role in their worse prognosis.

#### Abstract 1475

#### SEX-SPECIFIC EFFECTS OF CARDIOVASCULAR REACTIVITY ON MYOCARDIAL ISCHEMIA INDUCED BY MENTAL STRESS

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**Background:** Mental stress (MS) induced myocardial ischemia (MSIMI) is associated with adverse outcomes in patients with coronary artery disease (CAD). Sympathetic-mediated cardiovascular reactivity is a mechanism of MSIMI. For women, microvascular vasomotion is thought to play a dominant role, but this has not been tested.

**Objective:** To investigate sex differences in hemodynamic workload and peripheral microvascular reactivity to MS and their relationship with MSIMI.

**Methods:** We submitted 680 stable CAD patients (187 women) to  $^{99m}\text{Tc}$ sestamibi myocardial perfusion imaging after MS (public speaking) and conventional (exercise/pharmacological) stress. We

obtained the rate-pressure product (RPP, systolic blood pressure x heart rate) at rest and during MS and calculated the change. We assessed peripheral vasoconstriction as the ratio of arterial wave amplitude during MS to rest using peripheral arterial tonometry of the finger (PAT, Itamar). A lower PAT ratio indicates greater vasoconstriction. We used logistic regression to derive odds ratios (OR) and 95% confidence intervals (CI) for MSIMI. To ease interpretation, RPP change and PAT ratio were dichotomized as high and low values at the median (4439 beats x mmHg/min, and 0.67).

**Results:** The mean (SD) age was 63 (9) in both women and men and there were no sex differences in clinical risk profile. After adjusting for body surface area (BSA), PAT ratio and RPP change with MS were also similar. MSIMI occurred in 85 (16%) of patients and both PAT ratio and RPP change were associated with MSIMI. However, there was an interaction with sex for both PAT ratio ( $p=0.02$ ) and RPP ( $p=0.007$ ), such that PAT ratio was associated with MSIMI only in women, while RPP change was associated with MSIMI only in men. After adjustment for clinical risk factors, beta-blocker use and BSA, the OR of MSIMI for low PAT was 5.1 (CI, 1.5–16.9) in women and 1.6 (CI, 0.9–2.8) in men. The OR for high RPP response was 1.5 (CI, 0.6–3.5) in women and 2.6 (CI, 1.5–4.4) in men. PAT ratio and RPP change with MS were not associated with conventional stress ischemia.

**Conclusion:** Women and men have distinct cardiovascular reactivity mechanisms for MSIMI. For women, stress-induced increased vascular resistance, as opposed to stress-induced increased hemodynamic workload, is likely the driving factor for MSIMI, while for men the opposite appears to be true.

#### Abstract 1021

#### SOCIAL INHIBITION, EMOTIONAL DISTRESS AND TYPE D PERSONALITY IN PATIENTS WITH CORONARY ARTERY DISEASE

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**Background:** Type D personality refers to the combination of negative affectivity and social inhibition, and has been related to adverse outcomes in patients with coronary artery disease (CAD). However, relatively little is known about the nature of social inhibition in CAD patients, and how it may increase vulnerability to emotional distress. Therefore, we examined the content and distinctiveness of the social inhibition trait within the Type D framework, and its explanatory value regarding emotional distress in patients with CAD.

**Methods:** Social inhibition and negative affectivity were assessed with the DS14 in 171 patients with CAD. Inhibition markers included interaction anxiety (SIAS10), emotional inhibition (ECQ) and behavioral inhibition (BIS). Vulnerability to emotional distress included measures of depression (PHQ-9), mood (GMS), general anxiety (GAD-7), social phobia (SPS11) and loneliness (UCLA-RS). We analyzed social inhibition using three methodological approaches: *Dimensional* (factor analysis of DS14, inhibition and distress measures), *Continuous* (social inhibition\*negative affectivity interaction), and *Categorical* (high/low trait level subgroups).

**Results:** Social inhibition and negative affectivity emerged as two distinct latent traits in factor analysis (*dimensional approach*). After adjustment for the main personality trait effects, the social inhibition\*negative affectivity interaction still was significantly associated with higher levels of depression, negative mood, general anxiety, social phobia, loneliness, social interaction anxiety and emotional-behavioral inhibition; all  $ps < .001$  (*continuous approach*). Finally, Type D patients with elevated levels of both negative affectivity and social inhibition reported more depression ( $p < .001$ ), negative mood ( $p < .001$ ), interaction anxiety ( $p = .03$ ) and less positive mood ( $p = .02$ ), as compared with non-Type D patients (*categorical approach*).

**Conclusions:** Dimensional, continuous, and categorical analyses indicated that social inhibition and negative affectivity are distinctly different components of the Type D construct. Social inhibition was closely related to emotional-behavioral inhibition, and interacted with negative affectivity to explain higher levels of depression, anxiety and loneliness. Overall, these findings suggest that social inhibition may contribute to emotional distress in patients with CAD.

**Abstract 1351**  
**CRACKING THE CODE: EVERYDAY EMOTION ALTERS VENTRICULAR REPOLARIZATION DURATION IN CORONARY ARTERY DISEASE**

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**Background:** We previously observed that everyday emotion alters ventricular repolarization duration in Long QT Syndrome (LQTS), a rare genetic syndrome that has been called the “Rosetta Stone” for ventricular tachyarrhythmias. QT interval changes that are too long or too short can contribute to abnormal repolarization dynamics and heightened risk for life-threatening arrhythmias. Due to its simple, well-characterized substrate, factors observed in LQTS may be relevant to sudden cardiac death (SCD) risk in patients with coronary artery disease (CAD), a more complex and variable disease and the most common context for SCD. We therefore examined whether findings in LQTS were also observed in CAD.

**Methods:** We studied 199 patients with CAD (24% female; mean age 62 yrs), all with no history of serious arrhythmias and half with implanted defibrillators for primary prevention of CAD, and 50 randomly matched (1 to 4 ratio) healthy control subjects (26% female; mean age 60 yrs). Home visits were made in Tucson and Rochester to collect data over three days. Each day a 12-hour Holter recording was completed. Subjects engaged in typical daily activities and were paged 10 times per day at random times. Subjects responded by answering 59 questions using a smartphone pertaining to the 5 minutes preceding the page. Ratings addressed current activities, location, social circumstances, exertion, and 22 emotion terms (rated on a 7-point intensity scale). Holter and smartphone clocks were synchronized for later off-line analysis. Holter data over 5 minute epochs were analyzed for heart rate and QTc (QT interval using the Fredericia correction for heart rate).

**Results:** As shown in Table 1, within-person analyses controlling for age and gender reveal that QTc is significantly longer during moderate (p<.03) or high (p<.0001) compared to minimal Low Arousal Positive Affect and significantly shorter during moderate relative to low Activated Positive Affect (p<.0001) in CAD patients. No such associations were observed in Older Healthy Controls and these group differences were significant for both variables (p<.01).

**Conclusion:** These findings replicate those obtained in LQTS and suggest that everyday emotions contribute to SCD risk in CAD. The findings provide new clues to detect risk for SCD and suggest that emotion regulation strategies could potentially be protective in those at risk.

Variable	OH	CAD	OH vs. CAD
APA (2-4 vs. 0-1)	1.30±1.17 <sup>†</sup> P=0.27	-3.82±0.70 P<0.0001	-0.01
APA (5-6 vs. 0-1)	-0.89±1.36 P=0.56	-3.82±0.88 P<0.001	0.16
LAPA (2-4 vs. 0-1)	-1.51±1.85 P=0.15	1.82±0.74 P=0.03	0.66
LAPA (5-6 vs. 0-1)	-0.29±1.28 P=0.76	1.47±0.95 P=0.11	0.24
ANA (2-4 vs. 0-1)	0.52±0.54 P=0.33	0.89±0.51 P=0.06	0.43
LAN (2-4 vs. 0-1)	0.85±0.81 P=0.50	0.51±0.70 P=0.47	0.73

Effects of emotion on QTc by risk groups. Data values consist of changes in QTc in msec in one emotion context relative to another. \*Regression coefficient±standard error derived from a linear mixed effects model with a random intercept after adjusting for age and gender. APA = activated positive affect; LAPA = low arousal positive affect; ANA = activated negative affect; LAN = low arousal negative affect. (0-1 = low or minimal; 2-4 = moderate; 5-6 = high). OH=older healthy; CAD=coronary artery disease

**Sleep**  
**Saturday, March 18 from 3:30 - 4:15 pm**

**Abstract 1573**  
**ASSOCIATION OF POSTTRAUMATIC STRESS DISORDER WITH SLEEP DYSFUNCTION IN MALE VETERAN TWINS**

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**Introduction:** A hallmark of posttraumatic stress disorder (PTSD) is sleep disturbance. We studied its relationship between current/remitted PTSD and sleep quality subscales in male veteran twins. Additionally, we evaluated the association of poor sleep with specific PTSD symptoms.

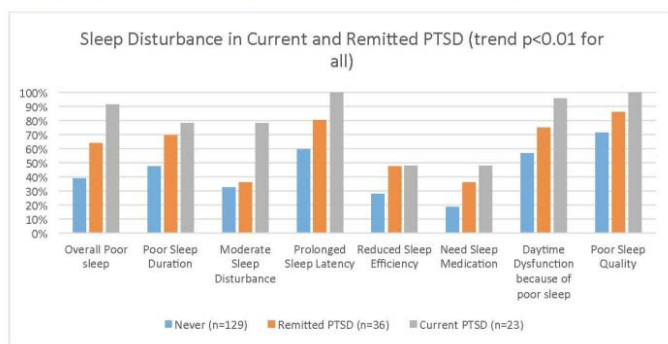
**Methods:** We examined 188 male twins recruited from the Vietnam Era Twin Registry. PTSD was assessed using the Structured Clinical Interview with DSM-IV criteria, and classified PTSD as current (within 30 days), or remitted (>30 days ago), PTSD. Sleep quality was measured by the Pittsburgh Sleep Quality Index (PSQI), which assesses subjective sleep quality, latency, duration, efficiency, and disturbance, as well as use of sleep medications and daytime dysfunction. The Clinician Administered PTSD Scale (CAPS) PTSD assessed symptom severity, including re-experiencing (B), avoidance behavior (C), and hyperarousal (D). The insomnia question was excluded from the calculation of criterion D. Generalized estimating equations were used

to adjust for possible confounding due to behavioral/health factors, as well as genetic/familial factors.

Results: The mean (SD) age was 58 (3) years; 12% had current PTSD and 19% had remitted PTSD. The total PSQI score was highest amongst those with current PTSD, with a mean (SD) value of 11.0 (3.8); those with remitted PTSD had a mean score of 7.7 (3.9), and twins with no PTSD had a mean (SD) score of 5.3 (3.6). Using a PSQI cutoff of 5, 91%, 64%, and 39% of twins with current, remitted, and no PTSD, respectively, had poor sleep ( $p < 0.0001$ ). The test was highly significant ( $p < 0.0001$ ) even after adjustment for use of alcohol, coffee, tobacco products, age, education, employment status, and history of major depression. The PTSD and total PSQI association remained significant ( $p < 0.001$ ) based on the within-pair regression analysis that adjusts for genetic and familial confounding. Individual sleep subscales (figure) showed significant trends for all PSQI subscales. When PTSD criteria B, C, and D were assessed together in a single regression model, only B (re-experiencing) remained significant as a predictor of a high total PSQI score (adjusted  $p = 0.007$ ).

Conclusion: PTSD is strongly associated with poor sleep quality in a dose-response relationship even after adjustment for lifestyle behaviors and family/genetic factors.

Figure – Association of PTSD with percentage of veterans with abnormal values of self-reported sleep subscales from the Pittsburgh Sleep Quality Index. An abnormal value was defined as a score of 1 or higher on each subscale.



## Abstract 1015

### TEMPORAL DYNAMICS BETWEEN DAILY AFFECT, PAIN, AND NIGHTLY SLEEP QUALITY IN YOUNG ADULTS

Danica C. Slavish, M.S., Jennifer E. Graham-Engeland, Ph.D., Biobehavioral Health, Lynn M. Martire, Ph.D., Human Development and Family Studies, Joshua M. Smyth, Ph.D., Biobehavioral Health and Medicine, The Pennsylvania State University, University Park, PA. Sleep impairment is a common concern among young adults and longitudinally predicts a variety of poor health outcomes. Among those reporting sleep impairment, pain and mood disturbances are frequently reported concomitant issues. Although these factors likely interact in everyday life, the day-to-day temporal dynamics between these variables are not well established. This research examined directional associations between daily affect, daily pain, and nightly sleep quality, and the potential moderating role of chronic pain status. Participants were 139 young adults ( $20.57 \pm 1.83$  years; 58% female), some of whom ( $n = 58$ ) had chronic back pain. Participants completed a baseline survey and a 14-day daily diary protocol. The daily diary included a morning survey of recent positive and negative affect (PA and NA), current pain severity, and previous night's sleep quality, and an evening survey of recent PA and NA, current pain severity, and daily alcohol use and physical activity. Data were nested as days within people and were analyzed using multilevel modeling. Models statistically controlled for daily alcohol use and physical activity, age, gender, BMI, SES, race, baseline depressed mood, and global self-reported health. Better reported sleep quality (relative to each individual's typical sleep; i.e., person-centered to test the within-person

effect) predicted higher morning PA ( $\beta = 0.56$ , S.E. = 0.18,  $p = .002$ ) and lower morning NA ( $\beta = -0.34$ , S.E. = 0.09,  $p = .0003$ ); in contrast, evening affect and pain did not significantly predict that night's sleep quality. Chronic pain status moderated bidirectional associations between daily pain and sleep (but not affect and sleep): Only among those with chronic back pain, better sleep quality predicted lower morning pain ( $\beta = -0.10$ , S.E. = 0.04,  $p = .03$ ), and lower evening pain predicted better sleep quality that night ( $\beta = -0.13$ , S.E. = 0.04,  $p = .004$ ). Results held with and without covariates. Findings suggest reported sleep quality may be a more reliable predictor of next-morning affect than evening affect is of that night's sleep quality. For those with chronic pain, there also appears to be a vicious cycle between poor sleep and pain in daily life. These findings extend understanding of the day-to-day relationships between affect, pain, and sleep in a sample of young adults with and without chronic back pain.

## Abstract 1181

### REMNANTS OF THE PAST: CHILDHOOD TRAUMA EXPOSURE AND AGE FIRST TRAUMATIC EXPOSURE RELATE TO POOR SLEEP HEALTH.

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Emerging data suggests that over 50% of the population experiences at least one traumatic event in childhood, an alarming rate given that childhood trauma has been related to adverse health outcomes, including premature death. Sleep may represent a potential mechanism through which childhood trauma impacts health. The current study aimed to characterize the relationship between childhood trauma, age of first trauma exposure, and sleep health, a self-report multidimensional measure of sleep. Participants ( $N = 165$ ; Mean (SD) age = 59.85 (9.06), 109 females) reported trauma exposure using the Trauma History Questionnaire, which captures the type, frequency, and age at which traumatic events occur. Childhood trauma exposure was defined as the total number of event types multiplied by the frequency of each event and was quantified before 18 years of age. Sleep regularity, satisfaction, timing, efficiency, and duration were derived from up to two weeks of daily sleep diary data while alertness was reported using the Epworth Sleepiness Scale (ESS). These six sleep health components were dichotomized using a median split or relevant cut-off values from the literature. Total sleep health was calculated as the sum of the component scores and ranged from 0 (poor) to 6 (optimal). Potential covariates, identified *a priori*, based on their association with trauma and sleep included age, depression, current stressors, interpersonal support, subjective social status (SSS), and body mass index. The relationships between childhood trauma and age of first trauma exposure and sleep health were examined using hierarchical linear regression. In an unadjusted model, increased childhood trauma was associated with poor sleep health,  $\beta = -0.23$ ,  $p < .001$ ,  $\Delta R^2 = .08$ . This result withstood adjustment for depression status, current stress, interpersonal support, and SSS,  $\beta = -0.20$ ,  $p = .005$ ,  $\Delta R^2 = .05$ . Earlier trauma exposure related to poor sleep health,  $\beta = 0.09$ ,  $p = .016$ ,  $\Delta R^2 = .08$ . The observed relationship between increased childhood trauma and poor sleep health aligns with a growing body of evidence linking childhood trauma to adverse health outcomes and suggests that sleep may be a potential mechanism through which childhood trauma impacts health later in life.

**Thursday, March 16 from 2:00 - 3:15 pm**

**Abstract 1405**

**A RANDOMIZED, CONTROLLED TRIAL OF NEUROFEEDBACK TO TREAT CHEMOTHERAPY-INDUCED PERIPHERAL NEUROPATHY (CIPN) LEADS TO IMPROVEMENT IN MULTIPLE SECONDARY ENDPOINTS**

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**Background:** CIPN is a common side effect of chemotherapy, leading to impairment in daily activities and diminished quality of life. Neurofeedback (NF) is a brain-training paradigm that induces neuroplasticity to modulate brain activity and we have previously shown it leads to improved CIPN symptoms that were mediated by NF-induced brain changes. **Methods:** Seventy-one (62 female; mean age=63; 52 breast, 8 gynecologic, 11 other; average length of symptoms=24 mos) cancer survivors  $\geq 3$  months from completing chemotherapy who reported  $\geq 3$  on the NCI's neuropathy rating scale, were randomized to a NF group (n=35) and underwent 20 sessions of electroencephalography (EEG) NF or a wait-list control group (WL; n=36). We used quantitative EEG imaging to determine any EEG patterns unique to CIPN and then provided NF to change aberrant brain signatures. Secondary outcome measures including the MD Anderson Symptom Inventory (MDASI), Short Form 36 (SF-36); Brief Fatigue Inventory (BFI); and Pittsburgh Sleep Quality Index (PSQI) were completed at baseline, at the end of treatment, and 4 months later. **Results:** 89% of the participants who were randomized completed treatment and 100% of participants who started NF completed treatment. Change scores from baseline to end of treatment demonstrate NF lead to significant reduction in cancer-related symptom interference (NF=-5.3 vs WL=-0.5,  $p=.000$ ); symptom severity (NF=-5.1 vs WL=-0.8,  $p=.000$ ); fatigue (NF=-3.7 vs WL=-0.8,  $p=.001$ ), and sleep disturbances (NF=-2.3 vs WL=0.8,  $p=.030$ ); and improved physical functioning (NF=3.3 vs WL= 1.4,  $p=.003$ ). Post EEG analyses showed increased alpha and decreased beta after NF, where protocols were based on increasing alpha and decreasing beta, with no changes noted in the WL group. At 4 months, the outcomes followed a similar pattern. **Conclusion:** NF clinically and significantly reduced secondary symptoms associated with CIPN. Further, patients with CIPN were able to change their brain function in the direction specified by the NF protocols.

**Abstract 1041**

**BRIGHT LIGHT THERAPY IMPROVES SYMPTOMS OF FATIGUE IN CANCER SURVIVORS WITH CLINICAL FATIGUE: A BLINDED RANDOMIZED CONTROLLED TRIAL**

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**BACKGROUND:** Cancer-related fatigue can last for months or years in up to one-third of cancer survivors, and has been identified as a significant contributor to decreased quality of life. Despite its prevalence, it is often under-recognized and under-treated making it an important target for intervention. Bright light therapy has been shown to prevent the worsening of fatigue during chemotherapy in women with breast cancer, and preliminary efficacy was demonstrated for fatigue reduction in a small sample of post-treatment survivors. The objective of this study was to examine the impact of a one-month light therapy intervention on symptoms of fatigue in cancer survivors with clinical fatigue.

**METHODS:** This 4-week blinded RCT recruited post-treatment cancer survivors who met ICD-10 criteria for cancer-related fatigue. Participants were randomly assigned to receive a light therapy device that produced either bright white light (BWL; treatment) or dim red light (DRL; active control). Participants were instructed to use their assigned device daily for 30 mins upon waking for 28 consecutive days. The primary outcome, fatigue, was assessed weekly with the Multidimensional Fatigue Symptom Inventory-Short Form. Secondary outcomes assessed pre- and post-intervention included mood (POMS), depressive symptoms (CES-D), and quality of life (FACT-G).

**RESULTS:** Eighty-one participants (mean age = 58.2; 86% women; 93.8% white) were randomly assigned to receive BWL (n=42) or DRL (n=39). Light devices were used for an average of 30 mins per day (SD=0.6), within 30 mins of waking (SD=23.2), and for a total of 26.7 days (SD=2.2). Linear mixed models analyses revealed a significant group-by-time interaction for fatigue symptoms ( $p=.034$ ), amounting to a 17% greater reduction in fatigue among those in the BWL group after 4 weeks relative to those in the DRL condition (between group effect size  $d=.30$ ). There were also significant improvements over time for both groups on measures of mood disturbance, depressive symptoms, and quality of life over the one-month intervention period.

**CONCLUSION:** Greater improvements in fatigue were observed among participants exposed to BWL compared to DRL. These results, in combination with previous reports of light therapy during and after cancer treatment, support the use of this therapy for the improvement of fatigue symptoms in those affected by cancer.

**Abstract 1116**

**PRELIMINARY EFFECTS OF A TECHNOLOGY-ADMINISTERED CBT-BASED STRESS- AND SELF-MANAGEMENT INTERVENTION ON DEPRESSION SYMPTOMS IN MEN UNDERGOING HORMONE THERAPY FOR ADVANCED PROSTATE CANCER**

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Hormone therapy (HT) is a primary treatment for advanced prostate cancer (APC), which is commonly seen among men age 65 and older. While HT can effectively suppress tumor growth, it is associated with numerous adverse side effects, including depression. This risk for depressive symptoms in APC can be exacerbated by common aging-related stressors, such as retirement and loss of independence. Research has supported the efficacy of cognitive behavioral therapy (CBT)-based stress- and self-management interventions (i.e., CBSM) to mitigate the physical and psychological symptoms experienced by localized prostate cancer patients. However, no evidence-based psychosocial treatments have been developed specifically for men with APC. Additionally, traditional psychosocial interventions require patients to attend in person sessions with health providers, which can present challenges for



APC patients due to greater comorbidities, functional limitations, and heightened symptom burden. This study evaluated the impact of a technology-based adaptation of CBSM on depressive symptoms among men with APC receiving HT. As part of a larger, ongoing study, patients were randomized to participate in either a CBSM group intervention ( $n = 51$ ), or a health promotion attention-matched control condition ( $n = 51$ ) for 10 weeks. Participants attended all weekly sessions with trained facilitators via video conferencing technology using tablet computers, and completed computer-administered psychosocial assessments at baseline (i.e., prior to participating in the intervention), and again six months later. Depression was evaluated with the Patient-Reported Outcomes Information System (PROMIS) Depression, which yields normed  $t$ -scores. Mixed model ANOVA demonstrated a significant effect of study condition over time, such that reported depressive symptoms significantly improved ( $F(1, 100) = 5.35, p = 0.02$ ) for participants in the CBSM condition from baseline ( $M = 46.09, SD = 7.68$ ) to six month follow-up ( $M = 44.36, SD = 7.36$ ) as compared to the health promotion control condition (baseline:  $M = 45.30, SD = 7.86$ ; six months:  $M = 46.83, SD = 7.36$ ). Neither a significant main effect of condition nor of time was found. Results indicated that technology-administered CBSM may be an effective strategy to decrease depressive symptoms among men with APC undergoing HT.

#### Abstract 1137

##### **EXPRESSIVE WRITING INTERVENTION AND SELF-REPORTED PHYSICAL HEALTH OUTCOMES: RESULTS FROM A NATIONWIDE RANDOMIZED CONTROLLED TRIAL WITH BREAST CANCER PATIENTS**

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**Aims:** To examine the effect of Expressive Writing Intervention (EWI) on self-reported physical symptoms and healthcare utilization in a nationwide randomized controlled trial with Danish women treated for primary breast cancer, and to explore participant characteristics related to emotion regulation as possible moderators of the effect.

**Methods:** Women who had recently completed treatment for primary breast cancer ( $n=507$ ) were randomly assigned to three 20 min. home-based writing exercises, one week apart, focusing on emotional disclosure (EWI) of a distressing experience (their cancer or a non-cancer topic) or a non-disclosing topic (control). Outcomes were self-reported physical symptoms (Patient Health Questionnaire; PHQ-15) and healthcare utilization (visits and telephone contacts with GP) 3 and 9 months post-intervention. Potential moderators were repressive coping, alexithymia, rumination, social constraints, and writing topic.

**Results:** No group by time interaction effects were found for any outcomes (Cohen's  $d=0.02-0.09; p=0.36-0.85$ ). Moderation analyses showed that 1) low alexithymic women showed larger decreases in telephone contacts with their GP than high alexithymic women and controls ( $d=0.17; p=0.029$ ), and 2) women who wrote about their cancer, but not women writing about other topics, showed larger

decreases in visits ( $d=0.30; p=0.012$ ) and telephone contacts with their GP ( $d=0.37; p=0.001$ ) compared to controls.

**Conclusions:** The results from this large randomized trial are concordant with previous findings showing that EWI is unlikely to be a generally applicable intervention to improve health-related outcomes in cancer patients and cancer survivors. However, written disclosure may have a beneficial impact for individuals who write about their own cancer, as well as for those low in alexithymia.

#### Abstract 1138

##### **BRIEF STRESS MANAGEMENT DECREASES LEUKOCYTE NUCLEAR NFkB DNA BINDING IN DISTRESSED BREAST CANCER PATIENTS UNDERGOING PRIMARY TREATMENT**

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**INTRODUCTION.** Breast cancer patients experience heightened distress during primary treatment. A 10-wk group-based cognitive behavioral stress management (CBSM) intervention showed concomitant decreases in negative affect and leukocyte pro-inflammatory gene expression. CBSM effects were strongest in women presenting with elevated cancer-specific distress. In a dismantling trial we found that even 5-wk interventions featuring CBSM components—cognitive behavioral therapy (CBT) or relaxation training (RT)—improve negative affect during treatment. It is unclear whether these brief approaches are sufficient to bring about changes in inflammatory signaling among those with elevated cancer-specific distress. **METHODS.** We conducted intensive molecular analyses of women who participated in the trial of these 5-week interventions and who reported elevated cancer-specific intrusive thoughts at entry (Impact of Events Scale-Intrusive Thoughts > 14). Peripheral blood mononuclear cells from 51 women (5wk CBT=23, 5wk RT=14, 5wk Health Education [HE]=14) were obtained at baseline (4 – 8 wks post-surgery and before adjuvant therapy) and 12 month follow-up for nuclear protein extraction and determination of nuclear factor Kappa-B (NFkB) DNA binding by electromobility shift assay. Samples were electrophoresed and dried gels were exposed to Kodak x-ray films. Films were scanned and analyzed for integrated areas under the densitometric curves. Optical density [OD] for each band was used to estimate protein binding. Mean OD values for NFkB were compared over time in a Repeated measures analysis of variance testing for condition by time effects. **RESULTS.** Women assigned to the 3 study conditions showed no differences in sociodemographics, disease characteristics or treatments received. Women in either stress management condition (RT or CBT) showed decreases in NFkB expression over 12-month follow-up while those in HE showed increases ( $p < .05$ ). Greater levels of cancer-specific distress at 12-months were associated with greater NFkB expression. **CONCLUSION.** Over a 12-month period brief stress management appeared to down-regulate expression of NFkB nuclear protein—a complex that controls DNA transcription, cytokine production and cell survival, and is one of the chief mediators of inflammatory signaling in immune cell nuclei—a key upstream pathway relevant for breast cancer.

**Thursday, March 16 from 5:00 - 6:00 pm**

**Abstract 1497**

**A MATTER OF LIFE AND DEATH: PSYCHOSOCIAL STRESS PREDICTS ALL-CAUSE MORTALITY OVER 20 YEARS**

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**Objective:** Extensive evidence links higher stress with poor psychological, behavioral, and physical outcomes. Stress is not unidimensional but varies in domain, duration, and severity; however, most stress research tests individual stress measures leaving open the question are all stressors equally important for health? The current study compares the prospective relationship between different stress measures and all-cause mortality.

**Methods:** Participants were 7,074 adults from the Midlife in the United States Study with data on at least one stress measure and mortality. Eight stress measures were assessed in the mid-1990s from three domains: (1) discrimination—daily and lifetime; (2) inequality—family, home, and work; (3) interpersonal strain—family, friend, and partner. Mortality data were assessed from informants connected to participants and national death index searches up to 2015, approximately 20 years after the initial stress surveys were completed. Missing data were addressed using random forest multiple imputation. Analyses were conducted using Cox proportional hazard models with age at death or censorship. The following covariates were adjusted in models: sex, race, parental education, welfare in childhood, participant education, work status, smoking, worst alcohol use, physical activity, and body mass index.

**Results:** Each domain of stress predicted significantly earlier mortality independent of all covariates (all  $p < .05$ ). Within domains, daily discrimination, home inequality, and interpersonal strain from friends predicted earlier mortality (all  $p < .01$ ) and these unique associations were sustained in a multivariate model simultaneously including all stress measures (all  $p < .05$  for those three stress measures).

**Conclusions:** Psychosocial stress measures emerged as robust predictors of all-cause mortality up to 20 years later after adjusting for several potential confounding factors. Each of the three conceptual domains of stress were predictive, but daily discrimination, perceived home inequality, and interpersonal strain from friends emerged as unique predictors independent of the other stress measures.

**Abstract 1471**

**CHRONIC INFLAMMATION IN ANXIETY DISORDERS: A SYSTEMATIC REVIEW AND META-ANALYSIS**

*Megan E. Renna, M.A., Psychology, The Graduate Center, City University of New York, New York, NY, Mia S. O'Toole, Ph.D., Psychology & Behavioral Sciences, Aarhus University, Aarhus, Denmark, Denmark, Phillip Spaeth, B.A., Douglas S. Mennin, Ph.D., Psychology, Hunter College, New York, NY*

The prolonged psychological activation common to many anxiety disorders may contribute to increased physiological activation over time, ultimately leading to a higher likelihood for people with anxiety disorders to be at risk for the development of chronic illness. Inflammation may play an integral role in the relationship between anxiety and poor health, and research has begun to examine the relationship between anxiety disorders and inflammation. The aim of the current meta-analysis was to examine differences between healthy controls and people with anxiety disorders in terms of inflammation. It was hypothesized that people with anxiety disorders would have significantly higher levels of pro-inflammatory markers and significantly lower levels of anti-inflammatory markers than controls. After screening the abstracts of 1173 search results and 73 full-text articles for eligibility, 41 studies ( $N = 2083$ ) were included in the meta-analytic investigation. Results demonstrated a significant overall difference between healthy controls and people with anxiety disorders

in terms of inflammation ( $p = .009$ , hedge's  $g = -.36$ ), with this result being largely driven by IL-6 ( $k = 24$ ,  $p < .001$ , hedge's  $g = -.93$ ), IL-1 $\beta$  ( $k = 18$ ,  $p = .009$ , hedge's  $g = -.50$ ), and TNF- $\alpha$  ( $k = 20$ ,  $p = .030$ , hedge's  $g = -.56$ ). Moderation analyses revealed a moderating effect of type of anxiety disorder, as only individuals with PTSD ( $k = 22$ ,  $p < .001$ , hedge's  $g = -.65$ ), in comparison to OCD ( $k = 6$ ,  $p = .594$ , hedge's  $g = .12$ ) or other anxiety disorders ( $k = 12$ ,  $p = .851$ , hedge's  $g = -.04$ ), demonstrated significant differences in inflammation between controls. However, there was not sufficient power to examine the effects of specific diagnoses in the other anxiety disorders category (i.e., generalized anxiety disorder, panic disorder, social anxiety disorder). These results were not moderated by comorbid depression ( $k = 30$ ,  $p = .876$ ), highlighting a unique contribution of an anxiety diagnosis on the exacerbation of dysregulated inflammation. Taken together, these findings have the potential to advance the understanding of the immunological impact of an anxiety disorder diagnosis, and provide an opportunity for researchers to consider the impact of anxiety on basic health markers such as inflammation in an effort to better inform the link between anxiety and risk factors for physical illness.

**Abstract 1565**

**THE MITOCHONDRIAL HEALTH INDEX LINKS CHRONIC STRESS AND PSYCHOSOCIAL FACTORS TO CELLULAR BIOENERGETICS**

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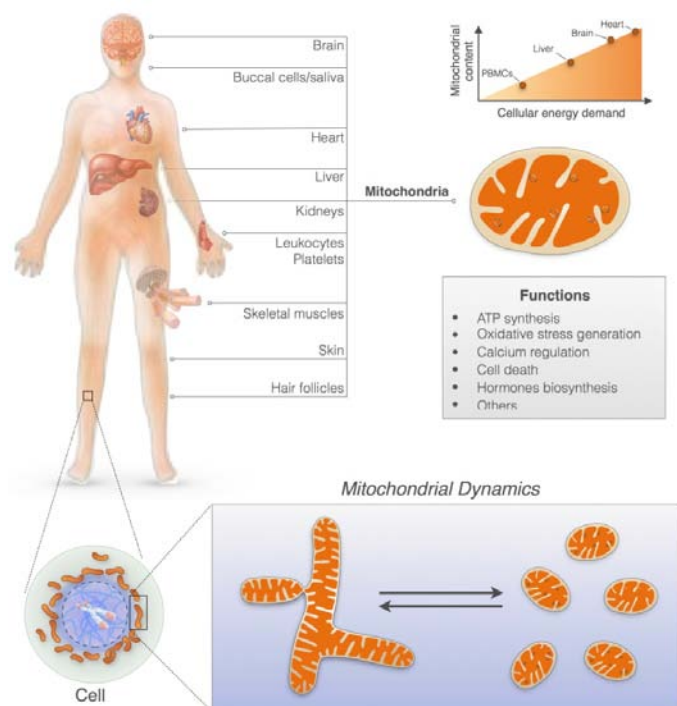
**Background:** Chronic psychosocial stress is associated with inflammation, gene dysregulation, and telomere shortening. The biological mechanisms underlying these pathophysiological markers are still incompletely understood, but emerging evidence suggests that a common cause may involve mitochondria. The mitochondrion is a cellular organelle with its own DNA – the mitochondrial DNA (mtDNA) – that sustains life by energy production and adaptive intracellular signaling. Chronic psychosocial stressors may impact cellular mitochondrial DNA content, but the association with dynamic mitochondrial function remains to be determined.

**Methods:** To address the hypothesis that chronic stress alters mitochondrial health, we studied healthy women who were either high stress maternal caregivers with a child with autism spectrum disorder ( $n=46$ ) or low stress control mothers with a normally developing child ( $n=45$ ). Peripheral blood mononuclear cells (PBMCs) were collected, frozen, and used to develop the mitochondrial health index (MHI), composed of three enzymatic measurements of mitochondrial energy production capacity and mtDNA content (mtDNA copy number). Other protein markers of mitochondrial energy production were also assessed.

**Results:** Women under high stress had a significantly lower MHI than controls ( $t(84)=2.42$ ,  $P=0.02$ ). Analyses of individual MHI components showed a signature consistent with molecular mtDNA alterations, although there was no difference in mtDNA copy number ( $t(87)=0.92$ ,  $P=0.36$ ). Multivariate analyses demonstrated that mtDNA copy number was a good indicator of cellular mitochondria content, but not of function. Furthermore, a time-lag analysis of daily affective states assessed 3 days before and 3 days after blood collection showed that affect predicted MHI, but not the reverse, suggesting an influence of psychological states on mitochondria.

**Conclusions:** The approach described allows reliable measurements of mitochondrial health in frozen blood cells from healthy women. These results support the hypothesis that chronic stress alters mitochondrial health. In addition, this study suggests that these effects are not unique

to chronic stress but that affective states dynamically influence mitochondrial health. Further work is needed to establish whether impaired mitochondrial health contributes to known markers of stress pathophysiology.



#### Abstract 1414 AN UNHEALTHY LIFESTYLE INDEX PREDICTING LONGITUDINAL COURSE OF DEPRESSION AND ANXIETY

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**Objective:** People with depression and anxiety often exhibit unhealthy lifestyle behaviours, including physical inactivity, high alcohol use, smoking, drug use, and shortened sleep. These behaviours tend to cluster together. Previous longitudinal studies have seldom examined whether an aggregated “unhealthy lifestyle index” of these risk behaviours predicts course of psychopathology.

**Method:** Participants were from the Netherlands Study of Depression and Anxiety (NESDA; 18-65 years; N = 2981). At baseline, 2, 4, and 6 year follow-up assessments, participants completed a diagnostic interview and self-report questionnaires. The unhealthy lifestyle index was calculated from responses to self-report questionnaires completed at baseline regarding physical activity levels, alcohol use, smoking, drug use and sleep duration. Participants scored one point for any lifestyle behaviour not meeting health guideline recommendations. Psychopathology course over time among those with a disorder at baseline was defined as chronic (disorder at all follow-up assessments), remitted (no disorder at follow-up assessments) or intermediate (neither remitted nor chronic).

**Results:** At baseline, smoking and low sleep duration were associated with greater odds of current or lifetime disorder relative to having no history of anxiety or depression. Examining the behaviours as a summed lifestyle index, for each additional poor lifestyle behaviour, odds of current disorder increased by 50% (95% CI 1.35 to 1.96) and odds of remitted disorder by 21% (95% CI 1.06 to 1.38), relative to controls. In examining course of psychopathology over time among people with a current disorder at baseline, for each additional poor

lifestyle behaviour present at the baseline assessment, odds of chronic course increased by 19% (95% CI 1.02 to 1.39) and odds of intermediate course by 15% (95% CI 1.00 to 1.33), relative to remitted course. Greater lifestyle index scores at baseline were also significantly associated with an increased proportion of time with depression, but not anxiety, across the follow-up period.

**Conclusion:** The presence of more lifestyle behaviours that do not meet health guidelines is associated with psychopathology cross-sectionally and poorer psychopathology course over time. A lifestyle index may therefore be a simple indicator of unfavourable course in depression and anxiety.

#### Technology-based Interventions

Friday, March 17 from 2:45 - 3:45 pm

#### Abstract 1528

#### A REMOTE SENSING PLATFORM FOR SUPPORTING EXERCISE IS AS EFFECTIVE AS TRADITIONAL SUPERVISED EXERCISE FOR IMPROVING CARDIORESPIRATORY FITNESS IN PEOPLE WITH CARDIOVASCULAR DISEASE: THE REMOTE-CR RANDOMISED CONTROLLED NON-INFERIORITY TRIAL

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**Background:** Exercise is an essential but underutilized component of contemporary cardiac rehabilitation programs for the secondary prevention of coronary heart disease. Increasingly powerful mobile technologies, such as smartphones and wireless physiological sensors, may extend the capability of exercise-based cardiac rehabilitation by enabling real-time exercise monitoring for those with coronary heart disease.

**Aim:** This study aimed to compare the effectiveness of mobile and wireless technology-assisted, home-based, remotely monitored exercise cardiac rehabilitation (exCR) to standard supervised centre-based cardiac rehabilitation in adults with ischaemic heart disease.

**Methods:** A randomized controlled non-inferiority trial of a smartphone-based remote intervention (REMOTE) was conducted in New Zealand to compare the effectiveness on exercise capacity and physical activity levels to current supervised cardiac rehabilitation for people (n=162) with ischemic heart disease. The REMOTE platform comprised commercially available smartphones and wearable sensors, bespoke smartphone and web apps, and custom middleware. Participants randomised to REMOTE received a 12 week programme of exercise prescription and support, as well as evidence and theory based behaviour change strategies encouraging participants to exercise regularly. The control condition comprised 12 weeks of supervised exercise delivered by trained exercise scientists in established cardiac rehabilitation clinics.

**Results:** The REMOTE platform was as effective at improving maximal oxygen ( $\text{VO}_{2\text{max}}$ ) ( $\text{INT}=2.75 \text{ ml}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$ ) compared to supervised exercise ( $\text{CON}=1.69 \text{ ml}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$ ), (adjusted mean difference = 0.46 [-0.92 – 1.84]). There were also changes in physical activity, sedentary behaviour, and self-efficacy and motivation variables.

Conclusions: Treatment effects of remotely delivered exCR were comparable with established centre-based exCR. Real-time remote exercise monitoring could help to close the gap between existing home- and centre-based programmes by making responsive, individualised exercise monitoring and coaching, behaviour change education, and social support available to patients in almost any location.

#### Abstract 1553

##### **IS COMPUTERIZED COGNITIVE BEHAVIORAL THERAPY AN EFFECTIVE MENTAL HEALTH TREATMENT FOR BOTH AFRICAN AMERICANS AND WHITES?**

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**Background:** Access to effective treatment for depression and anxiety in primary care is often limited, particularly for minority patients who also experience racial disparities in treatment outcomes. Recent trials demonstrate that computerized cognitive behavioral therapy (CCBT) programs may help improve access to treatment. However, it is unclear if these programs are equally acceptable to African Americans (AAs) as Whites, and whether these groups experience comparable benefits. We examined these questions among patients enrolled in our NIMH-funded trial of online collaborative care for mood and anxiety disorders.

**Methods:** Patients aged 18-75 with current depression, panic and/or generalized anxiety disorder were referred to our trial from 26 Pittsburgh-area primary care practices. We randomized protocol-eligible and consenting patients who reported elevated levels of mood and/or anxiety symptoms (PHQ-9 or GAD-7  $\geq 10$ ) with Internet access to receive their doctors' usual care or one of two other groups (1-3-3 ratio) that included 6-months of care manager-guided access to the U.S. version of the 8-session "Beating the Blues" CCBT program. Blinded assessor determined PROMIS depression and anxiety outcomes by phone at 6-months follow-up.

**Results:** Between 8/1/12 and 9/30/14, we randomized 91 AA and 499 White participants to our two CCBT study arms (mean age: 43 years; SD=14; range 18-75). AA patients, compared to Whites, had higher baseline PHQ-9 scores (14.4 vs. 13.1;  $p < 0.01$ ) and completed fewer CCBT sessions at both 3- and 6-months follow-up (mean sessions: 4.2 vs. 4.8;  $p = 0.08$  and 4.7 vs. 5.5;  $p = 0.03$ , respectively). However, AAs showed a greater 6-month decrease in depression (-4.76 vs. -1.73;  $p = .024$ ) and anxiety symptoms (-5.43 vs. -1.44;  $p = .083$ ) compared to whites.

**Conclusion:** Internet-delivered and care manager-guided CCBT is an acceptable and effective means to provide depressed and/or anxious AA patients with access to mental health care at scale and potentially reduce racial disparities in treatment outcomes.

#### Abstract 1437

##### **BIOBEHAVIOURAL THERAPY FOR EPILEPSY: TECHNOLOGICAL APPLICATION OF GALVANIC SKIN RESPONSE (GSR) BIOFEEDBACK TO REDUCE EPILEPTIC SEIZURES**

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*Neuroscience, Brighton and Sussex Medical School, University of Sussex, Brighton, East Sussex, UK*

Epilepsy is a neurological condition in which patients suffer from acute episodes of abnormal sensory and motor activity: seizures. One in a hundred people suffer from epilepsy. The unpredictability of seizures, and side-effects associated with drug treatment, often severely impact patients' lives. Over a decade ago, Nagai and her colleagues (2004a) introduced Galvanic Skin Response (GSR) biofeedback in patients with drug resistant epilepsy, demonstrating a robust positive effects. In the first randomized controlled trial, 60% of patients in the active biofeedback therapy group experienced seizure reduction of more than 50%. The therapy is grounded on neuroscientific observations characterizing an inverse relationship between electroencephalographic (EEG) indices of cortical neural excitability (slow cortical potentials) and peripheral sympathetic arousal (indexed by GSR activity) [Nagai et al., 2004b; Nagai et al., 2009]. Accompanying neuroimaging investigations also implicated thalamo-cortical circuitry in the generation of slow cortical potentials [Nagai et al., 2004c], and showed that ventromedial prefrontal cortex/orbitofrontal neural activity is inversely correlated to biofeedback-driven changes in the tonic level of GSR (Nagai et al., 2004d). In the current study, we conducted a wider clinical trial with 40 patients with drug resistant temporal lobe epilepsy (N= 20 Therapy group, N = 20 Control). Neuroimaging (fMRI) was conducted to explore neural network changes before and after GSR biofeedback intervention. A month of biofeedback training, elicited a significant reduction in the patients' seizure frequency ( $p < 0.001$ ). In the active therapy group, 9/20 of patients showed a reduction in seizure frequency of over 50%. The average seizure reduction in the active therapy group was 45.8%, compared to an increase of 14.3% seizure increase in the control (treatment as usual) group ( $p = 0.001$ ). Resting state functional neuroimaging indicated that GSR biofeedback strengthened neural connectivity within the default mode network, consistent with a normalization of abnormal default mode connectivity with this patient group.

Our combined clinical trial and neuroimaging study demonstrates the potential of GSR biofeedback as an effective technology-driven therapy that can be widely offered for patients with drug resistant epilepsy in the near future.

#### Abstract 1033

##### **COMBINED GROUP AND TECHNOLOGY-SUPPORTED SINGING INTERVENTIONS FOR POSTNATAL DEPRESSION: PSYCHOLOGICAL AND BIOLOGICAL RESULTS FROM A THREE-ARM RANDOMISED CONTROL TRIAL**

*Daisy Fancourt, PhD, Rosie Perkins, PhD, Centre for Performance Science, Imperial College / RCM, London, England, UK*

**Background:** Postnatal depression (PND) affects at least 13% of new mothers with over 75,000 cases per year in the UK alone. Current treatments models include antidepressants and psychotherapy, yet significant challenges are associated with each. However, given that studies examining predictors of PND have identified psychosocial factors such as stress and social support, group psychosocial interventions that simultaneously relax mothers and enhance their support networks could be of value. Technology could also play an important role in consolidating the effects from workshops. To explore this combined group and technology-supported approach, we focused on group singing interventions, since studies in other populations have suggested mental health benefits from music engagement.

**Methods:** 155 women with PND up to nine months post birth were randomised to one of three groups: usual care, 10 weeks of group play workshops or 10 weeks of group singing workshops, supported by singing recordings streamed over the internet and/or via smartphones in participants' own homes. Psychological scales including the Edinburgh Postnatal Depression Scale (EPDS) were taken at baseline, week 6 and week 10 along with saliva samples measuring neuroendocrine markers (including cortisol) and cytokine levels.



**Results:** Two different cut-offs for PND apply using EPDS: 9/10 (minor) and 12/13 (moderate-severe). Across time, there were improvements in PND across all groups. However, when applying 9/10, there was a near-significant difference between groups, with the singing group showing a trend towards a faster reduction in symptoms of PND. When applying 12/13, this result became significant ( $p < .05$ ) with post-hoc tests showing faster improvements in the singing group, including a drop to below the clinical cut-off a month earlier than either the play or usual care groups. Biological data exploring changes in stress response and inflammatory immune function over the length of the intervention and over single sessions are currently under analysis, with full results expected in November 2016.

**Conclusions:** This study suggests that 10-week programmes of group singing workshops supported by technology-streamed recordings could help reduce symptoms of PND amongst new mothers, especially amongst mothers experiencing more severe PND. Further research and app-development is underway.

### The Harms and Modification of Prenatal Stress

Friday, March 17 from 1:15 - 2:30 pm

#### Abstract 1580

#### **PRENATAL STRESS IN LOW-INCOME, OVERWEIGHT MOTHERS PREDICTS INFANT PHYSICAL ILLNESS ASSESSED VIA MEDICAL RECORDS**

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**Background:** Developmental Origins of Health and Disease (DOHaD) research has revealed that maternal prenatal stress, through activation of the maternal HPA axis, can adversely affect the developing fetus in ways that can influence its health in infancy and beyond. A small body of evidence has found prenatal stress is associated with alterations in offspring immunity and increased risk of hospitalization for infectious diseases. Yet, the few studies specifically examining offspring illness in infancy have been predominantly conducted in European, high-SES populations and/or have used maternal-report of illness. We sought to examine these associations in a diverse U.S. population, using objectively-rated health data abstracted from medical records.

**Methods:** In a sample of 161 low-income, ethnically-diverse, overweight pregnant women, mothers reported on their experience of significant negative life events during pregnancy (SLE) and their perceived stress (PS) and depression at 2<sup>nd</sup> and 3<sup>rd</sup> trimester and 6 months postpartum. Infant illness was assessed by medical record abstraction of all PCP and ER visits in the first 13 months of life (N=83 dyads with complete maternal and abstracted offspring data at the time of analyses). Negative Binomial regression was used to model PS and SLE as predictors of 1) total number of infections and 2) total number of unique diagnoses, with each model adjusting for gestational age, maternal age, household income, and postnatal PS.

**Results:** The sample experienced high levels of trauma and stress during their pregnancy. Results revealed that higher mean PS across pregnancy was significantly associated with a higher number of infant infections and number of unique diagnoses. Follow-up analyses revealed that effects were driven largely by PS during later pregnancy. See Table 1 for final model.

**Conclusions:** Even within a highly-stressed sample, variation in maternal psychosocial stress during pregnancy was positively associated with incidence of and diversity of their infants' physical

illness, after adjusting for postpartum maternal stress and covariates. Prenatal programming of infant immune system functioning may be evident within the first year of life, and the timing of stress exposure appears important for the developing fetus. Improved attention to maternal psychosocial wellbeing during pregnancy may prevent infant illness.

Table 1. Negative Binomial Regression Results		
Exp (estimates)	Total Infections Count	Total Unique Dx Count
Predictors		
SLE Count	1.040	1.001
3 <sup>rd</sup> trimester PS	1.750**	1.722***
Postnatal PS	0.805	0.923
Maternal Age	1.010	1.007
% Poverty	0.999	0.998**
Gestational Age	1.016	1.007
Birth weight	1.109	0.960

Note: \*= $<.05$ , \*\*= $<.01$ , \*\*\*= $<.001$

#### Abstract 1276

#### **PRELIMINARY FINDINGS ON GENERAL AND PREGNANCY-SPECIFIC ANXIETY ASSOCIATED WITH INTERLEUKIN-6 IN SECOND TRIMESTER OF PREGNANCY**

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**Background.** Antenatal mood disorders have been associated with poor pregnancy outcomes. Increased inflammation may be one pathway to poor pregnancy outcomes. In non-pregnant adults, mood disorders have been associated with increased inflammation. Few studies have assessed whether depression symptoms, general anxiety or pregnancy-specific anxiety are associated with inflammation during pregnancy. The purpose of these analyses is to determine whether maternal mood (general anxiety, pregnancy-specific anxiety, depressive symptoms) are associated with inflammatory markers (IL10, IL4, IL6) during the second trimester of pregnancy. **Methods.** The sample consisted of the first 36 participants of an on-going study of mood and inflammation during pregnancy. Women were recruited at 20-26 weeks gestational age (GA) from Denver and Los Angeles and interviewed with standardized scale measures of general anxiety (OASIS), pregnancy-specific anxiety and depressed mood (PHQ-9). At the same time points, they provided a blood sample. Blood serum was assessed using multiplex bead assay on Luminex for IL6, IL4 and IL10. Covariates included age, race/ethnicity, socioeconomic status, GA at assessment, partner cohabitation and pre-pregnancy BMI. **Results.** Women were predominately White (43%) and Latina (41%). None of the mood variables were associated with second trimester IL4 or IL10. Higher levels of IL6 was associated with higher general anxiety ( $r = .304$ ), and pregnancy-specific anxiety ( $r = .353$ ) during the second trimester of pregnancy, but depression symptoms were not ( $r = .003$ ). When general



anxiety and pregnancy-specific anxiety were entered simultaneously into regression analyses, only pregnancy-specific anxiety was marginally associated with second trimester IL6,  $\beta = .271, p = .099$ . **Conclusions.** These preliminary findings from an on-going study suggest that prenatal mood, specifically general anxiety and pregnancy-specific anxiety, may be associated with increased inflammatory IL6 during the second trimester of pregnancy, and that of the two, pregnancy anxiety is potentially a stronger marker. On-going data collection will allow extension of these analyses to test whether prenatal mood is associated with pregnancy outcomes, as mediated by inflammatory pathways.

#### **Abstract 1563**

##### **THE EFFECTS OF MATERNAL CORTISOL AND POSTPARTUM DEPRESSION ON INFANT SALIVARY CORTISOL**

*Lauren A. Dunne, B.A., Grace M. Thornburgh, B.A., Guido Urizar, PhD, Psychology, California State University, Long Beach, CA*

Recent studies have shown flatter diurnal cortisol patterns to be associated with several adverse health outcomes in at-risk populations. Yet, few studies have examined the effects of maternal cortisol on their infant's cortisol patterns. Even fewer studies have examined this relationship as it relates to postpartum depression. The purpose of this study was to investigate whether maternal cortisol and postpartum depression were associated with infant cortisol patterns. We hypothesized that mothers with flatter diurnal cortisol patterns and high levels of postpartum depression would have infants with flatter diurnal cortisol patterns at 3 months postpartum. Our sample included 72 low-income mothers and their infants (71% Latina, 71% with a high school education or less, 75% earned less than \$20,000 in total family income per year). At three months postpartum, seven saliva samples were collected from mothers throughout one collection day (upon waking, 30 minutes, 45 minutes, and one hour after waking, 12pm, 4pm, and 8pm) to calculate diurnal cortisol. On the same collection day, mothers also collected two saliva samples from their infants (8am and 8pm) to calculate their diurnal cortisol. Levels of postpartum depression were assessed using the Edinburgh Postnatal Depression Scale (EPDS). Results from a hierarchical multiple regression analysis revealed that mothers with flatter diurnal cortisol patterns had infants with flatter diurnal cortisol patterns ( $b = .243, p = .05$ ). Additionally, mothers with high levels of postpartum depression had infants with flatter cortisol patterns ( $b = .02, p < .05$ ). These results support the need for interventions focused on reducing maternal stress and the onset of postpartum depression to promote positive health outcomes in infants of at-risk mothers.

#### **Abstract 1204**

##### **BEING MINDFUL DURING PREGNANCY PREDICTS NOT ONLY MOOD OF THE MOTHER BUT ALSO BIRTH WEIGHT OF THE CHILD**

*Ivan Nyklicek, PhD, CoRPS Center of Research on Psychology in Somatic diseases, Tilburg University, Tilburg, NB, Netherlands, Sophie E. Truijens, PhD, Obstetrics and Gynecology, Máxima Medical Center, Eindhoven, NB, Netherlands, Viola Spek, PhD, Victor J. Pop, MD, PhD, CoRPS Center of Research on Psychology in Somatic diseases, Tilburg University, Tilburg, NB, Netherlands*

**Background:** Mindfulness skills have been associated with better mood and several health related outcomes. Because distressed mood during pregnancy has been related to worse child outcome, the aim was to examine the association of mindfulness skills during pregnancy with the mother's psychological distress and the child's birth medical records.

**Methods:** Participants were 905 pregnant women who participated in the longitudinal HAPPY study (Holistic Approach to Pregnancy and the first Postpartum Year). The 12-item Three Facet Mindfulness-Questionnaire-Short Form (Truijens et al., 2016) was completed at 22

weeks of gestation. Psychological distress was assessed using the Edinburg Depression Scale at 22 and 32 weeks, and post-delivery. The child's medical records were examined for gestation length, kind of delivery, birth weight, and Apgar score.

**Results:** Mindfulness skills Acting with Awareness and Nonjudging at 22 weeks were associated with lower depressive mood at 22 weeks, at 32 weeks and post-delivery. When controlled for depressive mood at 22 weeks, the association was still significant for Nonjudging predicting depressive mood at 32 weeks ( $\beta = -.14, p < .001$ ) and post-delivery ( $\beta = -.17, p < .001$ ). Regarding the child's medical records, only the mindfulness skill of Nonreacting predicted higher birth weight. Specifically, controlling for length of gestation and depressive symptoms, Nonreacting predicted having normal (non-underweight) birth weight (OR = 1.10, 95% CI = 1.03 – 1.18).

**Discussion:** It seems that different mindfulness skills during pregnancy are important in predicting mother's depressive symptoms versus child's birth weight. Potential mechanisms responsible for the associations found will be discussed. Successful replication of the findings may result in the consideration of application of mindfulness based interventions in prenatal care.

#### **Abstract 1547**

##### **IMPACT OF A PRENATAL COGNITIVE BEHAVIORAL STRESS MANAGEMENT INTERVENTION ON REGULATING CORTISOL LEVELS AMONG LOW-INCOME MOTHERS AND THEIR INFANTS**

*Guido Urizar, PhD, Psychology, California State University, Long Beach, CA*

Altered cortisol patterns during the postpartum period may lead to significant long-term health problems for low-income mothers and their infants. Yet, few studies have examined how to regulate cortisol in this population. The current randomized trial examined the impact of a prenatal cognitive behavioral stress management (CBSM) intervention on regulating postpartum salivary cortisol levels [i.e., total daily cortisol output (Area Under the Curve; AUC), diurnal cortisol] among 100 low-income mothers (mean age=27±6 years; 75% annual income<\$19K; 71% Latina) and their infants. During their first trimester of pregnancy, mothers were randomized to either an eight-week CBSM intervention or an attention-control (AC) group. Women in the CBSM intervention ( $n=55$ ) attended weekly group-based sessions in which a clinically trained researcher taught relaxation and coping skills, whereas women in the AC group ( $n=45$ ) received weekly print-based prenatal health information by mail. At three months postpartum, mothers' cortisol levels (AUC, diurnal cortisol) were estimated from seven saliva samples provided on one collection day (four morning samples, 12pm, 4pm, and 8pm). Additionally, infants' cortisol levels (average and diurnal cortisol) were estimated from two saliva samples (8am and 8pm) provided on the same collection day as their mothers. Results demonstrated that infants of mothers randomized to the AC group had higher cortisol (AUC) than infants of mothers receiving the CBSM intervention [ $F(1, 68) = 7.8, p = .007$ ]. Furthermore, infants of mothers randomized to the AC group showed flatter diurnal cortisol patterns (associated with poorer health outcomes) than infants of mothers receiving the CBSM intervention [ $F(1, 68) = 3.5, p = .07$ ]. These findings demonstrate the long-term impact that prenatal CBSM group interventions can have in regulating postpartum cortisol levels among low-income mothers and their infants.

**Thursday, March 16 from 2:00 - 3:15 pm**

**Abstract 1329**

**INVESTIGATING THE CROSS-STRESSOR HYPOTHESIS UNDER REAL-WORLD CONDITIONS: HABITUAL PHYSICAL ACTIVITY AS A MODERATOR OF THE ASSOCIATION BETWEEN MOMENTARY ANXIETY, AND HEART RATE AND BLOOD PRESSURE**

*Ipek Ensari, PhD, Joseph E. Schwartz, PhD, Donald E. Edmondson, PhD, Andrea T. Duran, MS, Daichi Shimbo, MD, Keith M. Diaz, PhD, Medicine, Columbia University Medical Center, New York, NY*

The cross-stressor hypothesis of physical activity (PA) postulates that engaging in regular PA results in cardiorespiratory, muscular and neural adaptations, which then favorably buffer the physiological response (e.g., heart rate [HR]; systolic blood pressure [SBP]) to psychological stressors that might be experienced in daily life. Few data exist testing this hypothesis outside of laboratory conditions.

Using ecological momentary assessment (EMA), we examined whether self-reported PA levels moderate the association between momentary fluctuations in self-reported anxiety and corresponding fluctuations in ambulatory HR and SBP measured over a 24-hour period. Adult participants without a history of cardiovascular disease (N=834) completed a 24-hour ambulatory monitoring of HR and SBP. The monitoring was done using an arm pressure cuff that was programmed to take readings at 28-minute intervals and self-reported anxiety levels were concurrently measured based on a visual analog scale (VAS) of 0 to 100 using a Palm Pilot. Habitual PA levels (i.e., minutes/week) were assessed using a self-reported questionnaire. Slope of the within-subjects regression on ambulatory HR and SBP readings on time-matched VAS anxiety ratings were estimated using a random-coefficients linear regression model. Habitual PA levels were categorized as no weekly PA, less than 150 minutes/week and at least 150 minutes/week; and added to the model as a between-subjects factor to estimate the average B-coefficient of the anxiety-HR and anxiety-SBP regression slopes for each PA category.

Higher anxiety scores were associated with greater momentary ambulatory HR and SBP ( $B=0.76$ ,  $SE=0.09$ , and  $B=0.76$ ,  $SE=0.15$ , respectively;  $p<0.001$ ). Models testing the moderating effect of PA on the anxiety-HR and anxiety-SBP associations showed a trend wherein higher PA levels were associated with blunted HR and SBP responses to anxiety; however, the interaction did not reach statistical significance ( $p>0.05$ ). No PA category was associated with significantly higher ambulatory HR and SBP when compared to the highest PA category ( $B=1.03$ ,  $SE=0.84$ ,  $p=150$  minutes/week).

Using ambulatory data (i.e., repeated EMA), we observed a trend in this cohort of 834 adults wherein those who engage in greater doses of habitual PA experience blunted HR and SBP responses associated with momentary experiences of anxiety throughout the day.

**Abstract 1402**

**EFFECT OF WELL-BEING ON LATER ACTIGRAPHIC PHYSICAL ACTIVITY**

*Jerrald L. Rector, PhD, Elliot M. Friedman, PhD, Human Development and Family Studies, Purdue University, West Lafayette, IN*

**Background** Physical activity (PA) is associated with numerous health benefits. Recent evidence suggests that PA may be bolstered by positive psychosocial factors, including hedonic well-being (positive affect) and eudaimonic well-being (a sense of purpose and engagement in life). While physical exercise improves later mood, precedence for a temporal effect of well-being on PA has not been established. Further, it is unclear if any effects of well-being exist beyond other predictors of PA. The aim of this study was to investigate the prospective relationship between well-being and objective PA at varying time

intervals. We hypothesized that higher well-being would be related to greater PA after controlling for other predictors. Based on the Broaden-and-Build Theory, we also anticipated that the benefits of well-being on PA would be greater as lag time increased.

**Methods** Participants (N=371) were from a sub-sample of the 2<sup>nd</sup> wave of the Survey of Midlife Development in the United States (MIDUS). Hedonic (PANAS) and eudaimonic (Ryff scales) well-being were measured by questionnaire, and 7 days of actigraphy data was obtained 1 to 62 months later. Linear regressions examined the relationship of (a) well-being, (b) time between measurements, and (c) the interaction between well-being and time with PA (total activity, maximum activity, and percent time active). Models were adjusted for demographics (age, sex, education, race), lifestyle (smoking, BMI), health status (chronic conditions), and fitness (resting heart rate).

**Results** Consistent with our hypothesis, positive affect ( $\beta=.14$ ,  $p<.05$ ) and composite eudaimonic well-being ( $\beta=.11$ ,  $p<.05$ ), as well as personal growth ( $\beta=.17$ ,  $p<.01$ ), positive relationships ( $\beta=.13$ ,  $p<.05$ ), and purpose in life ( $\beta=.16$ ,  $p<.01$ ) predicted total activity after full adjustment. Nearly identical associations were observed for percent time active, but not maximum activity. Interaction analyses revealed that the slope of PA with increasing lag time was steeper at higher levels of well-being. That is, the difference in later PA due to higher well-being is larger with increased lag time.

**Conclusion** This study provides evidence that well-being may increase objective PA up to 5 years later, and that well-being makes a unique contribution to long-term PA beyond other predictors.

**Abstract 1031**

**A RANDOMIZED CONTROLLED TRIAL OF THE COGNITIVE EFFECTS OF AN AEROBIC EXERCISE TRAINING INTERVENTION IN HEALTHY YOUNG ADULTS**

*Lars B. Margolis, B.A., Medicine, Columbia University College of Physicians and Surgeons, New York, NY, Paula S. McKinley, PhD, Medicine, Montefiore Medical Center, Bronx, NY, Adam M. Brickman, PhD, Neurology, Columbia University Medical Center, New York, NY, Kathleen M. McIntyre, MSW, Grace Liu, MA, Psychiatry, Columbia University Medical Center, New York State Psychiatric Institute, New York, NY, Jimmy K. Duong, MPH, Biostatistics, Mailman School of Public Health, Columbia University, New York, NY, Richard P. Sloan, PhD, Psychiatry, Columbia University Medical Center, New York State Psychiatric Institute, New York, NY*

**Background:**

Exercise-training and cardiorespiratory fitness have been associated with improved performance on cognitive assessments. However, the majority of studies have been performed in older adults. This study assessed the cognitive effects of an aerobic exercise training program for healthy young adults.

**Methods:**

242 young adults were recruited for a study of the effects of aerobic exercise training on inflammatory markers. Of these, 79 were enrolled in a substudy to assess for cognitive changes associated with exercise-training. The participants underwent baseline neuropsychological and  $VO_2$  max assessments prior to either a 12-week aerobic exercise training intervention or placement in a waitlist control group. Afterwards, 62 participants underwent repeat assessment. The outcomes of the following neuropsychological assessments were analyzed: Modified Rey Auditory Verbal Learning, CogState Identification Task, CogState Continuous Paired Associate Learning, CogState Groton Maze Chase, CogState One Card Learning, CogState One Back, ModBent average response time for correct rejections, Stark Separation Bias, Verbal Fluency Task, Category Fluency Test, Stroop Color-Word Interference, Digit Symbol Substitution Test. Statistical analysis was performed using a linear regression model where the outcome was change in score from baseline to follow-up, and the predictors were treatment group and baseline evaluation score.

**Results:**

The average age was 31.0 years-old (SD: 6.1), 50.0% were female. Mean  $\text{VO}_2$  max change in the exercise group was 3.88 mL/kg/min (SD: 2.89), as compared with (-) 1.02 mL/kg/min (SD: 4.00) in the control group ( $F(2,59)=15.28$ ,  $p<.001$ ). However, there was no significant effect on any of the neuropsychological domains assessed as defined by a significance level of  $p<0.05$ .

Conclusions: In a study of healthy young adults, an aerobic exercise-training intervention resulted in a statistically significant increase in aerobic capacity but did not result in improvements in cognitive functioning. These negative findings are consistent with the hypothesis that aerobic exercise training has the greatest neurocognitive effect in people with cognitive compromise, or at high risk for cognitive decline, but not in healthy young adults without apparent risk factors for cognitive decline.

#### **Abstract 1131**

#### **AEROBIC EXERCISE TRAINING AND INFLAMMATION ACROSS THE AGE SPAN - A CAUTIONARY TALE**

*Richard P. Sloan, PhD, Psychiatry, Columbia University Medical Center, New York, NY, Paula S. McKinley, PhD, General Medicine, Montefiore Medical Center 3300 Kossuth Ave. 2nd Floor, Bronx, NY, Kathleen McIntyre, LCSW, Vincenzo Lauriola, MS, Psychiatry, Martina Pavlicova, PhD, Biostatistics, Columbia University Medical Center, New York, NY, Tse-Hwei Choo, MS, Biostatistics, New York State Psychiatric Institute, New York, NY, Yaakov Stern, PhD, Neurology, Columbia University Medical Center, New York, NY*

#### **Objective**

The cardioprotective effects of aerobic exercise and the role of inflammation in atherogenesis suggest that one mechanism by which exercise contributes to cardioprotection through its anti-inflammatory effects. However, both observational and intervention studies have yielded equivocal results, with some studies showing that exercise was associated with lower levels of inflammatory markers and others showing no such effect. Here we report the results of a 24 week randomized controlled trial of aerobic exercise training vs. a stretching/toning control condition on serum TNF $\alpha$  and IL6 levels.

#### **Method**

129 healthy, sedentary adults (age 20-67 years) were randomly assigned to 24 weeks of either aerobic exercise training or a stretching/toning control condition. In either condition, participants attended 4 gym session/week. In the exercise condition, they performed 40 min of aerobic exercise beginning at 60% of their maximum heart rate and progressed to 75% after 4 weeks, where they remained for the rest of the intervention period. Stretching/toning participants practiced a series of stretches for 40 min in each session. Compliance with the protocol was established by Polar heart rate monitoring. Sedentary status and the effect of the exercise intervention were established by cardiopulmonary exercise testing. Blood samples for analysis of inflammatory markers were collected prior to randomization and after 24 weeks.

#### **Results**

$\text{VO}_2$ max increased by 11.58% in the exercise group compared to 0.96% in the stretching/toning group. However, there was no significant effect of group assignment on changes in TNF $\alpha$  levels ( $p=.91$ ), and neither treatment group's change in TNF $\alpha$  was significantly different from zero. While there also was no significant effect of group assignment on changes in IL6 ( $p=.89$ ), IL6 levels decreased from time 1 to time 2 in both the exercise and the stretching group, and the overall change in IL6, combining all subjects was significant ( $p=.03$ ).

#### **Discussion**

These findings raise questions about the often reported effect of aerobic exercise training on inflammatory markers. Despite significant improvements in aerobic capacity in the exercise group, there was no effect of training on TNF $\alpha$  and no difference between the two intervention groups in the effect on IL6, despite significant differences in changes in aerobic capacity.

## Symposium 1027

Friday, March 17 from 1:15 - 2:30 pm

**The Enduring Influence of Responsive Others: Implications for Health and Longevity across the Lifespan**

*Ledina Imami, M.A., Department of Psychology, Wayne State University, Detroit, Michigan, Sarah Stanton, Ph.D., Department of Psychology, University of Edinburgh, Edinburgh, Edinburgh, United Kingdom, Julianne Holt-Lunstad, Ph.D., Department of Psychology, Brigham Young University, Provo, Utah, Sarah Stanton, Ph.D., Department of Psychology, University of Edinburgh, Edinburgh, Edinburgh, Ledina Imami, M.A., Department of Psychology, Wayne State University, Detroit, Michigan, LillyBelle K. Deer, B.A., Department of Psychology, University of California-Davis, Davis, California, Beate Ditzen, Ph.D., Institute of Medical Psychology, University Hospital Heidelberg, Heidelberg, Heidelberg, Germany*

Perceived responsiveness and support from others are interpersonal processes that help us forge nurturing social bonds. Extensive research suggests that these processes allow us not only to build satisfying relationships, but also to sustain better health and well-being throughout the lifespan. The current symposium presents evidence from different developmental stages that addresses some of the most pressing questions arising from these insights: Which psychological mechanisms enable the health-promoting effects of responsiveness and social support? Which biological pathways underlie these links? And finally, are we able to successfully engineer social support interventions in clinical settings in order to reduce the mortality risk associated with social disconnection? The first talk reviews the association between social connection and survival odds and the robustness of this effect as revealed by two large meta-analyses. This talk also presents data from a third meta-analysis which critically examines current evidence from social support interventions and their effectiveness in reducing mortality risk. The following talks investigate the conditions under which responsive social ties are associated with beneficial health outcomes, as well as the biological processes that enable these associations. More specifically, the second talk investigates responsiveness processes among middle-aged adults and shows that increased perceptions of partner responsiveness over 10 years predict lower negative affectivity to daily stressors and lower all-cause mortality at the end of 20 years. The third talk examines how gender differences influence the association between perceived responsiveness, anti-inflammatory gene expression, and psychological well-being among youth with asthma. Finally, the fourth talk investigates the association between perceived support from close friends and cortisol reactivity to a laboratory-staged social evaluative stressor. The discussion will emphasize how these talks highlight the idea that being intimately connected to others in ways that make us feel valued and secure can have important implications for physical health and longevity. The symposium will conclude with a focus on the underlying psychobiological mechanisms and implications on how to use these insights in order to promote health and well-being across the lifespan.

**Individual Abstract Number: 1582****The Social Buffering of the HPA Axis in Children and Adolescents: The Role of Perceived Support from Close Friends**

*LillyBelle K. Deer, B.A., Department of Psychology, University of California-Davis, Davis, California, Megan R. Gunnar, Ph.D., Institute of Child Development, University of Minnesota, Minneapolis, Minnesota, Camelia E. Hostinar, Ph.D., Department of Psychology, University of California-Davis, Davis, California*

Positive relationships with close friends are associated with a plethora of beneficial mental and physical health outcomes across the lifespan. The stress-buffering role of social relationships has been proposed as

one underlying mechanism, but more research is needed to understand who can serve as a stress buffer at each developmental stage. The goal of the present study was to examine whether perceived social support from close friends is associated with lower cortisol reactivity to a laboratory-based stress paradigm in children and adolescents.

**Methods:** A sample of 81 children (ages 9-10,  $N = 40$ , 50% female) and adolescents (ages 15-16,  $N = 41$ , 48.8% female) completed the Trier Social Stress Test for Children (TSST-C) in the laboratory. Participants were randomly assigned to prepare for the TSST-C with their parent (low-stress condition) or a stranger (high-stress condition), followed by participating in the TSST-C alone. Salivary cortisol was collected 0, 20, 40, and 60 min post-stressor. Participants' perceived support from their closest same-sex friend was assessed using the Network of Relationships Inventory (Furman & Buhrmester, 2009) by averaging the Companionship, Instrumental Aid, Disclosure, Nurturance, Affection, Worth and Alliance scales (21 items,  $\alpha = .91$ ). Hierarchical linear modeling was used to model the cortisol response as a function of time and time-squared, including the effects of perceived friend support, age group, condition and their interactions in the model.

**Results:** Analyses revealed a significant interaction between perceived support from closest friends and condition on the linear time term,  $F(1,151) = 13.4, p < .001$ , and on the quadratic time term,  $F(1,151) = 9.2, p = .003$ , such that higher levels of perceived support from closest friends was associated with lower cortisol production in the high-stress condition. This effect was not noted in the low-stress condition. These findings remained significant after adjusting for sex, family income, life events, and prior-night sleep.

**Discussion:** The results suggest that, as early as age 9-10, perceived support from close friends may serve as an ongoing resource for children confronting stressful situations, and be associated with lower cortisol stress responses. The same effects were found in adolescents, consistent with the importance of peers during this developmental stage.

**Individual Abstract Number: 1257****Self-disclosure and Perceived Responsiveness in Youth with Asthma: Links to Gene Expression and Psychological Well-being**

*Ledina Imami, M.A., Department of Psychology, Wayne State University, Detroit, Michigan, Sarah Stanton, Ph.D., Department of Psychology, University of Edinburgh, Edinburgh, Edinburgh, United Kingdom, Samuele Zilioli, Ph.D., Department of Psychology and Department of Family Medicine and Public Health Sciences, Wayne State University, Detroit, Michigan, Erin T. Tobin, Ph.D., Henry Ford Health System, Henry Ford Health System, Dearborn, Michigan, Francesca Luca, Ph.D., Department of Obstetrics and Gynecology, Wayne State University, Detroit, Michigan*

Self-disclosure and responsiveness are two key intimacy-building processes that allow us to affiliate with others in ways that make us feel valued, understood, and secure. Emerging evidence suggests that self-disclosure and responsiveness may also have long-lasting consequences for physical health that extend beyond the romantic dyad. Despite the important implications of this line of work, researchers do not have a clear understanding of the conditions under which self-disclosure and responsiveness are more likely to lead to positive health outcomes. The current study examined how the interplay between these two processes affects biological pathways that sustain desirable health-outcomes among youth with asthma.

**Methods:** One hundred and forty two youth (12 -17 year old, 42% female) completed daily diaries throughout four days. Youth reported the extent to which they disclosed to others and rated their interaction partners' responsiveness to their disclosures. In addition, youth also reported the degree of negative and positive affect experienced throughout each day. NR3C1 gene expression was assessed by collecting 8 mL of peripheral blood from each youth after the daily diary period.

**Results:** Results revealed that among youth who disclosed more frequently, higher levels of perceived responsiveness were associated with higher levels of anti-inflammatory glucocorticoid receptor gene NR3C1 expression. Gender showed a moderating effect on responsiveness, such that higher levels of perceived responsiveness were linked with higher levels of NR3C1 expression in females but not in males. In terms of psychological well-being, findings revealed a significant interaction between self-disclosure and responsiveness for positive affect only. Higher levels of responsiveness were linked to higher levels of positive affect and this relationship was stronger among youth who engaged in self-disclosure more frequently.

**Discussion:** These findings are among the first to identify a molecular pathway through which intimacy-building processes can potentially impact immune responses and health outcomes in youth with asthma. In addition, our findings also suggest that the benefits of self-disclosure and responsiveness are not confined to adult romantic couples, but can have an important influence for both physical and psychological health throughout late childhood and adolescence.

**Individual Abstract Number: 1256**

**Partner Responsiveness Predicts All-Cause Mortality via Daily Negative Affect Reactivity: A 20-Year Longitudinal Study**

*Sarah Stanton, Ph.D., Department of Psychology, University of Edinburgh, Edinburgh, Edinburgh, Emre Selcuk, Ph.D., Department of Psychology, Middle East Technical University, Ankara, Ankara, Turkey, Allison K. Farrell, Ph.D., Richard B. Slatcher, Ph.D., Department of Psychology, Wayne State University, Detroit, Michigan, Anthony D. Ong, Ph.D., Department of Human Development, Cornell University, Ithaca, New York*

**Background:** Research has demonstrated that individuals with positive close relationships have a lower risk of death. Over and above simply being socially integrated, the quality of individuals' close relationships is an especially meaningful predictor of long-term health. The specific elements of relationship quality linked to health and longevity are not yet fully understood; however, growing evidence indicates that partner responsiveness—the extent to which people feel understood, cared for, and appreciated by their romantic partners—is positively linked to health and longevity. The effects of partner responsiveness may partly stem from its capacity to down-regulate reactivity to stressful events.

**Purpose:** This study tested longitudinal associations between partner responsiveness, negative affect (NA) and positive affect (PA) reactivity, and all-cause mortality in a sample of 1,208 U.S. adults over three waves of data collection spanning over 20 years.

**Method:** Participants completed measures of partner responsiveness at Wave 1 and Wave 2. At Wave 2, participants also completed an 8-day daily diary study wherein each day they reported whether they had experienced a number of common daily stressors, as well as their NA and PA. Names of participants who could not be contacted for a follow-up survey at Wave 3 were submitted to the National Death Index to ascertain if participants were deceased.

**Results:** Increases in partner responsiveness from Wave 1 to Wave 2 (10-year follow-up) predicted lower NA (but not PA) reactivity to daily stressors at Wave 2, which, in turn, predicted lower mortality risk a decade later (Wave 3). Results held when controlling for a number of demographic, health, and psychosocial factors.

**Discussion:** These findings provide some of the first direct evidence of psychological mechanisms underlying the links between marital relationships and mortality as well as the capacity for changes in partner responsiveness over time to be linked with long-term health. Partner responsiveness is a tractable and potentially modifiable target for marital therapy that could lead to beneficial reductions in negative reactions to daily stressors as well as improvements in health. Thus, a logical next step for future studies is to test interventions that promote an increase in partner responsiveness immediately and over time.

**Individual Abstract Number: 1029**

**Social (dis)Connection and Mortality Risk: A more Nuanced Approach Needed for Effective Interventions?**

*Julianne Holt-Lunstad, Ph.D., Department of Psychology, Timothy B. Smith, Ph.D., Department of Counseling Psychology, Devin Peterson, B.S., Department of Psychology, Brigham Young University, Provo, Utah*

Accumulating epidemiological data documents the association between social connection and longevity, but important questions remain regarding how to translate this to interventions aimed at risk reduction. Therefore, we examine meta-analytic data to address this issue.

**Methods:** We will first briefly present data from two previous meta-analyses establishing the overall association between social connection and survival odds ( $N=308,849$ ) and the overall effect of social deficits on mortality risk ( $N=3,407,134$ ). Then we will present data from a current meta-analysis examining the overall magnitude of mortality risk reduction among social support interventions in clinical populations—including 39 clinical trials and 14 non-experimental studies ( $N=19,648$ ).

**Results:** The previous meta-analyses reveal the magnitude of the effect of social connection and isolation is robust and rivals that of other leading health indicators; however, data from the intervention meta-analysis reveals a relatively modest effect for reducing mortality risk. Among studies examining discrete endpoint the OR = 1.21 (CI = .94-1.55; ns) and those examining time to death the HR = 1.32 (CI = 1.11-1.57;  $p < .002$ ).

**Discussion:** These findings suggest potential problems in translating observational data into effective interventions. Specifically, we will highlight gaps in the currently literature and point to potential limitations of current intervention approaches. We will conclude by discussing the potential implications of considering responsiveness to individual needs and desires (and when needs may not match desires) to increase effectiveness.

**Symposium 1051**

**Thursday, March 16 from 3:30 - 4:30 pm**

**Neuromodulation of emotion, cognition and behavior**

*Andreana P. Haley, Ph.D., Psychology, The University of Texas at Austin, Austin, TX, Sarah Prinsloo, Ph.D., General Oncology, The University of Texas MD Anderson Cancer Center, Houston, TX, Andreana P. Haley, Ph.D., Psychology, The University of Texas at Austin, Austin, TX, Asli Demirtas-Tatlidede, M.D., Neurology, Istanbul University, Istanbul, N/A, Turkey*

Millions of patients all over the world suffer the emotional, cognitive, and behavioral consequences of chronic illnesses such as cancer, cardiovascular diseases, stroke, psychiatric disorders, and dementia among others. While an ideal intervention for any of these conditions will restore each disordered physiological system to its original state, that is often not possible. Pharmacotherapies provide some symptom relief, but not infrequently add their own emotional, cognitive, and behavioral side effects. Neuromodulation through non-invasive means can be used to mobilize technology to advance health, to treat and enhance quality of life in individuals who suffer with persistent pain, spasticity, mood disorders, and cognitive impairment. This symposium is intended to provide an overview of several available tools for neuromodulation and some of their applications in treating disordered emotion, cognition, and behavior. Discussed neuromodulation tools will include electroencephalogram (EEG) neurofeedback (NF), transcranial low level light/laser therapy (LLLT), and repetitive transcranial magnetic stimulation (rTMS).



**Individual Abstract Number: 1564**

**Electroencephalographic (EEG) Neurofeedback to Treat Physical and Emotional Conditions: A Brain-Computer Interface to Regulate Brain Activity**

*Sarah Prinsloo, Ph.D., General Oncology, The University of Texas MD Anderson Cancer Center, Houston, TX*

Brain changes due to physical and emotional challenges have been well documented and are commonly measured via functional brain imaging techniques such as positron emission tomography and functional magnetic resonance imaging. However, the potential to measure temporal dynamics are often lost with these modalities. Because EEG imaging via quantitative EEG (qEEG) and Low Resolution Electromagnetic Tomography (LORETA) better measure temporal dynamics, we gain information about location and timing of brain function associated with symptoms. With advancement of technologies listed under the umbrella of 'brain-computer-interface', neuromodulatory techniques are becoming increasingly common as a symptom management tool for a variety of medical conditions. Although modifying the source of perception of the symptom, the brain, has been shown to relieve symptoms, these techniques are not yet the standard of care. For example, EEG neurofeedback (NFB) has been used successfully to treat a variety of health issues including pain, anxiety, and learning disabilities. NFB takes advantage of the learning process by providing 'feedback' to the participant about the workings of their own brain in real time while the participant plays a video game designed to reward brain change.

This presentation will focus on neuromodulation through NFB and will review imaging and treatment findings from the most recent studies regarding pain, mental health, and learning disabilities. A brief demonstration of EEG neurofeedback will be given.

**Individual Abstract Number: 1561**

**Neuromodulation of Cognition through Transcranial Laser Stimulation**

*Andreana P. Haley, Ph.D., Douglas Barrett, Ph.D., Enrique Vargas, H.S., Psychology, Evan Pasha, M.A., Hirofumi Tanaka, Ph.D., Kinesiology and Health Education, Francisco Gonzalez-Lima, Ph.D., Psychology, The University of Texas at Austin, Austin, TX*

**Background:** Cognitive impairment is the number one predictor of poor quality of life and loss of independence in the elderly. Decline in neurocognitive functions is often associated with highly prevalent chronic conditions such as cardiovascular disease and diabetes, thus impacting a great number of older adults, even those not suffering from dementia. While restoring cardiovascular health would be an ideal intervention in these cases, that is often not feasible and seeking alternative treatments to maintain and enhance cognitive function is of utmost importance. In this presentation, we will present data regarding the feasibility and efficacy of enhancing neurocognitive performance in the elderly through photoneuromodulation using non-invasive transcranial infrared laser to deliver low-power and high-fluence photonic energy to stimulate neuronal oxidative energy metabolism.

**Methods:** Twelve older adults (ages 49-90, median 54) underwent four weeks of transcranial laser stimulation. The psychomotor vigilance test (PVT, sustained attention) and the delayed match-to-sample test (DMS, working memory) were the primary outcome measures. Treatment consisted of applying light of a specific wavelength (1064 nm) using a laser diode supplied by Cell Gen Therapeutics, LLC (CG-5000 laser, HD Laser Center, Dallas, TX, USA). Each session included eight 1 min/cycle treatments alternating between two locations on the right forehead (right frontal polar and right midfrontal), each 4 cm in diameter. Each location was exposed to an irradiance (or power density) of 250 mW/cm<sup>2</sup> (3400 mW/13.6 cm<sup>2</sup> = 250 mW/cm<sup>2</sup>) for 4 min (3.4 W × 240 s = 816 J/location), which corresponds to a cumulative fluence (or energy density) of 60 J/cm<sup>2</sup> (0.25 W/cm<sup>2</sup> × 240 s = 60 J/cm<sup>2</sup>).

**Results:** Paired t-tests indicated a significant improvement after a Single Session vs. Baseline for PVT reaction time (p<0.05), PVT failures (p<0.001), and DMS correct responses (p<0.05). Paired t-tests conducted on Baseline vs. 4 Weeks of Treatment were significant for PVT reaction time (p<0.001), PVT failures (p<0.01), and DMS correct responses (p<0.05).

**Conclusion:** The present study demonstrates both within session and across session benefits of transcranial laser stimulation in older adults.

**Individual Abstract Number: 1289**

**Repetitive Transcranial Magnetic Stimulation for Regulation of Affect, Mood and Emotion**

*Asli Demirtas-Tatlidede, M.D., Neurology, Istanbul University, Istanbul, N/A, Turkey*

Repetitive transcranial magnetic stimulation (rTMS) is a novel noninvasive technique that employs rapidly fluctuating magnetic fields in order to regulate activity and enhance neuroplasticity within specific brain networks. Depending on the stimulation settings and number of applied sessions, rTMS-induced effects last beyond the time of application. In the last decade, this important feature led to its investigation as a treatment modality for neuropsychiatric diseases and numerous studies have been completed with promising results. In the clinical context, rTMS has been demonstrated to enhance induction of alterations in neural networks subserving affect, mood and emotion in several affective and cognitive disorders. Most prominently, large-scale studies have been carried out on the use of rTMS for treatment of major depressive disorder and recent meta-analyses of randomized-controlled studies confirmed the efficacy of repetitive transcranial magnetic stimulation in acute treatment of depression.

This presentation will focus on the neuromodulatory potential of repetitive transcranial magnetic stimulation with reference to findings from recent studies regarding affect, mood and emotion. A critical assessment of the available research on the symptomatology of depression, schizophrenia, autism, attention deficit and hyperactivity disorder will be provided. The perspectives of individually-tailored and neuronavigation-guided TMS, functionally relevant new target regions and innovative stimulation protocols for therapeutic effectiveness will be discussed.

**Symposium 1066**

**Thursday, March 16 from 2:00 - 3:15 pm**

**Harnessing mHealth Technology to Advance Intervention Research on Stress, Addiction, and Mental Health Disorders**

*Mustafa al'Absi, Ph.D., Biobehavioral Health, University of Minnesota Medical School, Minneapolis, MN, Inbal (Billie) Nahum-Shani, Ph.D., Institute for Social Research, University of Michigan, Ann Arbor, Michigan, , USA, Andrine Lemieux, Ph.D., Biobehavioral Health, University of Minnesota, Duluth, Minnesota, David W. Wetter, Ph.D., Population Health Sciences, University of Utah, Salt Lake City, Utah, Joel Swendsen, Ph.D., National Center for Scientific Research, University of Bordeaux, Bordeaux, Bordeaux, France, Emre Ertin, Ph.D., Electrical Engineering, Ohio State University, Columbus, Ohio*

Advancements in the field of mobile and wireless technologies provide a strong potential to transform health care. Levering advances in mobile technologies and applications to improve assessment and intervention strategies provides exciting opportunities to scientists and clinicians in behavioral health. This symposium will focus on novel evidence related to the use of recent technological innovations in the context of stress, addiction, and mental health assessment and intervention. The symposium will include the use of multiple technologies, including mobile phones, wearable sensors, and software applications in laboratory and field studies.

Presenters will focus on the following **themes**: 1) using real-time, real-world assessments of stressors and smoking lapse likelihood with a focus on assessment of minority specific stressors, such as discrimination; 2) developing novel applications for wearable sensors capable of unobtrusive measurement of stress physiology and smoking behavior; 3) using such technology for implementing “just-in-time” adaptive interventions (JITAI) for stress-management; and 4) reviewing the vast opportunities, challenges, and risks associated with the use of mobile technologies for research and treatment in the area of stress, addiction, and mental health.

The symposium will **conclude** with a discussion that will cover challenges in using mHealth in the context of stress and addictive behaviors, and opportunities for developing existing technologies to be used in delivering real-time interventions to mitigate the impact of stress on addictive behaviors and mental health problems. Future opportunities for intervention research, integration of these technologies with online social networks, using a team science approach will also be discussed.

#### **Individual Abstract Number: 1070**

##### **Unobtrusive Measurement of Stress and Smoking Psychophysiological Markers in the Natural Environment**

*Andrine Lemieux, Ph.D., Biobehavioral Health, University of Minnesota, Duluth, Minnesota, Motohiro Nakajima, PhD, Biobehavioral Medicine and Population Science, University of Minnesota, Minneapolis, MN, Soujanya Chatterjee, BE, Hillol Sarker, MS, Nazir Saleheen, MS, Computer Science, University of Memphis, Memphis, TN, Emre Ertin, PhD, Electrical and Computer Engineering, Ohio State University, Columbus, OH, Santosh Kumar, PhD, Computer Science, University of Memphis, Memphis, TN, Mustafa al'Absi, PhD, Biobehavioral Medicine and Population Science, University of Minnesota, Duluth, MN*

Applications of wearable sensors that are capable of unobtrusive measurement of stress and smoking could provide novel information on the various conditions in which smokers use tobacco in the natural environment. One such application is AutoSense, which consists of a respiration band, sensor probes (e.g., ECG), wrist bands with 6-axis inertial sensors, and a mobile phone. AutoSense continuously monitors physiological activity, subjective states, and environmental information. In our ongoing research examining physiological and psychosocial markers of stress and smoking ( $N = 72$ ), we conducted two preliminary projects to validate machine learning algorithms called *cStress* and *puffMarker*. The *puffMarker* is a model to detect smoking puffs in the natural environment (Saleheen et al., 2015). It uses data from two wearable sensors: a respiration band and two wrist bands. A smoking event is detected when the participant demonstrates the combined hand movements and respiratory cycles consistent with smoking. The rate of match in classifying lapse and no-lapse was 87% in *puffMarker* vs. retrospective interview, and 76% in *puffMarker* vs. Ecological Momentary Assessment. *cStress* is a computational stress model which estimates levels of the wearer's stress using physiological and subjective data. In past field studies the recall of signals was 89% and the rate of false positives 5%, while the accuracy 72% when compared with self-reports. Using *puffMarker* to define relapse in a field study requiring 72-hour abstinence, abstinent participants showed a progressive rise in *cStress* over the 72 hour abstinence ( $p = .02$ ) while lapsers showed no change at all. *cStress* during pre-quit period correlated positively with depressive affect ( $p = .008$ ). High *cStress* was moderately associated with fewer cigarettes per day ( $p = .009$ ), which was specific to abstainers ( $p = .01$ ) but not relapsers ( $p > .10$ ). These results provide initial evidence that AutoSense and the machine learning algorithms could contribute to the assessment of stress and smoking relapse in the field in clinically relevant populations.

#### **Individual Abstract Number: 1068**

##### **Acute Stressors, Discrimination, and Smoking Lapse Likelihood Among Underserved Groups**

*David W. Wetter, Ph.D., Cho Lam, PhD, Population Health Sciences, University of Utah, Salt Lake City, Utah, Christine Vinci, PhD, Health Outcomes and Behavior, Moffitt Cancer Center, Tampa, Florida, Aaron Haslam, BA, Psychology, Texas Tech University, Lubbock, Texas, Liang Li, PhD, Biostatistics, University of Texas MD Anderson Cancer Center, Houston, Texas*

Several conceptual models posit that greater exposure to stressors is a key mechanism linking underserved status to lower rates of smoking cessation. Surprisingly, there are only a handful of studies examining the impact of acute stress on real time, real world cessation outcomes, and to the best of our knowledge, none that examine the acute effects of minority specific stressors such as discrimination. Two longitudinal cohort studies examined the influence of acute stressors on the likelihood of smoking lapse. In both studies, smokers received smoking cessation treatment (behavioral, patch) and were tracked both pre- and postcessation using Ecological Momentary Assessments (EMA). The first study included 364 predominantly low socioeconomic status smokers evenly split among African Americans, Latinos, and Whites. Participants reported the presence of a new stressor in 3%, an ongoing stressor in 10%, and both new and ongoing stressors in 31% of EMAs. The presence of any stressor (new  $OR=2.1$ ,  $p<.001$ ; ongoing  $OR=1.4$ ,  $p=.003$ ; both  $OR=1.8$ ,  $p<.001$ ) increased the likelihood of a lapse in the next 4 hours, even after controlling for smoking in the previous 4 hours. There was no synergistic effect of experiencing both new and ongoing stressors. The second study examined the impact of acute discrimination on lapse likelihood among 159 Spanish speaking Latino smokers. Participants reported that they were certain they had experienced discrimination in <1% of EMAs. The presence of discrimination increased the likelihood of a lapse in the next 4 hours ( $OR=6.1$ ,  $p<.03$ ), even after controlling for smoking in the previous 4 hours. The results from these studies suggest that acute stressors place underserved populations at greater risk for poor cessation outcomes. Ongoing research is building on these data using state of the science methodologies such as AutoSense and geographic positioning system (GPS). AutoSense tracks behavioral and physiologic data in real-time and can objectively detect when an individual smokes or encounters a stressor. GPS permits real-time spatial mapping, which can be paired with EMA and Autosense, and with relevant environmental exposures (e.g., tobacco outlets; area-level poverty).

#### **Individual Abstract Number: 1067**

##### **Stress-management just-in-time adaptive interventions: opportunities and challenges**

*Inbal (Billie) Nahum-Shani, Ph.D., Institute for Social Research, University of Michigan, Ann Arbor, Michigan, Bonnie J. Spring, PhD, Preventive Medicine (Behavioral Medicine), Psychiatry and Behavioral Sciences and Weinberg College of Arts and Sciences, Northwestern, Chicago, IL, Susan A. Murphy, PhD, Department of Statistics and Institute for Social Research, U of Michigan, Ann Arbor, Michigan*

The use of smartphones to prevent and support the treatment of addictions and other chronic disorders is increasing rapidly. Mobile and wearable devices facilitate the delivery of Just-In-Time Adaptive Interventions (JITAI)—an intervention design in which the timing and type of support are adapted over time to address rapid changes in an individual's state and context. More specifically, JITAI operationalize the personalization of the real time selection, and real time delivery, of intervention options based on real time assessments (e.g. just-in-time personalized medicine). A JITAI approach can help individuals better regulate stress; where stress is defined here as a state in which an individual's homeostasis is threatened by adverse conditions. First, although empirical evidence suggests that brief emotion-regulation exercises, such as those based on mindfulness approaches, are effective; empirical evidence also suggests that individuals rarely use these exercises to regulate stress in real-life. Hence, providing just-in-

time recommendations to engage in these exercises might be beneficial. Moreover, providing emotion-regulation interventions when stress arises in the person's natural environment can help him/her better identify and address "hot" or emotionally laden situations and bounce back quickly from stressful situations. Capitalizing on such "teachable moments" can support the learning of emotion regulation skills. Despite the potential of the JITAI approach for supporting stress management, most current empirical evidence and health behavior models fail to provide the dynamic theory necessary for guiding when and how to provide support so as to help individuals better regulate stress experiences, as they occur in real-life. Here, we will review the key elements of JITAIs, using an example of a stress-management JITAI – Sense2stop—to guide the discussion. Currently under development, Sense2stop is designed to help individuals attempting to quit smoking regulate real-time experiences of stress in order to prevent stress-induced lapses. Open scientific questions concerning the development of this JITAI will be reviewed, and directions for future research aiming to advance the science of JITAIs for supporting stress management will be discussed.

**Individual Abstract Number: 1069**

**The Huge Benefits, and Enormous Risks, of Mobile Technologies for Research and Treatment**

*Joel Swendsen, Ph.D., National Center for Scientific Research, University of Bordeaux, Bordeaux, Bordeaux, France*

The use of mobile technologies in mental health research has expanded exponentially over the past two decades, and these applications are increasingly used for treatment purposes. Using substance addiction as an illustration, this talk will demonstrate how mobile technologies overcome two traditional methodological barriers in research that have been long-acknowledged but remain poorly mastered. The first barrier is that of time, whereby the mechanisms underlying the expression of symptoms often have a very brief 'life cycle' spanning periods of seconds to hours, but are paradoxically studied in most clinical research protocols over periods of weeks or months. The second barrier is that of context, in that while some laboratory or hospital research protocols may be able to overcome temporal constraints, they are limited to assessments in the same environment each time. Mobile technologies overcome both limitations in order to investigate the expression of clinical phenomena in real-time and in the daily lives of patients. This approach can also be personalized to each patient in order to understand their unique risk and protective factors. However, despite the enormous benefits of this methodology for research purposes, its application to clinical treatment poses complex questions. Indeed, mobile technologies have the capacity to provide reminders and interventions at the very moment that they are most needed by patients, but they also have substantial limitations that may be counterproductive and, at times, dangerous.

**Symposium 1088**

**Saturday, March 18 from 2:15 - 3:15 pm**

**Early Life Adversity Predicts Coronary Heart Disease: Evidence, Mechanisms and Implications**

*Richard Lane, M.D., Ph.D., Psychiatry, University of Arizona, Tucson, AZ, Eric B. Loucks, PhD, Epidemiology, Brown University, Providence, Rhode Island, Shaoyong Su, PhD, Pediatrics, Augusta University Medical College of Georgia, Augusta, Georgia, Christine Power, PhD, Population, Policy and Practice Programme, University College London, Great Ormond Street Institute of Child Health, London, -, UK, Christoph Herrmann-Lingen, MD, Psychosomatic Medicine & Psychotherapy, Univ. of Göttingen Medical Center, Göttingen, Nds, Germany*

Stress, depression, anxiety, hostility, social isolation and adult socioeconomic status are established predictors of morbidity and mortality in coronary heart disease (CHD). A less well known and less appreciated area for which compelling evidence is emerging is the effect of early life adversities (disadvantage, abuse and neglect) on risk for CHD in adulthood. The first speaker will present compelling evidence from several large epidemiological studies showing that early adversities increase risk for incident CHD and mortality in adulthood. The second speaker will review evidence from human and experimental animal studies showing that stress in early life compromises endothelial function and blood pressure regulation. The third speaker will present evidence from the 1958 British Cohort study showing that a variety of early adversity factors predict risk factors for cardiometabolic disease, including obesity, dyslipidemia, hyperglycemia and inflammation. Each speaker will discuss implications for preventive intervention efforts to counteract the effects of early adversity. The discussant will address the adaptations that occur in the context of early adversity that predispose to physiological dysregulation and later heart disease, the implications of the current findings for clinical intervention and treatment, and the most pressing needs for future research in this area.

**Individual Abstract Number: 1142**

**Associations of adverse childhood experiences with cardiovascular disease incidence and mortality: An overview with implications on providing stronger tests for causality.**

*Eric B. Loucks, PhD, Epidemiology, Brown University, Providence, Rhode Island*

There is increasing evidence that Adverse Childhood Experiences (ACEs) predict cardiovascular disease (CVD) incidence and mortality, although methods to date have limitations, and effect sizes are somewhat variable. For example the ACE Study of 17,337 participants demonstrated an odds ratio of 3.6 (95% CI: 2.4-5.3) of ischemic heart disease for those with  $\geq 7$  vs. 0 ACEs. A prospective population-based study in Finland (n=23,916) found significant positive linear trends between number of ACEs and risk of incident, confirmed CVD cases; evidence was stronger in females than males. The prospective Nurses' Health Study (n=66,798) found, for those with severe vs. no physical abuse, hazard ratios of 1.46 (95% CI: 1.11, 1.92) for CVD events. A United States nationally representative telephone survey collected exposure information on ACEs from 53,998 adults in 10 US states and District of Columbia, and found that exposure  $\geq 7$  vs. 0 ACEs was associated with 3.8 (95% CI: 1.9, 7.8) higher odds of self-reported coronary heart disease. Details on the quality and quantity of evidence for the relation of ACEs with CVD incidence and mortality will be provided, with implications of ways forward to provide stronger tests for causality. One direction forward that will be emphasized includes randomized controlled trials customized to participants with ACEs. Evidence will include that from randomized controlled trials evaluating impacts of mindfulness-based interventions, showing differential effects between participants with low vs. high ACEs. New data will be shown, demonstrating in a clinical trial of Mindfulness-Based Blood Pressure Reduction, evidence of faster reductions in blood pressure for those with  $\geq 2$  vs.  $< 2$  ACEs.

**Individual Abstract Number: 1182**

**Endothelial Dysfunction, a Potential Mechanism Linking Early Life Stress and Cardiovascular Disease**

*Shaoyong Su, PhD, Pediatrics, Augusta University Medical College of Georgia, Augusta, Georgia*

Adverse environments in early life have been consistently associated with increased risk of cardiovascular diseases in later life, including hypertension. Recently, we have shown that young adults who were exposed to multiple adverse childhood experiences (ACEs) displayed an earlier onset of elevated BP compared to their counterparts without a history of ACEs, measured by the casual BP. Furthermore, using 24 hour ambulatory BP data collected from a longitudinal youth cohort,

we found that individuals exposed to ACEs showed altered BP regulation in real life, with increased BP variability in daytime and persistently high BP levels during nighttime. However, the underlying mechanism remains unclear. Study in rats showed that maternal separation, a rodent model of early life stress, induced increased circulating endothelin-1 (ET-1) levels, as well as BP reactivity through the ET-1 pathway. ET-1 is well known as a potent vasoconstrictor with inotropic and proinflammatory properties. Furthermore, in a study of 221 healthy adolescents and young adults, we found graded associations of ACE exposure with plasma ET-1 levels, which were on average 18% and 24% higher in participants with 1 ACE and  $\geq 2$  ACEs, respectively, vs. those without ACEs ( $P=0.001$ ). Dysregulation of the endothelin pathway is considered to occur early during development of atherosclerosis and vascular complications. Elevated plasma ET-1 levels have been found in patients with coronary heart disease, heart failure, and pulmonary arterial hypertension. These studies suggest that altered endothelial function may in part underlie the link between early life stress and development of cardiovascular disease. We will review the evidence from human and experimental animal studies to indicate how stress in early life compromises endothelial function. Some new data and preliminary results from our longitudinal youth cohort will be presented.

#### **Individual Abstract Number: 1155**

##### **Early life adversities and risk factors for cardiometabolic disease: a population cohort followed to mid-life.**

*Christine Power, PhD, Population, Policy and Practice Programme, University College London, Great Ormond Street Institute of Child Health, London, -, UK*

Early life adversities (ELAs) are suspected to lead to cardiometabolic outcomes, such as ischaemic heart disease mortality. Attention has now turned to establish the full extent of long-term outcomes and associated mechanisms. One problem in research to date is the inter-relatedness of ELAs, hence many studies examine cumulative types of adversity. Whilst emphasising the increased health burden of those with multiple ELAs, the cumulative adversities approach is limited for the purpose of understanding mechanisms as we cannot assume that mechanisms operating are the same for a range of ELA-adult outcome associations. To shed light on mechanisms, the aim of this work is assess (i) whether specific ELAs namely, neglect and different forms of abuse, are related similarly to cardiometabolic intermediate phenotypes and (ii) whether explanations for child-adult outcome relationships differ. Data are from a general population birth cohort ( $N=10,000$ ) in the UK with information collected during child and adulthood to age 50y. Child neglect, physical, psychological and sexual abuse were associated with dyslipidemia and, except for psychological abuse, also with raised glycated haemoglobin. After adjustment for other early life factors (birthweight and early life socio-economic position) associations for neglect and abuse were modest. For example, physical abuse was associated with an increased risk of elevated LDL-cholesterol (odds ratio 1.24 (95% CI 1.00,1.55) and psychological abuse with increased risk of elevated triglycerides ( $OR=1.23(1.03,1.46)$ ). ELA groups differed from their contemporaries in terms of their lifetime development of adiposity, mental health and adult lifestyles: e.g. 32 to 47% of maltreated (neglect and abuse) females were smokers at 50y vs 20% of non-maltreated ( $p<0.001$ ). After adjusting for these factors associations of ELAs and mid-life lipid and glucose measures were no longer evident; lifestyle differences were particularly important in explaining associations. By examining child neglect and abuse independent of other ELAs, notably economic disadvantage and poor prenatal development, our study suggests some modest specificity of child neglect and abuse associations with mid-life lipid and glucose metabolism. Implications for future research directions and interventions will be outlined.

#### **Symposium 1187**

**Thursday, March 16 from 2:00 - 3:15 pm**

##### **Current Directions in SES Disparities Research: Socio-emotional and physiological mechanisms.**

*Meanne Chan, PhD, Psychology, University of Toronto, Toronto, Ontario, Canada, Jenny Cundiff, PhD, Psychological Sciences, Texas Tech University, Lubbock, TX, United States of America, Frederick K. Ho, PGDE, Pediatrics and Adolescent Medicine, University of Hong Kong, Pokfulam, Hong Kong, Hong Kong, Meanne Chan, PhD, Psychology, University of Toronto, Toronto, Ontario, Canada, Kharah M. Ross, PhD, Psychology, University of California Los Angeles, Los Angeles, CA, United States of America, Jennifer Morozink Boylan, PhD, Health and Behavioral Sciences, University of Colorado Denver, Denver, Colorado*

The robust socioeconomic gradient in wellbeing and health outcomes has garnered extensive mechanistic research in the past two decades. The objective of this symposium is to further contribute to this literature by examining novel pathways across distinct socio-emotional and physiological domains. This symposium will bring together data from different developmental periods across the life course (e.g., adolescence, motherhood) and cultural backgrounds, and includes both longitudinal and meta-analytic results. One study shows, using two waves of longitudinal data, that factors such as sleep, physical activity, and parenting style may link socioeconomic position to socio-emotional functioning. Another study will present data showing that aspects of socio-emotional functioning, such as emotion regulation as well as implicit theory of emotions, may foster social mobility and attenuate the association between lower socioeconomic position and higher inflammatory biomarkers in a sample of adolescents. A third study will examine cardiometabolic risk during pregnancy and its relation to postnatal outcomes in a racially and socioeconomically diverse sample of women. The fourth and final study will present a systematic review and meta-analysis examining whether cardiovascular reactivity is a viable mechanism for explaining how low socioeconomic position “gets under the skin” to influence cardiovascular health. Findings add to the current understanding of mechanisms connecting socioeconomic disadvantage to health across development, and provide new insights into viable targets for intervention.

#### **Individual Abstract Number: 1190**

##### **Widening socioeconomic gap in child development and multi-domain mechanisms: Chinese kindergarten cohort study**

*Frederick K. Ho, PGDE, Pediatrics and Adolescent Medicine, Nirmala Rao, PhD, Faculty of Education, University of Hong Kong, Pokfulam, Hong Kong, Hong Kong, Meanne Chan, PhD, Psychology, University of Toronto, Toronto, Ontario, Canada, Ko Ling Chan, PhD, Social Work and Social Administration, Patrick Ip, MPH, Paediatrics and Adolescent Medicine, University of Hong Kong, Pokfulam, Hong Kong, Hong Kong*

Socioeconomic disparity in cognitive and socioemotional functions already exists in preschool. However, a dearth of longitudinal data tracking the dynamic changes of disparity from preschool to schooling ages has limited the exploration of mechanisms. The current study utilized a cohort sample to address this gap as an extension of Ip et al. (2016), which recruited a population representative sample of 5-year-old Chinese preschoolers. Health behaviours, parenting style, and family functioning dimensions were examined as possible mediators. The cohort was revisited four years after initial recruitment ( $N=519$ , Mean age=9.33 years, 55.3% girls, 76.2% retention). The effect of SES on both cognitive and socioemotional functions were relatively small ( $\eta^2=.02, p<.01$ ) in initial recruitment but the effect became stronger at follow-up (cognitive development:  $\eta^2=.09, p<.0001$ ; socioemotional development:  $\eta^2=.05, p<.0001$ ; symptoms of attention-deficit hyperactivity disorder:  $\eta^2=.02, p=.008$ ). Controlling for baseline SES, an upward change in SES also predicted better socioemotional development ( $\beta=.10, p=.02$ ).

Using path analysis, early exposure to electronic devices and family learning environment were identified as the mediators between SES and cognitive development, which collectively explained 33.6% of the main effect. Similarly, the mediators for socioemotional development were early exposure to electronic devices, regular sleeping habit, sleep quality, authoritarian parenting style, and physical activity level, which explained 73.8% of the main effect. Findings suggest a widened socioeconomic gap among Chinese children, which may be partially explained by behavioural risk factors such as exposure to electronic devices, sleep patterns, and physical activity, as well as family functioning. Comprehensive models exploring risk and resilience processes will be discussed. These diverse mediators serve as potential entry points to tackle vulnerable trajectories with early interventions.

**Individual Abstract Number: 1191**

**Establishing adaptive social capital in the face of risk: Subjective social status, emotion processing, and CVD risk in young adults**

*Meanne Chan, PhD, Psychology, University of Toronto, Toronto, Ontario, Canada, Iris Chat, MA, Psychology, Northwestern University, Evanston, Illinois, Meghan Vinograd, MA, Michelle G. Craske, PhD, Madeline Roth, BA, Psychology, University of California Los Angeles, Los Angeles, CA, Gregory E. Miller, PhD, Rick Zinbarg, PhD, Robin Nusslock, PhD, Psychology, Northwestern University, Evanston, IL*

**Objectives:** Independent of objective socioeconomic conditions (SES), subjective social status (SSS) has predicted morbidity. However, it has also been suggested that changes in subjective social status can have detrimental effects. The social capital needed for adaptive upward social mobility and reduced health implications remain unclear. This study examined SSS with emotion regulation, implicit theory of emotion, and parental care in a sample of adolescents transitioning to adulthood. Indicators of obesity and systemic inflammation were indexed as early cardiovascular risk.

**Method:** The sample consisted of 113 healthy young adults aged 18 to 19. SSS was assessed with the two versions of MacArthur Scale (nation and community). Re-appraisal vs. suppression regulation approaches was measured with Emotion Regulation Questionnaire. Fixed vs. malleable theories of emotion was assessed by Implicit Theories of Emotion Scale. Parental care during the first 16 years of life was indexed with Parental Bonding Inventory. Obesity dimensions include waist circumference and body mass index. Systemic inflammation was indexed by C-reactive protein (CRP) levels measured from peripheral blood. Age, gender, and ethnicity were included as covariates.

**Results:** Above and beyond objective SES (years of education), higher community SSS was associated with lower waist circumference ( $b = -.58$ ,  $t = -1.946$ ,  $p = .05$ ). Nation SSS interacted with reappraisal tendencies to predict CRP levels ( $b = .47$ ,  $t = 3.38$ ,  $p < .05$ ), while community SSS interacted with parental care to predict CRP levels ( $b = 1.27$ ,  $t = 2.47$ ,  $p < .05$ ). Patterns indicate that CRP levels are the lowest for those individuals higher in SSS but who also use reappraisal approaches to regulate emotion and report greater care from parents during childhood. On other hand, marginal interactions emerged between nation SSS and the entity subscale of Implicit Theory of Emotion ( $b = -.14$ ,  $t = -1.97$ ,  $p < .10$ ), such that those individuals higher in nation SSS but reported a more fixed theory of emotion had higher levels of CRP.

**Conclusions:** These findings point to domains of emotion processing that help explain how subjective social status can buffer against health implications associated with socioeconomic disadvantage, as well as implicit theories that may hinder adaptive social mobility.

**Individual Abstract Number: 1189**

**Race/ethnicity, Socioeconomic Status and Diagnosis with Pregnancy Cardio-metabolic Disorders and Postpartum Cardio-metabolic Risk**

*Kharah M. Ross, PhD, Psychology, University of California Los Angeles, Los Angeles, CA, Christine Guardino, PhD, Christine Dunkel Schetter, PhD, Psychology, University of California, Los Angeles, Los Angeles, CA, Calvin J. Hobel, MD, Obstetrics and Gynecology, Cedars Sinai Medical Center, Los Angeles, CA*

*Angeles, CA, Calvin J. Hobel, MD, Obstetrics and Gynecology, Cedars Sinai Medical Center, Los Angeles, CA*

Health disparities affect individuals of non-White race and lower socioeconomic status (SES). Pregnancy metabolic complications, although sometimes resolved when pregnancy ends, may “program” a woman’s physiology to increase postpartum cardiovascular disease risk. How factors implicated in health disparities interact with pregnancy metabolic complications to predict postpartum cardio-metabolic risk is understudied, with implications for identifying at-risk women and managing postpartum health. The purpose of these analyses was to assess whether SES, race/ethnicity and pregnancy metabolic disorders interact to predict postpartum cardio-metabolic risk. **Methods.** Women ( $n = 1717$ ; 53% Black) were recruited after birth in 5 US communities. Household income and size defined poverty status: Poor ( $<$ Federal Poverty Level [FPL], 43% of sample), near poor (100-200% FPL), low income ( $>$ 200% FPL). Medical records identified women with a pregnancy metabolic disorder (preeclampsia, gestational hypertension, gestational diabetes). Four biomarkers were collected at 6 and 12 mos postpartum and used to calculate an average postpartum cardio-metabolic risk index: Mean arterial pressure, glycosylated hemoglobin, total cholesterol:HDL ratio, and waist-hip ratio. Covariates were maternal age, pre-pregnancy BMI, parity, health behaviors, breastfeeding and employment status. **Results.** Binary logistic analyses revealed that Black women were 84% more likely to have had a pregnancy metabolic disorder compared to Latina and White. A 3x3x2 ANCOVA revealed a race x poverty status interaction. Low income Black women had greater cardio-metabolic risk compared to poor Black and all Latina and White women. A marginally significant interaction between race/ethnicity, poverty status and pregnancy metabolic disorder further suggested that low income black women who also had a pregnancy metabolic disorder had greater postpartum cardio-metabolic risk compared to all other groups. **Conclusion.** Black women were more likely to have had a pregnancy metabolic disorder compared to non-Black. Low income Black women had greater risk than poor Black and non-Black women, and diagnosis of a pregnancy metabolic disorder exacerbated this risk. These findings echo research reporting inverse SES gradients in Black samples, and how Black women may be disproportionately impacted by cardio-metabolic complications.

**Individual Abstract Number: 1192**

**Socioeconomic Status and Acute Cardiovascular Responses to Stress in the Laboratory: A Systematic Review**

*Jennifer Morozink Boylan, PhD, Health and Behavioral Sciences, University of Colorado Denver, Denver, Colorado, Jenny M. Cundiff, PhD, Psychological Sciences, Texas Tech University, Lubbock, TX, Karen A. Matthews, PhD, Psychiatry, University of Pittsburgh, Pittsburgh, PA*

Disparities in health by socioeconomic status (SES) are a pressing public health concern. Individuals with less education, lower incomes, and less prestigious occupations have more adverse biological risk factors and higher rates of morbidity and mortality than more advantaged counterparts. One of the key physiological mechanisms hypothesized to underlie how SES “gets under the skin” to affect poor health is through physiological dysregulation in stress responses systems, including the cardiovascular system. However, empirical evidence examining cardiovascular reactivity and recovery to stress as a mediator of socioeconomic disparities in health has not been systematically reviewed. Building on prior meta-analytic research that greater cardiovascular reactivity and poorer cardiovascular recovery are predictive of adverse cardiovascular outcomes and mortality (Chida & Steptoe, 2010, *Hypertension*; Panaite et al., 2015, *Psychosomatic Medicine*), the current study presents results from a systematic review of the literature on SES and cardiovascular (i.e., blood pressure and heart rate) reactivity and recovery to stress. PubMed and PsycINFO databases were searched, and 28 studies with relevant data were identified after thorough examination. Included studies had at least one



measure of SES *and* at least one measure of blood pressure or heart rate reactivity or recovery to an acute stressor among adolescent or adult samples (>12 years). Extant data across studies support that lower SES individuals exhibit reliably greater cardiovascular reactivity to stress, although the cumulative difference appears small, and there is notable heterogeneity in effect size. While considerably fewer studies have examined associations between SES and cardiovascular parameters in recovery from stress ( $n=9$ ), all but one support that lower SES individuals exhibit delayed recovery or higher blood pressure or heart rate during the recovery window following a stressor. Race is an important moderating factor in understanding the association between SES and cardiovascular reactivity and recovery that will be explored in the forthcoming meta-analysis, in addition to moderation by gender, SES indicator, and stressor type (i.e., physical or psychological). Taken together, results support cardiovascular responses to stress as a pathway underlying socioeconomic health disparities.

## Symposium 1219

Friday, March 17 from 2:45 - 3:45 pm

### Beat-to-Beat Blood Pressure Variability in a Large, National Study: Results from the Midlife in the US Study

*Richard P. Sloan, PhD, Psychiatry, Columbia University Medical Center, New York, NY, Tara Gruenewald, PhD, Gerontology, California State University, Long Beach, Long Beach, California, Richard P. Sloan, PhD, Psychiatry, Columbia University Medical Center, New York, NY, Joshua Sweigert, BS, College of Physicians and Surgeons, Columbia University Medical Center, New York, NY, Tara Gruenewald, PhD, Gerontology, California State University, Long Beach, Long Beach, CA, Joseph E. Schwartz, PhD, Medicine, Columbia University Medical Center, New York, NY*

For decades, it has been widely recognized that lower heart rate (HR) is associated with reduced morbidity and mortality. But HR is not stable - it fluctuates around the mean, even at rest. Beginning in the 1970's, research began to reveal that these fluctuations were not random noise but rather were organized into distinct periodicities that reflect underlying physiology. Quantification of these oscillations as Heart Rate Variability (HRV) indicates individual variation predictive of cardiovascular disease outcomes in initially healthy community samples. Thus, measurement "noise" in HR is now recognized as a valuable index of cardiovascular health and community studies have begun to explore its relationship to sociodemographic and psychosocial factors to understand the contextual factors that drive risk of CAD.

Today, blood pressure (BP) is in the same position as HR was 40 years ago. While the clinical significance of BP level is widely appreciated, within-subject BP variability (BPV), once dismissed as noise, is now thought to contain valuable information. However, the time scale of BPV measurement (e.g., week-to-week, year-to-year) has typically been much greater than for HRV. But BP also varies on a beat-to-beat basis, in the same frequency range as HRV, and beat-to-beat BPV may hold similar prognostic significance as HRV.

We will present findings from the first large, national study, the Midlife in the U.S. (MIDUS) Study, to collect beat-to-beat BPV and baroreflex sensitivity (BRS) data under conditions of rest and psychological and physical challenge. Presentations will report on sociodemographic (age, race, sex, socioeconomic status) variations in BPV and BRS under resting, challenge and recovery conditions and associations of beat-to-beat BPV and BRS with other autonomic nervous system, cardiovascular and endocrine biomarkers, morbid conditions, cognitive function and mortality. Presentations will highlight how beat-to-beat BPV and BRS variations diminish with advancing age and how greater reactivity and recovery of each are linked to cognitive function and mortality over time.

## Individual Abstract Number: 1228

### Effects of Age, Sex, And Race on Beat To Beat Blood Pressure Variability - The MIDUS Study

*Richard P. Sloan, PhD, Psychiatry, Columbia University Medical Center, New York, NY, Paula McKinley, PhD, Medicine, Montefiore Medical Center, Bronx, NY, Teresa Seeman, PhD, Gerontology, UCLA, Los Angeles, CA, Maxine Weinstein, PhD, Graduate School of Arts and Sciences, Georgetown University, Washington, DC, Gayle Love, PhD, Institute on Aging, University of Wisconsin, Madison, WI, Joseph E. Schwartz, PhD, Medicine, Columbia University Medical Center, New York, NY, Tara Gruenewald, PhD, Gerontology, University of Southern California, Los Angeles, CA*

Like heart rate, blood pressure oscillates at low (0.04 – 0.15 Hz, LF-BPV) and high (0.15 – 0.40 Hz, HF-BPV) frequency ranges. HF-BPV is the mechanical product of respiration-induced changes in intrathoracic pressure. The physiology of LF-BPV are less clear, with evidence that it may be the product of a central sympathetic oscillator, a resonance phenomenon, or the feedforward product of heart rate variability. Whether BPV is clinically meaningful is unknown, largely because the technical difficulties in noninvasively measuring beat-to-beat BPV have been difficult to overcome. For similar reasons, the effects of age, sex, and race on BPV have not been established. Here, we report analyses of LF-BPV during 11 min of seated rest using data from the Midlife in the US (MIDUS) study. Data were collected as part of a longer psychophysiology testing session.

Spectrally-defined LF-SBPV and LF-DBPV were inversely related to age, with this effect most pronounced for LF-DBPV. In unadjusted and covariate-adjusted models, both SBPV and DBPV were greater in men compared to women. Whites and non-whites did not differ in either measure of BPV. Socioeconomic status, measured either as educational attainment or income, generally was unrelated to BPV.

LF-BPV was significantly but weakly and inversely related to several inflammatory markers and urinary norepinephrine. It was inversely related to HDL cholesterol but positively related to LDL cholesterol. LF-DBPV was also inversely related to HbA1c. Both LF-SBPV and DBPV were inversely related to health condition burden. BPV was higher in hypertensives than normotensives, lower in diabetics than nondiabetics, lower in those with low CRP, and marginally lower in the obese compared to non-obese participants.

## Individual Abstract Number: 1230

### Beat-to-Beat Blood Pressure Variability and Cognition in the MIDUS Study

*Joshua Sweigert, BS, College of Physicians and Surgeons, Columbia University Medical Center, New York, NY, Paula McKinley, PhD, Internal Medicine, Montefiore Medical Center, Bronx, NY, Margie Lachman, PhD, Psychology, Brandeis University, Waltham, MA, Tara Gruenewald, PhD, Gerontology, California State University, Long Beach, Long Beach, CA, Teresa Seeman, PhD, Internal Medicine, UCLA, Los Angeles, CA, Gayle Love, PhD, Gerontology, University of Wisconsin, Madison, WI, Maxine Weinstein, PhD, Epidemiology, Georgetown University, Washington, D.C., Kathleen McIntyre, LCSW, Psychiatry, Jimmy Duong, MPH, Biostatistics, Richard P. Sloan, PhD, Psychiatry, Columbia University Medical Center, New York, NY*

**Background:** Blood pressure variability (BPV), the standard deviation of visit-to-visit measures of systolic and diastolic blood pressure, has been shown to provide meaningful prognostic information on numerous health outcomes, including risk of stroke, coronary artery disease and poorer cognitive performance. Advances in monitoring technology now permit measurement of beat-to-beat blood pressure but few studies have examined relationships between beat to beat variability and clinical outcomes. Here, we report on the relationship between beat-to-

beat blood pressure variability and cognitive function in a large, representative population sample.

**Methods:** 842 subjects (mean age =  $54 \pm 11$  years) from the Midlife in the United States (MIDUS) study underwent a brief cognitive evaluation assessing processing speed, verbal fluency, as well as episodic and working memory, via telephone. In addition, beat-to-beat blood pressure recordings were collected for an 11 minute resting period during a psychophysiological evaluation.

**Results:** Simple regression analyses demonstrated a strong positive association systolic BPV and superior cognitive performance in working memory ( $p = 0.001$ ) and processing speed ( $p = 0.001$ ). Diastolic BPV was significantly and positively related to all cognitive domains, including episodic memory ( $p < 0.001$ ), working memory ( $p < 0.001$ ), processing speed ( $p < 0.001$ ), and verbal fluency ( $p < 0.001$ ). Multivariate regression analyses controlling for demographic (age, sex, education), behavioral (exercise) and clinical (BMI, disease status, medications) covariates yielded similar results.

**Conclusion:** These findings, showing a direct, positive association of beat to beat BPV and cognitive function, contradict the majority of studies showing inverse relationships between visit-to-visit BPV and cognitive performance. However, no studies have directly examined the link between beat-to-beat BPV and cognition in a large, representative sample until now. These novel findings suggest increased beat-to-beat BPV may have a beneficial influence on cognition.

**Individual Abstract Number: 1229**

**The Aging Baroreflex and its Association with Cognitive Function and Mortality Risk**

Tara Gruenewald, PhD, Gerontology, California State University, Long Beach, Long Beach, CA, Diana Wang, BS, USC Leonard Davis School of Gerontology, University of Southern California, Los Angeles, CA, Paula McKinley, PhD, Medicine, Montefiore Medical Center, New York, NY, Teresa Seeman, PhD, Medicine/Geriatrics, University of California, Los Angeles, Los Angeles, CA, Gayle Love, PhD, Institute on Aging, University of Wisconsin, Madison, Madison, WI, Maxine Weinstein, PhD, Graduate School of Arts and Sciences, Georgetown University, Washington DC, DC, Richard P. Sloan, PhD, Psychiatry, Columbia University Medical Center, New York, NY

Autonomic nervous system (ANS) dysregulation is hypothesized to play an important role in cognitive and physical health. Accumulating evidence indicates that spontaneous baroreflex sensitivity (BRS), an indicator of cardiac ANS regulation, is linked to cardiovascular disease morbidity and cardiovascular- and all-cause mortality. However, BRS and its health correlates are often assessed in small community or patient samples. The current analyses utilize measures of BRS assessed in a large subsample of 1,097 individuals from the Biomarker Substudy of the Midlife in the United States (MIDUS) Study, a national sample of adults aged 35-84, to examine demographic (age, sex, race, socioeconomic status) variations in BRS and associations with cognitive function and mortality. MIDUS Biomarker Substudy participants visited one of three general clinical research centers in the U.S. for an overnight stay which included a medical exam, biomarker assessment, and a psychophysiology challenge. BRS was assessed during a baseline resting period, during a psychological/cognitive challenge protocol, and during a resting recovery period using the sequence calculation method from continuous Finapres finger arterial blood pressure monitoring. Demographic variables included age, sex, race and an index of life course SES. Cognitive function was assessed with a battery of measures of memory and executive function. Mortality was assessed over a subsequent 5-year follow-up period. BRS was significantly lower in those of older age, in males as compared to females, and in those with lower levels of socioeconomic status. BRS decreased during psychological challenge and rebounded during a recovery phase although challenge-induced BRS modulation was lower in those of older age and lower socioeconomic status. Greater resting BRS was associated with better memory function and greater resting, reactivity and recovery BRS was associated with better executive

function in older individuals. Greater BRS recovery also predicted lower odds of mortality 5 years later. Findings suggest that ANS regulatory capacity as measured via BRS may be an important indicator of risk for age-related health conditions.

**Symposium**

**1316**

**Thursday, March 16 from 2:00 - 3:15 pm**

**How will the genomics era inform the link between soma and psyche?**

Eco J. de Geus, PhD, Biological Psychology, Vrije Universiteit, Amsterdam, NH, Netherlands, Brenda W. Penninx, PhD, Department of Psychiatry, VU medical center, Amsterdam, NH, Netherlands, Viola Vaccarino, MD, PhD, Department of Epidemiology, Emory Rollins School of Public Health, Atlanta, GA, Antonio Terracciano, PhD, Department of Geriatrics, Florida State University College of Medicine, Tallahassee, FL, Brenda W. Penninx, PhD, Department of Psychiatry, VU medical center, Amsterdam, NH, Netherlands, Eco J. de Geus, PhD, Department of Biological Psychology, Vrije Universiteit, Amsterdam, NH, Netherlands, Peter J. Gianaros, PhD, Department Psychology, University of Pittsburgh, Pittsburgh, PA

Large-scale consortia have successfully used meta-analyses on genome-wide association studies to identify genetic variants that influence traits of importance to Biobehavioral Medicine, including aspects of personality and depression, as well as blood pressure, heart rate and heart rate variability. These genetic variants provide unique opportunities for the APS community.

First, they offer solid candidate genes for use in Gene-by-Stress designs. Second, they can be used to test potential shared biological pathways between psychological and behavioral traits on the one hand, and somatic disease risk factors and outcomes on the other. Third, if a genetic variant, or a combination of multiple variants in a polygenic risk score, explains sufficient variance in a behavioral trait, it can be used to estimate the (non-confounded) causal effect of the behavioural trait on disease outcomes through Mendelian Randomization.

In this symposium we begin with an example of a Gene- by-Stress design using candidate gene testing of stress-induced ischemia (Viola Vaccarino). We then review the main methodological developments in genome-wide association studies and the most recent results of large international consortia focused on the genetics of personality traits (Antonio Terracciano), depression (Brenda Penninx), and heart rate variability (Eco de Geus). Pete Gianaros will discuss the larger impact of these findings for our field.

**Individual Abstract Number: 1321**

**Meta-analysis on genome-wide association studies on heart rate variability**

Eco J. de Geus, PhD, Department of Biological Psychology, Vrije Universiteit, Amsterdam, NH, Netherlands

Loss of cardiac vagal control as indexed by low HRV is associated with mortality in patients with cardiovascular disease. Animal research further supports a role for cardiac vagal activity in preventing sudden death and ventricular fibrillation. In addition, hypertension, end-stage renal disease and diabetes are all associated with low HRV. Although the above associations may partly reflect impaired cardiac vagal control caused by these diseases, lowered HRV does not simply indicate disease severity as it also predicts all-cause mortality and cardiac morbidity and mortality in apparently healthy individuals. Large inter-individual differences in HRV exist in the basal resting state. Family and twin studies have uniformly confirmed a substantial genetic contribution to resting HRV with heritability estimates between 25% and 71%. Candidate gene studies based on current knowledge of parasympathetic nervous system biology have not yielded results that hold up in replication.

To improve our understanding of the genetic basis of HRV, we performed a two-stage meta-analysis of genome-wide association studies (GWAS) in up to 53,174 individuals of European ancestry on three HRV traits (the standard deviation of the normal-to-normal inter beat intervals [SDNN], the root mean square of the successive differences of inter beat intervals [RMSSD], and the peak-valley respiratory sinus arrhythmia or high frequency power [pRSA/HF]). These HRV traits were measured during resting, basal recordings ranging in length from ultrashort 10-s ECGs to up to 90 minutes of sitting or from 2-12 hours of daytime recording. Genome-wide significant associations were detected in eight loci in 17 SNPs tagging non-synonymous SNPs (in *NDUFA11* and *KIAA1755*), eQTLs (influencing *GNG11*, *RGS6*, and *NEOI*), and genes preferentially expressed in the sinoatrial node (*GNG11*, *RGS6*, and *HCN4*). Genetic risk scores accounting for 0.9 to 2.6% of the HRV variance were significantly associated with higher heart rate and lower atrial fibrillation risk, compatible with clinical relevance. These findings provide biological insight into heritable variation in vagal heart rhythm regulation, suggesting a key role for genetic variants that influence G-protein heterotrimer action in GIRK-channel induced pacemaker membrane hyper-polarization.

#### Individual Abstract Number: 1320

##### Genetics of depression: state-of-the art and implications for psychosomatic medicine

Brenda W. Penninx, PhD, Department of Psychiatry, VU medical center, Amsterdam, NH, Netherlands

Depression is a common condition often examined in the psychosomatic research community. Depression is both a risk factor as well as a consequence of many different somatic conditions. Although there are multiple physiological and behavioral mechanisms that may explain the link between depression and somatic health, there is another route that is much less often considered. This route is genetics. There is evidence that part of the link between depression and somatic health could be due to shared genetic variants that increase both the vulnerability for depression as well as for somatic conditions. The heritability of depression is 35%.

Various recent genome-wide meta-analyses, involving data of amongst others the Psychiatric Genomics Consortium (PGC), the UK Biobank and 23andMe, involving more than 19,000 depression cases and even larger numbers of controls, have revealed for the first time several genome-wide significant genetic variants (e.g. variants in the *OLFM4*, *MEF2C* or *TMEM161B* genes, all  $p < 10^{-8}$ ). A number of these hits lead to interesting genetic pathways, e.g. in the immunometabolic mechanism, which are also relevant for somatic conditions such as cardiometabolic diseases. In addition, genome-wide analyses allow to test whether, averaged over the genome, there is enriched overlap in the genetic basis of depression and that of various somatic and behavioral conditions. These first analyses show that there is a significant shared genetic overlap between e.g. depression and smoking behavior and obesity. This indicates that genetics contribute to observed links between these conditions.

Finally, genome-wide data have provided us with novel insights into clinical subtypes of depression that have a differential genetic basis. Using recent results from the PGC, other genome-wide meta-analyses and our data from the Netherlands Study of Depression and Anxiety, I will present the newest evidence on significant genetic variants involved in (subtypes of ) depression and to what extent depression does or does not share a genetic basis with a range of somatic and behavioral conditions. This presentation aims to illustrate that genetics informs us about the extent to which genetic pathways are shared between depression and somatic conditions, and to which key underlying physiological mechanisms genetics is pointing us for this.

#### Individual Abstract Number: 1319

##### Findings from genome-wide association analyses for personality traits

Antonio Terracciano, PhD, Department of Geriatrics, Florida State University College of Medicine, Tallahassee, FL

A large literature indicates that major dimensions of personality (neuroticism, extraversion, openness, agreeableness, and conscientiousness) are linked to health behaviors such as cigarette smoking and physical inactivity. There is also robust evidence that personality traits are associated with health conditions such as obesity, chronic obstructive pulmonary disease, and Alzheimer's disease, and that personality traits are strong predictors of mental health outcomes, such as major depression. Despite their relevance for health and well-being, the source of individual differences in personality remains elusive. A genetic component for personality is supported by several lines of research, including the universality of traits in cross-cultural studies and the relative stability of personality in longitudinal studies. Over the past decade, significant advances on the genetics of personality have been made through genome-wide association studies. Meta-analyses inclusive of tens of thousands of participants have recently converged on genome-wide significant hits, especially for neuroticism. The combined results from the Genetics of Personality Consortium and the UK Biobank (max N = 170,911) identified 11 lead SNPs, with the strongest associations found for an inversion-tagging polymorphism on chromosome 8 ( $p = 4 \times 10^{-16}$ ) and one on chromosome 17 ( $p = 6 \times 10^{-11}$ ). Given the extremely small effect sizes of the identified associations (max  $R^2 = 0.04$ ), independent large samples are still needed to determine whether these associations are replicable. These analyses, however, have made it clear that the genetics of personality is complex, highly polygenic, and no single common variant accounts for a large share of the genetic variance in personality traits. Given the extremely small effect of any single variant, genetic correlations based on genome-wide data have been used to examine shared genetic influences between traits and diseases. These studies have found large genetic correlations between neuroticism and mental health conditions such as major depression. More genotyped or fully sequenced samples will help further advance knowledge on the genetics of personality and on the extent to which the observed phenotypic associations between personality and health are due to shared genetic influences.

#### Individual Abstract Number: 1318

##### Genetic Determinants of Mental Stress Induced Myocardial Ischemia

Viola Vaccarino, MD, PhD, Department of Epidemiology, Emory Rollins School of Public Health, Atlanta, GA

**Introduction:** Mental stress-induced myocardial ischemia (MSIMI) is a transient myocardial ischemic response to a standardized mental stress challenge, which is common among patients with coronary artery disease (CAD). MSIMI has a similar prognostic value compared to conventional exercise or pharmacological stress ischemia, with a 2-fold average increased risk of future cardiac events or mortality. Several stress-related mechanisms have been postulated for MSIMI, but the role of genetics in MSIMI occurrence, especially genes involved with ANS and vascular response to stress, have not been studied in detail.

**Methods:** We studied 376 white and 161 black individuals with established CAD. Participants underwent myocardial perfusion SPECT imaging before and after a laboratory mental stress challenge (speech task). MSIMI was defined as a reversible perfusion defect after mental stress compared to the rest scan. Genotyping (Illumina) was performed for 90 candidate genes selected for their known role in stress-responses (38 genes), and those with established association with CAD (52 genes). The analysis was stratified by race and Bonferroni corrected P-value cut-off was set at  $5 \times 10^{-4}$ .

**Results:** In whites, MSIMI was associated with genetic polymorphisms in three genes: 1) EDN2 gene, coding for endothelin ( $rs12133441$ ,  $P = 9 \times 10^{-5}$ ), 2) PHACTR1 gene, coding for an actin regulator protein involved in endothelial cell survival and previously associated with

CAD (rs2496132,  $P = 2.5 \times 10^{-4}$ ), and 3) PDGFD gene that codes for platelet-derived growth factor (rs488753,  $P = 4.4 \times 10^{-4}$ ). In blacks, MSIMI was associated with genetic polymorphisms in 1) TRIB1, a gene coding for kinase enzyme involved in cellular function (rs10111919,  $P = 5.4 \times 10^{-5}$ ), 2) ADRA1B gene, coding for alpha 1B adrenergic receptor (rs31693,  $P = 1.9 \times 10^{-4}$ ), 3) KCNK5 gene, coding for a potassium channel protein (rs4711589,  $P = 2.7 \times 10^{-4}$ ), and 4) DBH gene, coding for an enzyme converting dopamine to norepinephrine in sympathetic neurons (rs2428103,  $P = 2.8 \times 10^{-4}$ ).

**Conclusion:** Genetic polymorphisms mostly related to vascular responses to stress and previously associated with CAD appear to play a role in MSIMI susceptibility, and these associations are race specific. Future studies are needed to replicate these findings.

## Symposium 1361

Friday, March 17 from 1:15 - 2:30 pm

### eHealth for HIV prevention

*Brian Mustanski, PhD, Medical Social Sciences, Northwestern University, Chicago, IL, Brian Mustanski, PhD, Medical Social Sciences, Northwestern University, Chicago, IL, Michael Newcomb, PhD, Medical Social Sciences, Northwestern University, Chicago, IL, Jeffrey T. Parsons, PhD, Psychology, Hunter College, New York, NY, Patrick Sullivan, PhD, DVM, Epidemiology, Emory University, Atlanta, GA*

Men who have sex with men (MSM) are disproportionately affected by HIV in the United States (US) and Western Europe. In 2014, MSM accounted for 67% of new diagnoses in the US and 43% of diagnoses in Western Europe (CDC, 2016; WHO, 2015). In the US, young MSM account for 80% of HIV diagnoses among all young people, and Black and Latino MSM account for more than 60% of HIV diagnoses among all MSM (CDC, 2016). In Western Europe, foreign born MSM represent a significant proportion of HIV diagnoses (WHO, 2015). Utilizing eHealth strategies for delivering or supporting behavioral and biomedical HIV prevention research is a promising way to impact populations that are at high risk for HIV infection. Internet and mobile based technologies are tools that may be especially helpful in disseminating interventions that focus on sensitive topics such as sexual behavior and HIV/STIs, and connecting with hard to reach populations (e.g. MSM who are not out, undocumented MSM, and rural MSM). This symposium will give an overview of innovative eHealth approaches that are being used to engage and promote behavior change in MSM. Speaker 1 will present interim behavioral, motivational, and skill outcome data from an ongoing, online HIV prevention randomized control trial for YMSM. Speaker 2 will present on the development of the SMART program, a stepped care package of interventions for adolescent gay and bisexual boys aimed at improving sexual health knowledge, increasing motivation to reduce HIV risk, and teaching skills for preventing HIV acquisitions. The package will be evaluated in an adaptive RCT. Speaker 3 will present preferences of MSM for sexual health features integrated into smartphone apps. Speaker 4 will present data from a smartphone prevention app that promotes uptake of basic HIV prevention services. Through this symposium, we hope to demonstrate the ways in which eHealth interventions can be harnessed to increase access to and dissemination of HIV prevention programs and services.

#### References

<https://www.cdc.gov/hiv/group/msm/>  
<http://ecdc.europa.eu/en/publications/Publications/hiv-aids-surveillance-in-Europe-2014.pdf>

## Individual Abstract Number: 1418

### Interim Outcomes from an Online HIV Prevention Program for Diverse Young Men who Have Sex with Men

*Brian Mustanski, PhD, Krystal Madkins, MPH, Medical Social Sciences, Northwestern University, Chicago, IL, Jeffrey T. Parsons, PhD, Psychology, Hunter College, New York, NY, Patrick Sullivan, PhD, DVM, Eli Rosenberg, PhD, Epidemiology, Emory University, Atlanta, GA*

Young men who have sex with men (YMSM) are disproportionately affected by HIV. In 2014, YMSM accounted for 80% of HIV diagnoses among all young people (CDC, 2016). Black and Latino YMSM were especially affected, representing 55% and 23%, respectively, of diagnoses among YMSM (CDC, 2016). Despite this burden of HIV, there are few proven HIV prevention programs tailored to diverse YMSM. Keep It Up! (KIU!) was developed in response to this dearth of culturally appropriate evidence-based interventions. It is targeted at YMSM that recently tested HIV negative to capitalize on the clinical interaction as a “teachable moment.” KIU! is an on-going RCT based on principles of E-learning and the Information-Motivation-Behavior Skills (IMB) model of HIV risk behavior change. The intervention uses diverse delivery methods (e.g., videos, animation, games) to address HIV knowledge, motivate safer behaviors, teach behavioral skills, and instill self-efficacy for preventive behaviors. HIV negative YMSM were primarily recruited through community-based HIV testing centers in Atlanta, Chicago, and New York as well as local and national ads posted to online sites and dating apps. Participants complete assessments with questions on risk and preventive behaviors at baseline and 3, 6, and 12 months post-intervention. All participants complete distance self-testing for urethral and rectal chlamydia and gonorrhea at baseline and 12 month follow-up. 3-month follow-up data is fully collected and interim results will be reported for condomless anal sex and IMB factors theorized to mediate behavior change. The enrolled sample ( $n = 901$ ) is diverse: 37% White, 29% Latino, 24% Black, and 10% other or multiracial. The mean age of the sample at baseline was 24.2 years and most participants identified as gay (87%), single (56%), and having at least some college education (88%). At baseline, 3.4% tested positive for urethral STIs and 13% for rectal STIs. Retention 3 months post-intervention was high with 86% of participants completing their assessment. Interim analysis using 3 month follow-up data will be presented. The presentation will report behavioral, motivational, and skill outcome data collected 3 months post-intervention. The data will provide insight into how eHealth interventions such as KIU! may promote behavior change among YMSM.

#### Reference:

<http://www.cdc.gov/hiv/group/age/youth/>

## Individual Abstract Number: 1363

### A Stepped-Care Evaluation of a Package of eHealth HIV Prevention Programs for Adolescent Gay and Bisexual Boys: The SMART Program

*Michael Newcomb, PhD, Medical Social Sciences, Northwestern University, Chicago, IL, Eric Laber, PhD, Marie Davidian, PhD, Statistics, North Carolina State University, Raleigh, NC, Carlos Rodriguez-Diaz, PhD, School of Public Health, University of Puerto Rico, San Juan, PR, Kenneth Weingardt, PhD, 4Center for Behavioral Intervention Technologies, Northwestern University, Chicago, IL, Jeffrey T. Parsons, PhD, Psychology, Hunter College, New York, NY, Brian Mustanski, PhD, Medical Social Sciences, Northwestern University, Chicago, IL*

Young gay and bisexual men are at high risk for HIV, and those under age 18 lack access to accurate and comprehensive sex education and prevention services, leaving them particularly vulnerable to HIV acquisition. This lack of access is perhaps most pronounced in minority populations, including racial minorities, native Spanish speakers, and rural residents, because existing programs are not culturally adapted to their needs. eHealth approaches are ideally suited to reaching underprivileged populations due to their broad reach and the ubiquity

of internet use. To address these gaps in education and prevention, we developed the SMART Program, which is a suite of interventions aimed at improving sexual health knowledge, increasing motivation to reduce HIV risk, and teaching skills for preventing HIV. Further, these interventions are culturally and linguistically adapted to meet the needs of racial minorities, native English and Spanish speakers, and urban and rural young men. SMART consists of three empirically-supported interventions: Queer Sex Ed (QSE; online sex education for gay and bisexual boys), Keep it Up! (KIU; eHealth HIV prevention for at-risk youth), and Young Men's Health Project (YMHP; motivational interviewing for sexually risky and substance-using youth administered remotely via video chat). We are utilizing the sequential multiple assignment randomized trial (SMART) design to evaluate the SMART Program. This design mimics real-world clinical care by utilizing a stepped-care approach. Non-responders receive increasingly intensive interventions to maximize efficacy and minimize needed resources (i.e., early responders receive no further intervention). In this trial, all participants receive QSE (comprehensive sex education). QSE non-responders (i.e., continue to engage in HIV risk behaviors) are then randomized to the more intensive KIU eHealth intervention or a control condition. KIU non-responders are further randomized to receive the YMHP motivational interviewing program or control. By trial end, we will describe the optimal staging of intervention content for maximizing efficacy, as well as understand which subgroups benefit most from different treatment combinations. This presentation will focus on describing the SMART Program methodology, emphasizing its potential for optimizing eHealth interventions.

#### **Individual Abstract Number: 1413**

##### **Give Them What They Want: Preferences for Sexual Health Apps for Gay and Bisexual Men**

*Jeffrey T. Parsons, PhD, Psychology, Hunter College, New York, NY, Ana Ventuneac, PhD, Medicine, Mount Sinai, New York, NY, Steven A. John, PhD, Thomas Whitfield, BA, Center for HIV Educational Studies and Training, H. Jonathan Rendina, PhD, Psychology, Ruben Jimenez, BA, Center for HIV Educational Studies and Training, Hunter College, New York, NY, Krystal Madkins, MPH, Michael Newcomb, PhD, Brian Mustanski, PhD, Medical Social Sciences, Northwestern University, Chicago, IL*

**Background:** Gay, bisexual and other men who have sex with men (GBM) use geospatial networking smartphone applications ("apps") to meet sex partners. Integrating sexual health features in apps GBM are already using could be instrumental in reaching those at greatest risk for HIV/STIs. No studies to date have reported the types of features GBM would be willing to use.

**Methods:** Participants (557 GBM) recruited via a sexual networking app completed an online survey, including demographics, sexual behavior, and 9 items on sexual health (e.g., receive STI results) and behavior-tracking features (e.g., daily sexual behavior and substance use). Items were analyzed using the Mann-Whitney or the Kruskal-Wallis rank test. Because sexual health apps will need to be highly adaptable to GBM's needs, predictors of each feature were examined using adjusted logistic regressions.

**Results:** GBM were ages 18-74; most identified as gay (84.6%), Caucasian (74.5%), and reported a negative HIV status (77.4%). Finding LGBT-friendly providers (82.8%) and receiving lab results (67%) and appointment reminders (66.7%) were popular, while tracking and receiving feedback about substance use were less favorable (31.5% and 25.8%, respectively). Overall, 84.5% were interested in features being integrated into apps already used. Younger GBM and those with lower income chose a greater number of features. College educated and F/T employed GBM chose fewer tracking features. Mean rank tests showed that some features were more acceptable among some subgroups (e.g., scheduling visits and receiving medication alerts were ranked higher among GBM of color). GBM reporting recent condomless anal sex had higher odds on willingness to track their sexual behavior (AOR=1.56, 95%CI 1.07-2.28) and receive

medication alerts (AOR=1.89, 95%CI 1.27-2.81). GBM who engaged in group sex had higher odds on willingness to track (AOR=2.73, 95%CI 1.84-4.06) and receive feedback (AOR=1.79, 95%CI 1.22-2.64) about their sexual behavior. However, HIV-positive GBM had lower odds on willingness to receive lab results (AOR=.56, 95%CI .31-.98) or visit alerts (AOR=.56, 95%CI .31-.99).

**Conclusions:** Intervention approaches integrating sexual health features into existing apps are acceptable to many GBM. A more nuanced understanding of app preferences will help tailor efforts targeting specific at-risk subgroups of GBM.

#### **Individual Abstract Number: 1423**

##### **Providing a Basic Package of HIV Prevention Services for At-Risk Men Who Have Sex With Men in the United States**

*Patrick Sullivan, PhD, DVM, Epidemiology, Emory University, Atlanta, GA, Joanne Stekler, MD, Medicine, University of Washington, Seattle, WA, Rob Driggers, MSPH, School of Public Health, Emory University, Atlanta, GA, Rob Stephenson, PhD, Health Behavior and Biological Sciences, University of Michigan, Ann Arbor, MI*

The US National HIV/AIDS Strategy aims to reduce new HIV diagnoses among men who have sex with men (MSM) by 25% by 2020. Agent-based modeling suggests that achieving this goal requires reaching 40%-50% of MSM with a package of basic HIV prevention services, including routine HIV and STI testing, distribution of condoms and lubricants, and pre-exposure prophylaxis (PrEP) screening and referrals. We developed a mobile prevention app based on Social Cognitive Theory that included functions of risk assessments, service scheduling modules, and ordering of commodities (home HIV test kits, and condoms and lubricants). We tested the app in 121 Atlanta and Seattle MSM who were HIV-negative or did not know their HIV status and allowed them to use the app for a 4-month period. The median age of all participants was 31 (IQR or range); 49% were non-white; 16% had never been tested for HIV, and 38% did not know of a place to seek HIV testing. Respondents had spent a mean of 17.7 minutes interacting with the app over 4 months. After 4 months, men were invited to complete a survey on their experiences using the app; 99 men (82%) completed the assessment. Subsequent data are from these 99 participants. During this period, 53% of men ordered at-home HIV test kits, of whom 78% reported using the kits; 64% of men ordered condoms and sexual lubricant, of whom 87% reported using the condoms they ordered. 80 met behavioral eligibility for PrEP, of whom 10% reported initiating PrEP during the 4 month period. Of the 8 PrEP initiators, 7 reported that app influenced their decision to start PrEP. Among 69 participants who did not have a plan to test for HIV regularly at the start of the study, 47 (76%) used the app to develop an HIV testing plan. Participants were asked to assess the app using the System Usability Scale, a standard measure of acceptability and usability for which a score of 68 is considered to be above average; the score for the app was 73, indicating above average acceptability and usability. 70% of participants reported that they would recommend the app to a friend. A mobile prevention app for promoting uptake of basic HIV prevention services is acceptable and increased uptake of routine HIV testing and PrEP. We recommend extending the app to offer at-home STI specimen collection kits and broader distribution of the app for MSM.

#### **Symposium 1415**

**Saturday, March 18 from 2:15 - 3:15 pm**

##### **Increasing Therapeutic Precision in Psychosomatic Medicine Through N-of-1 Studies**

*Ian Kronish, MD, MPH, Internal Medicine, Columbia University Medical Center, New York, New York, Paige Green, PhD, Basic Biobehavioral and Psychological Sciences Branch, National Cancer*



*Institute, Rockville, Maryland, David Mohr, PhD, Preventive Medicine, Northwestern University Feinberg School of Medicine, Chicago, Illinois, Karina Davidson, PhD, Medicine and Psychiatry, Columbia University Medical Center, New York, New York, Ian Kronish, MD, MPH, Medicine, Columbia University Medical Center, New York, New York, Nathalie Moise, MD, MS, Medicine, Columbia University Medical Center, New York, New York*

This symposium brings together experts in behavioral medicine and clinical trials to explore the rationale, feasibility, and best use cases for N-of-1 studies as innovative approaches to increasing therapeutic precision in psychosomatic medicine. The current method for obtaining the evidence for a psychosomatic therapy is to conduct a definitive, between-patient, Phase III randomized controlled trial (RCT). This between-patient RCT provides evidence that, all other things equal, the therapy tested in one group of patients is better than the placebo or alternative therapy tested in another group of patients. Yet, between-patient RCTs do not provide precise information on which therapy is optimal for individual patients. Rather, they provide an estimate of the average therapy effect, and even for highly efficacious therapies, some proportion of patients receives little benefit or even *even harm*. Thus, we must look elsewhere for study designs that can better identify the optimal, precise treatment for individual patients. This symposium will reveal how N-of-1 study designs can achieve this goal. During the introduction to the symposium, the history of N-of-1 studies will be reviewed, and the relevance of this study design to psychosomatic medicine will be discussed. The first speaker will present the results of a randomized experiment evaluating the effect of providing intermittent exercisers with their personalized predictors of exercise on subsequent physical activity; the personalized exercise predictors were empirically derived using N-of-1 methodologies. The second speaker will describe the results of a systematic review of N-of-1 trials for the treatment of depressive symptoms. Within this presentation, the criteria for more broadly incorporating N-of-1 trials into psychosomatic medicine will be discussed. The third speaker will present the results from a national poll that assessed patient preferences for N-of-1 trials. These data will be used to provide insight on efforts to incorporate N-of-1 trials more broadly into psychosomatic medicine. The symposium will conclude with the discussant highlighting how recent advances in mobile health technology have created exciting opportunities for N-of-1 studies that promise to revolutionize the practice of psychosomatic medicine.

#### **Individual Abstract Number: 1421**

##### **Acceptability and preferences for participating in N-of-1 trials: A national survey of patients with multiple chronic comorbidities**

*Nathalie Moise, MD, MS, Medicine, Karina Davidson, PhD, Medicine and Psychiatry, Joan Duer-Hefele, RN, Tara St. Onge, B.A., Medicine, Columbia University Medical Center, New York, New York, Ty Ridenour, PhD, Division of Behavioral Health and Criminal Justice Research, RTI International, Research Triangle, North Carolina, Ying Kuen Cheung, PhD, Biostatistics, Mailman School of Public Health, Columbia University, New York, New York, Elizabeth Cohn, PhD, Nursing, Scott Kelly, BA, Ian Kronish, MD, MPH, Medicine, Columbia University Medical Center, New York, New York*

**Introduction:** N-of-1 trials are multiple crossover experiments comparing two or more treatments across time for a single patient, and help personalize the selection of treatments. The circumstances under which patients would participate in N-of-1 trials are unknown.

**Methodology:** We recruited 500 participants from the Harris Poll Online Chronic Illness Panel and pre-screened to include those with 2 or more relevant conditions (hypertension, hyperlipidemia, diabetes, asthma, osteoporosis, and depression) who resembled the general population in age, gender, income and region. Questions elicited preferences for health conditions/symptoms, and attitudes toward design features including use of mobile health devices.

**Results:** Participants were on average 56 years old; 57% were female, 8% black. After reading a description of N-of-1 trials, 82% were interested in participating; 23% of those uninterested would participate

if paid. The most preferred conditions/symptoms for N-of-1 trials were pain (58%), hypertension (39%), diabetes (29%), sleep problems (27%), and depression (23%). A majority of participants were willing to participate even if there was a chance they would receive placebo (58%) or usual care (70%). Design features that increased participation willingness were allowing patients to choose treatment options (88%) and receive the more effective treatment at trial end (50%), and close monitoring by clinician (86%). Some participants were less willing to participate if they (25%) or their physicians (41%) did not know treatment order. Most were willing to answer up to 20 questions (78%) 1-3 times per day (76%) and use mHealth devices to track outcomes (83%). Of those with devices, 92% would share data with the trial. Most preferred to hear about N-of-1 trials from their physicians (63%).

**Discussion:** This is one of the first studies to elicit patient preferences for N-of-1 trials. We found high acceptability for N-of-1 trials, particularly for pain, hypertension and diabetes. Placebo or usual care comparators and blinding were mostly acceptable. Passively obtaining outcomes data through mHealth devices was widely acceptable. Financial incentives and enabling patients to choose their treatment options might foster uptake of N-of-1 trials. Designing patient and provider materials to facilitate communication about these preferred features will be key.

#### **Individual Abstract Number: 1420**

##### **Are N-of-1 trials useful for achieving therapeutic precision in the treatment of depression? A systematic review of N-of-1 trials for depressive symptoms**

*Ian Kronish, MD, MPH, Louise Falzon, PG DipInf, Meghan Hampsey, BA, Beatrice Konrad, BA, Medicine, Karina Davidson, PhD, Medicine and Psychiatry, Columbia University Medical Center, New York, New York*

**Background:** N-of-1 trials are single-patient, crossover-design experiments with systematic assessments that may be useful for increasing treatment precision. A comprehensive review of N-of-1 trials for depressive symptoms is lacking and may provide insight into the potential for this personalized approach to improving depression care.

**Methods:** We conducted a systematic review of N-of-1 trials for depressive symptoms published from electronic database inception through October 15, 2015. Studies were eligible if they enrolled depressed patients, included a within-subject crossover design, and systematically assessed individual treatment effects on depressive symptoms.

**Results:** We identified 4 eligible studies, published between 1992 and 2001, reporting on 32 adult patients. Three studies compared fast-onset/rapid washout stimulants (methylphenidate versus placebo in two studies, d-amphetamine versus methylphenidate in one study). One study compared sulpiride, an atypical antipsychotic, to placebo in patients with chronic depression. Trial duration ranged from 2 days to 28 weeks. Patients were blinded to treatment in all 4 studies. Outcomes were assessed by patients and/or clinicians using paper and pen diaries. All studies provided useful data to patients and clinicians, either showing that the depression treatment was superior to placebo or that there were clinically significant inter-individual differences in treatment benefits.

**Conclusion:** The feasibility of N-of-1 trials for depression has been demonstrated for a limited number of pharmacologic treatments that are not commonly used in the contemporary management of depression. Additional research is needed to determine whether N-of-1 trials can be useful for helping patients identify the best depression treatments for them.

**Individual Abstract Number: 1419****A personalized stress fingerprint: Does knowing your stress barriers and facilitators improve your daily exercise bouts?**

*Karina Davidson, PhD, Medicine and Psychiatry, Columbia University Medical Center, New York, New York, Sunmoo Yoon, PhD, School of Nursing, Columbia University, New York, New York, Joseph Schwartz, PhD, Psychiatry, Stony Brook University School of Medicine, Stony Brook, New York, Matthew Burg, PhD, Medicine and Anesthesiology, Yale University School of Medicine, New Haven, Connecticut, Ian Kronish, MD, MPH, Medicine, Columbia University Medical Center, New York, New York, Carmela Alcantara, PhD, Social Work, Columbia University, New York, New York, Julian Jacob, BA, Faith Parsons, MS, Beatrice Konrad, BA, Keith Diaz, PhD, Medicine, Columbia University Medical Center, New York, New York*

**Purpose:** To test if individuals randomized to receive feedback regarding their person-specific “stress and physical activity fingerprint” – stress sources associated with low exercise – subsequently increase daily exercise.

**Method:** We enrolled a single cohort of 79 intermittently exercising, healthy adults. Observational data were collected for 360 days. Coupling ecological momentary assessment (EMA) with smartphone technology and actigraphy, we monitored daily exposure to psychosocial stressors in real time, in ecologically valid settings such as home and work. Each morning the participant responded to questions: 1) “How stressful do you expect today to be?” 2) “How likely are you to exercise today?” using a response scale of 0 (Not at all) to 10 (Extremely); these questions were asked in the past tense at night. Participants were prompted via text message 3 times during the day to answer questions about key sources of stress and stress appraisal, using the 4-item Perceived Stress Scale.

Physical activity was objectively monitored using a wrist-based model of the Fitbit®. If the subject exercised for one 30-minute period – defined as  $\geq 24$  out of any 30 consecutive mins of moderate or vigorous intensity activity or self-reported (EMA) exercising for 30 mins – the day was counted as an ‘exercise day.’

At 180 days, we built a ‘personalized stress and physical activity fingerprint’, or N-of-1 observational model of stress perception and exercise. Of the 73 remaining in the study, 39 randomly-assigned participants received their stress fingerprint, and 34 did not. We obtained physical activity data and EMA as above for the subsequent 180 days.

**Results:** Mean age of participants was  $32.4 \pm 10.1$ , 41.1% were male and 26.1% were Hispanic; no demographic differences were noted between groups. A multilevel generalized linear model provided estimates of mean % days exercised by group and period (3 months pre- vs 3 months post-fingerprint). The % days exercised decreased from 43% to 32% in the control group ( $p < 0.001$ ) and from 44% to 40% among those receiving the fingerprint ( $p = ns$ ); the differential decline of 7% between groups was statistically significant ( $p < 0.05$ ).

**Conclusions:** A stress and physical activity fingerprint conveying personalized factors that predispose one to exercise on a given day had a prophylactic effect on the maintenance of exercise behavior over 6 months.

**Symposium 1428**

**Thursday, March 16 from 5:00 - 6:00 pm**

**Health-Relevant Social Environment Sampling Techniques**

*Megan L. Robbins, PhD, Psychology, University of California, Riverside, Riverside, CA, Megan L. Robbins, PhD, Psychology, University of California, Riverside, Riverside, CA, Robert C. Wright, MA, Psychology, University of California, Riverside, Riverside, CA, Peggy M. Zoccola, PhD, Psychology, Ohio University, Athens, OH, Joshua M. Smyth, PhD, Biobehavioral Health and Medicine, The Pennsylvania State University, University Park, PA*

Psychosomatic research has historically relied on retrospective accounts and observation of in-lab behavior for measurement of psychosocial processes. However, technology has provided psychology researchers with an exciting set of methodological tools to assess psychosocial processes in daily life. Social environment sampling techniques enable in-the-moment data collection, facilitating a more comprehensive understanding of psychosocial processes than was previously possible. The use of three social environment sampling techniques will be described, using empirical data as examples to give an overview of how such techniques can be used in psychosomatic research. The first two methods gather psychosocial information from the observer’s perspective. The first method is the Electronically Activated Recorder (EAR), a device participants wear on their waistline that records snippets of ambient sound. The EAR can be used for measuring psychosocial variables as predictors of psychological adjustment to serious illness such as breast cancer, or as an outcome measure for assessing changes to daily life following intervention, such as an alternative treatment for major depressive disorder. The second method utilizes publicly available online social network (OSN) data to track how patients discuss illness-related information and navigate the coping context. For example, linguistic differences observed in the types of language used in OSN posts about pain versus general topics may indicate meaning-making about the pain experience. This talk will discuss the potential to use such data to predict health behavior and adjustment outcomes by linking it to clinical data. Finally, the third social environment sampling technique yields social environment information via the participants’ perspective. Ecological Momentary Assessment (EMA) can be used to assess psychological states and social factors in-the-moment. The presentation will demonstrate the utility of EMA to examine within-day patterns of emotion and salivary cortisol as a function of trait rumination. All three talks highlight advancements technology has made to directly measure psychosocial factors in real time. Thus, social environment sampling brings measurement of health-relevant psychosocial processes where they naturally occur—in the context of everyday life.

**Individual Abstract Number: 1430****The EAR as a Naturalistic Observation Measure of Patients’ Social Behavior**

*Megan L. Robbins, PhD, Psychology, University of California, Riverside, Riverside, CA, Charles Raison, MD, Psychiatry, University of Wisconsin-Madison, Madison, WI, Matthias R. Mehl, PhD, Psychology, University of Arizona, Tucson, AZ*

The Electronically Activated Recorder (EAR) is a naturalistic observation tool for sampling audible aspects of social environments and behavior. It periodically records snippets of ambient sounds, adding the observer’s perspective to psychosocial assessments in cross-sectional, longitudinal, and experimental health-related research. Two studies highlight the use of the EAR in patient samples. The first study investigated 52 couples coping with breast cancer, who wore the EAR over one weekend while the patient was on active treatment. Using a sampling rate of 50 s every 9 min, we found that 4.3% ( $SD = 5.6$ ) of their conversations were about cancer, and that spouses’ engagement in substantive conversations about cancer with patients was associated with patients’ improved adjustment over a two-month period. The data also revealed what topics *did* come up most frequently in everyday life while couples coped: work ( $M = 10.6\%$ ,  $SD = 6.0$ ), leisure ( $M = 9.1\%$ ,  $SD = 5.2$ ), eating ( $M = 8.2\%$ ,  $SD = 4.0$ ), body ( $M = 6.8\%$ ,  $SD = 4.0$ ), home ( $M = 6.7\%$ ,  $SD = 4.2$ ), and money ( $M = 6.4\%$ ,  $SD = 4.6$ ). Beyond understanding the landscape of everyday conversations while coping, the EAR can also be used as a behavioral outcome measure for experimental tests of medical and well-being interventions. A preliminary, randomized controlled trial of whole body hyperthermia (WBH; heating the body with infrared lights to 101.3°F degrees) as a treatment for major depressive disorder revealed a substantial effect on depression among those in the treatment group ( $n = 14$ ), relative to controls ( $n = 9$ ). Self-reports and interviews to assess

depression are certainly the gold standard for assessing treatment efficacy; however, corroboration with behavioral measures of quality of life elucidate the effect of treatment on patients' everyday life. Participants in the WBH condition spent significantly less time alone than those in the control condition following treatment,  $F(1,22)=6.63$ ,  $p=.02$ ,  $\eta^2=.25$ . They also spent marginally more time emotionally disclosing to others,  $F(1,22)=3.91$ ,  $p=.06$ ,  $\eta^2=.16$ , suggesting a general effect of WBH on the social lives of patients with major depressive disorder. In summary, the EAR adds assessment of psychosocial factors without reliance on participants' recollections and biases inherent in self-reports. It can be used for objective assessment of social behavior relevant to psychosomatic research.

#### Individual Abstract Number: 1431

##### Using Online Social Network Data to Investigate Pain Experiences

Robert C. Wright, MA, Psychology, Ryan Rivas, BA, Vagelis Hristidis, PhD, Computer Science, Megan L. Robbins, PhD, Psychology, University of California, Riverside, Riverside, CA

Patients are increasingly turning to illness-specific online social networks (OSNs) for support and information. For researchers, these public forums offer a glimpse into naturally-occurring interactions which are implicated in downstream health outcomes. Past research has shown word use predicts important health outcomes; therefore, this study sought to expand on past research by identifying meaningful differences in natural pain discussions on OSN platforms. A validated pain-specific Linguistic Inquiry and Word Count (LIWC) dictionary was used to identify pain-related posts from three illness-related OSNs—fibromyalgia ( $n=343,439$ ), rheumatoid arthritis ( $n=12,430$ ), and breast cancer ( $n=2525$ ). LIWC is text-analysis software that calculates the proportion of words that fall into various dictionaries. As predicted, pain was a major topic mentioned on all three sites ( $M_{posts}=62.18\%$ ; 99% CI [61.97, 62.39]). In pain versus non-pain posts, there was a higher proportion of first-person personal pronouns (e.g. "I had to learn to ask for and accept help"),  $t(215125) = -60.783$ ,  $p < 0.001$ ,  $d = .262$ . There was also a higher proportion of cognitive processing words (e.g. "I **decided** that something had to be done"),  $t(197106) = -67.748$ ,  $p < 0.001$ ,  $d = .305$ . Conversely, in pain versus non-pain posts there were fewer social related words (e.g. "he's a friend of a friend AND he has a sister with fibro"),  $t(186403) = 91.894$ ,  $p < 0.001$ ,  $d = .426$ ; and fewer positive emotion words (e.g. "Can't get much **better** than that"),  $t(156653) = 129.837$ ,  $p < 0.001$ ,  $d = .660$ . Taken together, the linguistic differences observed in the types of language used in pain versus non-pain posts may indicate meaning-making about the pain experience, as evidenced by higher proportions of self-focused and cognitive processing words. Notably, this study utilized a natural form of patient-to-patient communication which allows users to freely discuss their conditions without researcher interference. These massive data can provide insight into evolving support networks, such as tracking patient coping and support interactions over time. Ultimately, pairing clinical and OSN data will allow researchers to gain insight into factors contributing to coping outcomes. OSN data provides researchers with a cheap, noninvasive way to monitor patient behavior outside the clinic for psychosomatic research.

#### Individual Abstract Number: 1429

##### Using Ecological Momentary Assessment to Examine Gender Differences in Trait Rumination, Momentary Distress, and Diurnal Cortisol in Daily Life

Peggy M. Zoccola, PhD, Psychology, Ohio University, Athens, OH, Sally Dickerson, PhD, Office of Sponsored Research, Pace University, New York City, NY, Matthew Zawadzki, PhD, Psychology, University of California, Merced, Merced, CA, Katrina Hamilton, BA, Psychology, Ohio University, Athens, OH

There is accumulating evidence that ruminating on stressors can prolong stress-related physiological activation, including salivary

cortisol. However, prior work from our group and others indicates that the rumination-related physiological activation may differ for men and women. For example, following a laboratory speech stressor, women with greater rumination tendencies have had flatter cortisol slopes and higher evening cortisol compared to men. In the current study, we tested whether these gender-specific rumination-cortisol patterns are present in daily life, and whether gender differences in diurnal momentary distress may shed light on divergent rumination-cortisol profiles for men and women.

We invited 124 healthy young adults 18–36 years of age (56% women) to complete a laboratory speech stressor and 5 consecutive days of ecological momentary assessment (EMA) of mood and salivary cortisol. For the EMA component, participants rated their current emotions and provided saliva samples each day at the following times: at wake, 12:00 PM, 2:00 PM, 4:00 PM, 6:00 PM, and 8:00 PM. Trait rumination was assessed during the initial laboratory visit. Multilevel linear models were used to identify diurnal patterns of cortisol concentrations and distress.

Although men and women did not differ in ruminative tendencies, trait rumination predicted flatter diurnal cortisol slopes for women compared to men across the 5 days of observation, consistent with our prior work,  $F(1,2502) = 5.86$ ,  $p = .016$ . EMA of momentary distress showed that, similar to the diurnal cortisol findings, trait rumination interacted with gender and time to predict distress,  $F(1,2213) = 4.51$ ,  $p = .034$ . For women, higher trait rumination scores predicted increasing distress throughout the day. Trait rumination did not predict diurnal change in distress for men. Results remained significant in the presence of potential confounding variables, including depressed mood. Results support past work that trait rumination predicts different cortisol response patterns for men and women. Our findings also highlight the utility of using EMA to examine within-day patterns of emotion and salivary cortisol as a function of trait rumination. EMA helps us to better understand social contextual factors in physiological activation by revealing within-day changes in distress that co-occur with changes in cortisol.

## How to Cite your Abstract

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