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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. 1) Abstract 1234

YIELDING TO SOCIAL SUPPORT CORRESPONDS WITH DECREASED RELIANCE ON SELF-REGULATION

Andrea M. Coppola, BA, Marlen Z. Gonzalez, MA, James A. Coan, PhD, Psychology, University of Virginia, Charlottesville, VA

Social Baseline Theory suggests that the brain assesses proximity and access to social resources when budgeting for its own responses to contextual demands and threats (Beckes & Coan, 2011). For example, holding hands with a supportive partner is associated with attenuated activity in neural markers of threat (Coan et al., 2006), suggesting savings in biological resources, and perhaps decreased allostatic load. Interestingly, the strength of this phenomena varies considerably by individual (Maresh et al., 2013). We speculate that the propensity to benefit neurally from social support (an effect we call yielding) may be dispositional in that it may carry over benefits to other social tasks. In this study, seventy-six participants completed two fMRI paradigms. The first was a task measuring yielding (Handholding), and the second was a social rejection paradigm (Cyberball). During the Handholding task, participants viewed a series of threat (20% chance of shock) and safety cues under two conditions: alone and holding hands with a supportive partner. Prior to analysis, we selected two regions of interest (ROIs) implicated in emotion regulation: the dorsal anterior cingulate cortex (dACC) and the dorsolateral prefrontal cortex (dlPFC). Yielding in these regions was operationalized as the difference in threat activation between the alone and partner conditions, with a greater difference indicating more yielding. During the second fMRI task, participants played a virtual ball-tossing game in which they were first included and then excluded, thereby simulating social rejection. Participants completed the Brief COPE Inventory two years post-scanning. Greater yielding corresponded with decreased activity during social exclusion in the lateral occipital cortex, precuneus, right dlPFC, vmPFC, and superior parietal lobule (Z = 3.09, p = 0.05), and with use of coping strategies involving both social regulation and selfregulation. Importantly, low yielders relied heavily on selfregulation strategies (p < .05). These findings suggest that yielding may correspond with an expectation that social resources are available, decreasing dependence on self-regulation both neurally and behaviorally. Future directions will address how yielding and sustained reliance on self-regulatory strategies might impact actual health outcomes.

2) Abstract 1172

PROTON PUMP INHIBITOR USE AMONG BREAST CANCER SURVIVORS PREDICTS LOWER HEART RATE VARIABILITY DURING STRESSOR AND INCREASED NEGATIVE AFFECT FOLLOWING STRESSOR

Annelise Madison, PhD Student, Psychology, Ohio State University, Columbus, OH

Breast cancer survivors are at higher risk for cardiovascular disease (CVD) and depression compared to their peers. Proton pump inhibitor (PPI) use among breast cancer survivors may be one pathway to cardiovascular morbidity and negative affect. PPIs are routinely prescribed to manage gastrointestinal side effects of chemotherapy, and they are being explored as adjuvant chemo-sensitizing treatments. Despite the potential therapeutic

effect, recent animal and human studies suggest that long-term PPI use may negatively impact cardiovascular and psychological health. To date, no studies have examined the impact of PPI use on heart rate variability (HRV) and mood in breast cancer survivors. The current study investigated whether breast cancer survivors (n=144, stages 0-IIIa) taking PPIs exhibited significantly lower vagal activity, as indexed by HRV, before, during, and after the Trier Social Stress Test (TSST), as well as increased negative affect on a thoughtlisting task following the TSST than those not taking PPIs. The 144 Participants had completed cancer treatment 1.5 years earlier, on average. HRV (RMSSD) was recorded before, during, and after the TSST. Three hours after the task, participants completed a two-minute thoughtlisting exercise reflecting on the TSST. Controlling for beta blocker use, physical activity, chemotherapy treatment, BMI, comorbidities, and age, repeated measures analysis indicated that PPI-users had significantly lower HRV than their peers at baseline, during, and immediately following TSST (p=.04). The group by time interaction was significant (p=.04), and post-hoc analysis revealed that PPI use did not predict lower HRV at baseline (p=.39), but did predict lower HRV during (p=.009) and after TSST (p=.05). Additionally, PPI-users reported increased anger during the thoughtlisting task when controlling for baseline emotional wellbeing, depression, and anxiety (p < .001). Building on prior research, these results suggest that PPI use may impact the physiological stress resilience of breast cancer survivors. HRV during stress may mediate the link between PPI use and post-stress negative affect.

3) Abstract 1252

TRANSIENT ENDOTHELIAL DYSFUNCTION INDUCED BY MENTAL STRESS PREDICTS ADVERSE OUTCOMES IN WOMEN WITH CORONARY ARTERY DISEASE

Bruno B. Lima, MD PhD, Muhammad Hammadah, MD, Ibhar Al Mheid, MD, Kobina Wilmot, MD, Irina Uphoff, BS, Salman Sher, MD, Cardiology, Emory, Atlanta, GA, Ronnie Ramadan, MD, Cardiology, Harvard, Boston, MA, Jeong Hwan Kim, MD, Amit Shah, MD, Cardiology, Oleksiy Levantsevych, MD, Epidemiology, Malik Obideen, MD, Cardiology, Laura Ward, MPH, Michael Kutner, PhD, Yi-An Ko, PhD, Epidemiology, Douglas Bremner, MD, Psychiatry, Arshed Quyyumi, MD, Viola Vaccarino, MD PhD, Cardiology, Emory, Atlanta, GA

Background: Even brief episodes of mental stress have been shown to result in transient endothelial dysfunction assessed by brachial artery flow mediated dilatation (FMD). However, the prognostic significance of this phenomenon and whether it differ by sex in patients with coronary artery disease (CAD) is unknown.

Methods: We subjected 554 outpatients (age 63 ± 9 years, 25% women) with stable CAD to mental stress (speech task). FMD was measured at rest and 30-min after stress and expressed as % hyperemic dilation. Patients were followed for cardiovascular (CV) events and mortality. We used the delta FMD (post-stress minus rest) as a predictor of an adjudicated combined endpoint of myocardial infarction (MI) and CV death in Cox-proportional hazards models, adjusting for sociodemographics, medical history and depression, and tested the interaction by sex.

Results: During a follow-up of 3 years, 24 patients had CV events. There was no overall association between delta FMD and CV events. However, when examined by sex, women with CV events, but not men, demonstrated a significantly lower post-stress FMD than their counterparts without events (Figure). In

women, a 10% decrease in post-stress FMD compared with rest was associated with an adjusted 2.5% increase in adverse events (p<0.001). This association was not seen in men (0.9% increase; p=0.32), p=0.04 for interaction.

Conclusions: Transient endothelial dysfunction with mental stress is associated with worse cardiovascular outcomes in women with CAD.

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4) Abstract 1542

DAILY PHYSICAL AFFECTION IN MARRIED WOMEN PREDICTS HPA AXIS ACTIVITY THE FOLLOWING DAY

Chelsea E. Romney, M.A., Health Psychology, Theodore F. Robles, PhD, Rena L. Repetti, PhD, Psychology, University of California Los Angeles, Los Angeles, CA

Background: Greater marital quality is related to better health, but the specific daily mechanisms that explain why are unclear. While negative interactions have been linked to health through stress-responsive biological systems like the hypothalamic-pituitary-adrenal (HPA) axis, little is known about the role of positive interactions. Daily positive physical contact has been associated with lower HPA axis activity, but previous research has not uncovered the temporal direction of this association.

Methods: Participants were an ethnically diverse sample of married couples with children. Couples completed daily reports of physical affection with their spouse, which was used to predict cortisol levels the next day. Cortisol was collected with saliva samples 4 times during each day for 8 days. Total daily cortisol output was computed using the area under the curve with respect to ground (AUCg) formula. Hierarchical linear modeling accounted for nested data. Daily overall cortisol (AUCg) was modeled as a function of the previous day's physical affection score, which allowed for determining temporal ordering of the association between affection and AUCg. *A priori* covariates related to cortisol were entered in the model, including self-reported daily stress.

Results: Higher levels of self-reported physical affection were significantly associated with lower cortisol AUCg the next day, unstandardized coefficient= -0.0507 (0.028), p<0.001, for the wives in the sample. The association between physical affection and next-day cortisol AUCg was not significant for husbands. After including other positive relationship variables in the model (daily marital quality, perceived partner responsiveness and self-disclosure), the association between physical affection and overall cortisol output remained significant.

Conclusion: Greater self-reported physical affection between married couples was associated with lower HPA axis activity the following day for wives. Physical affection may be one mechanism through which romantic relationships can positively influence health, potentially above and beyond other positive factors like perceived partner responsiveness. While temporal precedence allowed causal interpretations to be made for this study, future research should implement experimental methods.

5) Abstract 1459

EXPERIENTIAL AVOIDANCE IN ASTHMA PREDICTS QUALITY OF LIFE AND ASTHMA CONTROL

Chelsey A. Werchan, MA, Thomas Ritz, PhD, Psychology, Southern Methodist University, Dallas, TX, Hans-Ulrich Wittchen, PhD, Psychology, Technische Universität Dresden, Dresden, Germany, Jens Klotsche, PhD, Psychology, Deutsches Rheumaforschungszentrum, Berlin, Germany, Andrew Gloster, PhD, Psychology, University of Basel, Basel, Switzerland, Oliver Riedel, PhD, Epidemiology, Leibniz-Institute for Prevention Research and Epidemiology, Bremen, Germany

Background. Experiential avoidance (EA) refers to the tendency to avoid distressing thoughts, feelings, and other internal experiences, even if doing so creates harm (Hayes et al., 1996). Research on EA in chronic pain and other medical populations suggests a relation to increased distress and poorer quality of life. Avoidance of asthma-related cues could complicate self-management of the disease substantially, but EA has yet to be fully investigated in such respiratory diseases. The current study aimed to explore the utility of a brief asthma-specific measure of EA and examine its relation to quality of life, asthma control, and other clinical outcomes.

Methods. Participants were 476 asthma patients randomly selected through their pulmonary care physician practices. Participants and their physicians completed questionnaires about their asthma diagnosis, comorbidities, treatment history, lung function, medications, compliance, asthma triggers, experiential avoidance, mood symptoms, quality of life, asthma control, and patient satisfaction.

Results. Exploratory PCA with Varimax rotation resulted in a 7item measure of EA in asthma, for which all items loaded on a single factor. This measure demonstrated adequate internal consistency (Cronbach's alpha = 0.85). Multiple regression analyses controlling for demographics, disease severity, anxiety, and depression showed that scores on this Experiential Avoidance of Asthma Questionnaire significantly predicted asthma-related quality of life, general quality of life, asthma control, number of exacerbations in the past year, as well as number of emergency visits. Higher experiential avoidance predicted less asthma control, more exacerbations and emergency visits, and poorer general and asthma-related quality of life.

Discussion. The current study presents a brief, 7-item measure of EA specific to asthma, which shows adequate internal reliability and significant relations with various clinical outcomes such as quality of life and asthma control. These relations suggest that examining an asthmatic's EA may prove informative in their overall health care. Additionally, future research may examine whether EA is able to change in response to intervention and if so, whether such change can influence clinical outcomes in this population.

6) Abstract 1005

INTERACTIVE RELATIONS OF EXECUTIVE FUNCTION, RACE, AND SEX WITH PHYSICAL PERFORMANCE: A LONGITUDINAL INVESTIGATION IN AFRICAN AMERICAN AND WHITE ADULTS

Daniel K. Leibel, MA, Megan R. Williams, MA, Psychology, University of Maryland, Baltimore County, Baltimore, MD, Leslie I. Katzel, MD, PhD, Geriatric Research and Education Clinical Center, Baltimore Veterans Affairs Medical Center, Baltimore, MD, Michele K. Evans, MD, Alan B. Zonderman, PhD, Laboratory of Epidemiology and Population Science, National Institute on Aging, Baltimore, MD, Shari R. Waldstein, PhD, Psychology, University of Maryland, Baltimore County, Baltimore, MD

Previous studies have shown robust cross-sectional associations between executive functions (EF) and physical performance, as well as variation in physical performance as a function of race and sex among older adults. However, little is known about how EF relates to age-related decline in physical performance during middle adulthood, and whether this association is moderated by

race and sex. Using a sample of 1,549 urban-dwelling adults (59.6% female; 59.4% African American; 39.9% living in poverty; aged 30 to 64 years at baseline) from the Healthy Aging in Neighborhoods of Diversity across the Life Span (HANDLS) study, the present investigation used linear and logistic mixedeffects regression analyses to examine interactive relations among EF, race, and sex with age-related decline in handgrip strength, standing balance, and lower extremity strength and endurance over four to five years. Results revealed a significant three-way interaction of EF, race, and age with right-handgrip strength (B = -0.04, t(2244) = -2.60 p = .010), such that lower EF was associated with greater decline in right-handgrip strength among Whites, but lesser decline in right-handgrip strength among African Americans. Additionally, lower EF was related to worse left-handgrip strength (B = 0.35, t(2232) = 4.14, p < .001), single-leg balance (B = -.11, z = -3.09, p = .002), and lower extremity strength and endurance (B = -.18, t(2024) = -2.12, p =.034) across time points. Findings also showed significant twoway interactions of (1) race and age, such that Whites experienced greater age-related decline in single-leg balance (B =-0.04, z = -2.00 p = .047) and right-handgrip strength (B = .09, t(2244) = 2.14, p = .03) than African Americans; and (2) sex and age (B = 0.12, t(2024) = 2.96, p = .003), such that men experienced greater age-related decline in lower extremity strength and endurance than women. These findings have implications for screening and intervention strategies targeting individuals at heightened risk for future physical decline, particularly those with lower EF, men, and Whites.

7) Abstract 1500

MULTIPLE CORTICAL AREAS INFLUENCE THE NEURAL REGULATION OF THE RAT COLON

David J. Levinthal, MD, PhD, Medicine, Division of Gastroenterology, Hepatology, and Nutriiton, University of Pittsburgh Medical Center, Pittsburgh, PA

Increased stress or intense emotions, the anticipation of unpleasant events, or changes in physical activity are all associated with changes in colonic function, implying that the colon is influenced by the brain. However, the cerebral cortical sources of neurally encoded brain-gut commands remain poorly understood. We injected rabies virus into the rat distal colon and used the retrograde transneuronal transport of the virus, along with careful adjustment of survival times, to define the cortical areas that influence the colon. Rabies virus-infected neurons with the most direct influence over the colon were found primarily within three cortical areas: primary motor cortex, secondary motor cortex, and the primary somatosensory cortex. The majority of neurons within these cortical regions were located within their respective representations of the trunk and hindlimb muscles. To identify cortical regions with an indirect influence over the colon, we extended the survival time to allow for one additional stage of transneuronal transport. In these animals, the majority of rabies-infected cortical neurons were found within the previously labeled sensorimotor areas. However, a notable minority of rabies-infected neurons was located within the medial prefrontal cortex and the insula. Thus, while sensorimotor regions of the cortex have the more substantial and direct influence on the neural regulation of the colon, non-motor cortical regions also gain influence via a less substantial and indirect pathway.

Our results provide a neural substrate directly linking the control of motor function and the colon, and this connection may explain how physical movement (or lack thereof) influences colonic function in health and disease. It may also account for the observation that exercise or movement-based therapies such as yoga are therapeutic for some colonic disorders. Our results also provide a neural substrate indirectly linking cognitive and affective processing and the colon, and this connection may explain how mental events influence the colon. The latter may partly account for the clinical benefits of cognitive behavioral therapy or mindfulness meditation in those with functional gastrointestinal disorders such as irritable bowel syndrome.

8) Abstract 1527

THE ASSOCIATION BETWEEN THE LOW-TO-HIGH FREQUENCY RATIO AND CARDIAC AUTONOMIC BALANCE AND REGULATION

DeWayne P. Williams, PhD, Gina M. Gerardo, MA, Havovi Desai, Ms., Nicholas Joseph, Mr., Psychology, The Ohio State University, Columbus, OH, Julian Koenig, Dr. sc hum, Section for Translational Psychobiology in Child and Adolescent Psychiatry, Heidelberg University, Heidelberg, Germany, Julian F. Thayer, PhD, Psychology, The Ohio State University, Columbus, OH

Converging evidence supports the high frequency (HF) component of heart rate variability (HRV) as an index of cardiac parasympathetic (PNS) activity. However continuing debate over the validity of the low frequency (LF) component of HRV as an index of cardiac sympathetic (SNS) activity calls into question the LF/HF ratio as an index of cardiac autonomic balance. Our group recently published a report that showed a strong relationship and good agreement between the LF/HF ratio and impedance derived measures of cardiac autonomic balance (CAB) and regulation (CAR) in 50 participants (Williams et al., 2017). In the present investigation, we reexamine these relationships in a larger sample of participants (n = 155, mean age = 19, 109 women). CAB and CAR values were calculated using the root mean square of successive differences (RMSSD; time-domain index of PNS activity) and systolic time intervals (indices of SNS activity), including pre-ejection periods (PEP) and left ventricular ejection times (LVET). The LF/HF ratio was derived via standard spectral-analytic techniques of both HF- and LF-HRV (Task Force, 1996). Greater CAB scores and lower LF/HF ratios are thought to reflect greater PNS activity relative to SNS activity, whereas greater CAR scores reflect greater activity of both the PNS and SNS. Results revealed a significant and negative relationship between the LF/HF ratio and CAB calculated using both LVET (r = -.372, p < .001) PEP (r = -.368, p < .001). Additionally, the LF/HF ratio was also associated with CAR calculated using both LVET (r = -.291, p < .001) and PEP (r = -.352, p < .001). Bland-Altman plots showed at least 92% of the sample (143 of 155 individuals) fell within the 95% limits of agreement for all measures of CAB and CAR measures, with the best agreement (148 of 155 individuals) emerging for CAB calculated using PEPs. Our data suggest that while the exact nature of LF-HRV component remains controversial, in a resting state, the LF/HF ratio is indeed related to CAB. Interestingly, the LF/HF ratio is also associated with CAR, however, the strength of this relationship may vary as a function of the systolic time interval used in the calculation. Overall, the LF/HF ratio appears to be a suitable proxy for CAB, especially in settings where impedance cardiography methods may be difficult.

9) Abstract 1307

THE LINK BETWEEN STRESS AND INFLAMMATION IS MEDIATED BY DEPRESSIVE SYMPTOMOLOGY AND MODERATED BY GENDER

Erik L. Knight, PhD, Center for Healthy Aging, Marzieh Majd, PharmD, Jennifer E. Graham-Engeland, PhD, Joshua M. Smyth, PhD, Biobehavioral Health, Martin J. Sliwinsky, PhD, Human Development & Family Studies, Penn State University, University Park, PA, Richard B. Lipton, MD, Department of Neurology, Department of Psychiatry and Behavioral Sciences, Department of Epidemiology and Population Health, Mindy J. Katz, MPH, Department of Neurology, Albert Einstein College of Medicine, Bronx, NY, Christopher G. Engeland, PhD, Biobehavioral Health, Penn State University, University Park, PA

Recent work has identified gender as a critical moderator of the association between depressive symptomology and inflammatory responses: Greater depressive symptomology was associated with increased inflammation in men but reduced inflammation in women (Majd et al., *under review*). Although prior research has linked stress to depressive symptoms and increased inflammatory responses, the extent to which gender may alter the relationships between stress, depression, and inflammation is unknown. The present study therefore investigated gender as part of a moderated-mediation model linking indices of recent and lifetime stress to depressive symptoms and inflammatory responses; depressive symptoms and inflammatory responses; depressive symptoms were explored as a moderated mediator of the link between stress and inflammation.

A diverse sample (n = 162; aged 25-65 years; 67% women) selfreported depressive symptoms, lifetime stressors (childhood and lifetime adversity), recent stressors (recent life events [past year]; Perceived Stress Scale [past month]), and cumulative stressor severity obtained from ecological momentary assessment (EMA [past 2 weeks]). Inflammatory responses were determined from lipopolysaccharide (LPS) stimulated cytokines (IL1 β , IL6, IL8, IL10, TNF α) in blood collected at the end of the EMA period.

In models controlling for age and BMI, the relationship between recent stressful events in the last year and inflammatory responses was mediated by depressive symptoms, but this mediation was dependent on gender (Indices of Moderated Mediation: IL-6: $\omega = 0.070, 95\%$ CI[0.017, 0.148], p = 0.030; IL-10: $\omega = 0.059, 95\% CI$ [-0.004, 0.132], p = 0.071; TNF α : $\omega =$ 0.064, 95% CI[0.016, 0.134], p = 0.040). Recent stress was associated with higher depressive symptoms for men and women; higher depressive symptoms in turn related to higher inflammatory responses for men, but reduced inflammatory responses for women. Similar patterns were evident for both perceived stress and EMA cumulative stressor severity. No mediating effects were found for longer-term stress measures of childhood or lifetime adversity. This research indicates that the relationship between recent stress and stimulated inflammatory responses is mediated by depressive symptomology. Further, the direction of the relationship between depressive symptomology and inflammation may be dependent on gender.

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10) Abstract 1452

AROUSAL, AWARENESS, OR APPRAISAL? A DOUBLE-BLIND STUDY WITH PROPRANOLOL COMPARING THE RELATIVE ROLES OF SYMPATHETIC ACTIVATION, INTEROCEPTION, AND APPRAISALS IN AFFECTIVE RESPONSES TO STRESS

Jennifer K. MacCormack, MA, Emma Armstrong-Carter, BA, Psychology & Neuroscience, Samantha Meltzer-Brody, MD,

Psychiatry, Kristen A. Lindquist, PhD, Keely A. Muscatell, PhD, Psychology & Neuroscience, University of North Carolina at Chapel Hill, Chapel Hill, NC

Sympathetic activation, interoception or inner bodily awareness, and appraisals all contribute to the affective experience of stress (e.g., Blascovich & Mendes, 2010; Schulz & Vogel, 2015; Smith & Ellsworth, 1985). In the present study, we sought to untangle how sympathetic activation, interoception, and appraisals may differentially and jointly drive emotions, perceptions of somatic sensations, and interpersonal judgments during an acute stressor. As part of a double-blind, placebo-controlled study, 90 healthy young adults (45% female) received either a 40 mg dose of propranolol or a placebo. Subjects then completed the Trier Social Stress Test (TSST; Kirshbaum et al., 1993), in which they performed two social evaluative tasks (job speech, verbal arithmetic) in front of neutral evaluators. Afterward, subjects reported their emotions, somatic sensations, and appraisals during the TSST, and also rated the interviewers (e.g., empathy). In a prior session not on a drug/placebo, subjects completed the modified Whitehead heartbeat task to assess trait interoception (Kleckner et al., 2016). Using multiple regressions, we examined the main effects and interactions of drug condition, interoception, and negative appraisals in predicting negative and high arousal emotions, somatic perceptions, and negative judgments of the interviewers. We found that negative appraisals were the primary predictor of negative emotions, b=.302, p=.001, high arousal emotions, b=.19, p=.007, and negative interpersonal judgments, b=.23, p=.007, but also significantly interacted with drug (b=.20, p=.026) and interoception (b=.08, p=.051) to predict high arousal emotions, such that participants making more negative appraisals who were on placebo or who were more interoceptive both reported greater high arousal emotions. Compared to emotions, somatic perceptions were primarily driven by interoception, b= 15, p=.006. Results suggest that although sympathetic activation and awareness of bodily changes may drive perceptions of arousal and somatic sensations, appraisals are key for transforming sympathetic arousal into emotions and interpersonal judgments (e.g., Lindquist & Barrett, 2008; Schachter & Singer, 1972). These findings provide new insights into the nature of stress, highlighting the relative contributions of sympathetic activation, interoceptive awareness, and appraisals.

11) Abstract 1541

PHYSICIAN BURNOUT: WHAT ARE WE MISSING? REVIEW OF THE LITERATURE FROM A PSYCHIATRIC PERSPECTIVE, AND A HYPOTHESIS.

Katherine E. Taylor, MD, Peter A. Shapiro, MD, Psychiatry / Consult-Liaison Service, New York Presbyterian / Columbia University Medical Center, New York, NY

Job burnout is highly prevalent and increasing among US physicians. Graduate medical trainees are a particularly vulnerable subset of this population; burnout during training leads to significant long-term term consequences not only for the trainees but also for the patients and communities they serve. Despite increased attention to this issue over recent years, evidence supporting effective interventions remains limited. Recent literature suggests that even using a combination of evidence-based strategies yields only modest (10%) reductions in burnout rates. The purpose of this review is to assess the current evidence for burnout interventions from a psychiatric perspective, with specific attention to psychological and environmental factors that may predispose to, exacerbate, or mitigate trainee burnout. Methods: The authors completed a comprehensive search of electronic databases (including

PsycINFO, Medline, PubMed, and Science Direct) for englishlanguage publications from 2000-2017 related to physician and trainee burnout, stress, depression, resiliency, wellness and wellbeing. Results: 171 publications were identified in the initial search, with abstract review yielding 73 papers included in the full review. The highest rates of burnout are among trainees working at the "front line" of medical care, which includes emergency medicine, internal medicine and neurology. Psychiatry residents have relatively lower burnout rates. Factors uniquely correlated with burnout in psychiatry residents included fear of patients and exposure to patient aggression. Discussion: While psychiatry residents are specifically trained to manage violent and aggressive patients, residents in other "front line" specialties are commonly called upon to care for these patients, without comparable training. Psychiatry residents are additionally taught to examine and utilize negative emotional reactions that result from difficult patient interactions. We hypothesize that exposure to aggressive patients without adequate training leads trainees to seek psychological distance from their work and experience feelings of helplessness, lack of control, and decreased sense of professional efficacy, thus causing or greatly amplifying risk of burnout. Specific training on recognition and utilization of negative emotional reactions to difficult patients might mitigate the risk.

12) Abstract 1137

SOCIODEMOGRAPHIC PREDICTORS OF AGE-RELATED CHANGE IN HEALTH-RELATED QUALITY OF LIFE IN AN URBAN-DWELLING SAMPLE OF ADULTS

Lauren M. Faulkner, BA, Daniel K. Leibel, MA, Shari R. Waldstein, PhD, Psychology, University of Maryland, Baltimore County, Baltimore, MD, Megan M. Hosey, PhD, Physical Medicine and Rehabilitation, Johns Hopkins School of Medicine, Baltimore, MD, Leslie I. Katzel, MD, PhD, Geriatric Research and Education Clinical Center, Baltimore Veterans Affairs Medical Center, Baltimore, MD, Michele K. Evans, MD, Alan B. Zonderman, PhD, Laboratory of Epidemiology and Population Science, National Institute on Aging, Baltimore, MD

Introduction. Although race-, poverty-, and sex-related health disparities are well documented, less is known about disparities in Health Related Quality of Life (HRQoL). Furthermore, few studies have examined interactive effects of these sociodemographic factors on age-related change in mental and physical HRQoL over time. The present study examined longitudinal change in HRQoL in a diverse sample of adults.

Methods: Participants were 3,714 African American (AA) and White, urban-dwelling adults (mean baseline age = 48.2 years; 54.7% female; 59.1% AA; 41.3% below the poverty line) from the Healthy Aging in Neighborhoods of Diversity across the Life Span (HANDLS) study who completed the Medical Outcomes Survey Short Form-12 (SF-12). Linear mixed effects models (with age used to index time) were used to examine linear and quadratic change in the Physical Component Score (PCS) and Mental Component Score (MCS) of the SF-12. PCS and MCS were assessed at baseline and at two subsequent waves with an average of nine years of follow-up; participants with data from at least one wave were included in analyses.

Results. Results revealed a significant interaction of poverty status and age with PCS (p=.02); individuals living in poverty exhibited greater decline in PCS than those living above the poverty line. Results also revealed a significant interaction of poverty status and quadratic age with MCS (p=.01). Those living above the poverty line exhibited gradual improvement in MCS

over time, whereas those living in poverty exhibited decline in MCS through midlife and improvement into older age. Whites (p<.001) and women (p=.01) exhibited lower MCS during midlife than AAs and men, respectively, whereas these differences were nonsignificant in older age due to improvements in MCS among women and Whites.

Discussion. Living in poverty was associated with greater agerelated decline in physical HRQoL, which suggests that physical health concerns may be more important for this group as they age. Furthermore, individuals living in poverty, women, and Whites exhibited lower mental HRQoL during middle adulthood relative to those living above poverty, men, and AAs, respectively. However, these differences diminished with age, suggesting that mental health concerns may be more dynamic for these groups during midlife.

13) Abstract 1525

CARDIOVASCULAR AND AFFECTIVE RESPONSES TO NEUTRAL SPEECH AND ANGER:BENEFITS OF A SINGLE BRIEF SESSION OF MINDFULNESS MEDITATION

Marcellus M. Merritt, Ph.D., Kayla T. Johnson, B.A., Psychology, University of Wisconsin Milwaukee, Milwaukee, WI, Matthew J. Zawadzki, Ph.D., Psychology and Behavioral Sciences, University of California, Merced, Merced, CA, Michelle R. Di Paolo, Ph.D., Maryam Ayazi, M.S., Psychology, University of Wisconsin Milwaukee, Milwaukee, WI

Recent research suggests that mindfulness meditation (MM) interventions are good for cardiovascular (CV) health, but it is unclear how much training needs to happen before observing effects. More brief forms of MM may be equally as effective for acute CV stress responses for certain persons. Notably, perseveration (i.e., continual reflection on negative events) may limit the ability to distract oneself, and likely influence the effectiveness of brief MM on CV reactivity. We evaluated the direct benefits of a five-minute single-session of MM training for CV and affective reactivity to neutral speech and anger recall, and if trait perseverative cognitions (PCs) was a moderator.

68 young adults completed a 5-minute resting baseline, a 2minute neutral speech task, and a 5-minute anger recall task (2 minutes of thinking and 3 minutes of talking). Persons randomly assigned to MM received a 5-minute MM training session before the resting baseline period. Measures of CV responses were collected continuously with Portapres monitors, and momentary mood was collected before baseline and after anger recall. Mean scores were computed for each task for negative mood (the combination of negative mood and reversed positive mood) and measures of CV response (systolic and diastolic blood pressure (BP), and heart rate).

Repeated measures ANOVA tests found a significant period by condition effect for systolic BP [F (3, 198) = 3.95, p = 0.025]; with the brief MM group showing less systolic BP reactivity during neutral speech [$\underline{t}(66) > -2.987$, p < .004], thinking [$\underline{t}(66) > -3.740$, p < .0001] and verbal recall [$\underline{t}(66) > -3.429$, p< .001] than the control group, but not baseline [$\underline{t}(66) > -1.10$, p < .275].

Thus, even a brief MM training session (vs. no training session) predicts less CV reactivity to neutral speech and anger recall. By reducing CV reactivity to a related psychological stressor then there is less need to intervene at the stage of post-stress activation.

14) Abstract 1366

MINDFULNESS-BASED COGNITIVE THERAPY FOR TREATMENT OF PSYCHOLOGICAL DISTRESS IN PREGNANCY: IS THERE AN EFFECT ON MATERNAL AUTONOMIC RESPONSE TO ACUTE STRESS?

Matthew S. Shay, MSc, Tavis S. Campbell, PhD, Psychology, Linda E. Carlson, PhD, Oncology, Gerald F. Giesbrecht, PhD, Paediatrics, Lianne M. Tomfohr-Madsen, PhD, Psychology, University of Calgary, Calgary, AB, Canada

Pregnancy is a time of increased physical and emotional stress for many women. Examination of cardiovascular response to acute stress can provide a non-invasive way of assessing autonomic nervous system function in the face of such stressors. Previous research suggests that experiencing a heightened stress response in pregnancy is a risk factor for poor maternal and child health. The current randomized controlled trial investigated mindfulnessbased cognitive therapy (MBCT) in the context of prenatal distress and examined whether MBCT was associated with changes in the physiological stress response. Women between 12-28 weeks gestation were recruited for participation in an 8week MBCT intervention (N = 29) or assigned to treatment-asusual (TAU) (N = 32). Resting cardiovascular measurements, as well as reactivity to and recovery from laboratory-based Stroop and mental arithmetic stress tasks were measured pre-treatment, posttreatment, and three-months postpartum. Cardiovascular measurements included respiratory sinus arrhythmia (RSA), heart rate, and systolic and diastolic blood pressure. Analysis using a series of ANCOVAs revealed that the MBCT group had higher RSA in the posttreatment period than those receiving TAU during mental arithmetic, $(\eta_p^2 = .131, p = .015)$, recovery from mental arithmetic $(\eta_p^2 = .122, p = .020)$, during the Stroop, $(\eta_p^2 = .122, p = .020)$.175, p = .004), and during recovery from the Stroop, $(\eta_p^2 =$.132, p = .016). Additionally, the MBCT group had a significantly lower heart rate in the posttreatment period than those in TAU during mental arithmetic ($\eta_p^2 = .083$, p = .043), during recovery from mental arithmetic ($\eta_p^2 = .119$, p = .015), and during the Stroop ($\eta_p^2 = .171$, p = .003). Finally, MBCT participants had significantly greater reductions in RSA during mental arithmetic at three-month follow-up ($\eta_p^2 = .150, p = .009$) compared to TAU. No differences in blood pressure or blood pressure reactivity were found between groups at either time point. Higher RSA during stress at posttreatment, as well as greater reductions from baseline RSA during stress at three month follow-up could be viewed as poissble evidence of a more flexible stress response system following MBCT. These initial results suggest that treatment of maternal distress with mindfulness-based interventions may potentially have physiological health benefits.

15) Abstract 1478

RACE MODERATES THE RELATIONSHIP BETWEEN PERCEIVED DISCRIMINATION AND HAIR CORTISOL CONCENTRATION

Matthew Lehrer, MS, Mary A. Steinhardt, EdD, Kinesiology and Health Education, The University of Texas at Austin, Austin, TX, Susan K. Dubois, MD, Internal Medicine, Dell Medical School -The University of Texas at Austin, Austin, TX

Background: Perceived discrimination is considered a key determinant of racial/ethnic health disparities, in part due to its ability to impair hypothalamic-pituitary-adrenal (HPA) axis function over time. Perceived discrimination is associated with long-term HPA axis dysregulation (e.g., hair cortisol concentration), but more work is needed to understand which individuals are most affected by this process. Given that

discrimination may elicit greater perceived consequences, and thus a more pronounced stress response, for minority vs majority groups, we expect that perceived discrimination will be more strongly associated with hair cortisol levels among African Americans compared to non-Hispanic Whites.

Method: Participants included 143 community-dwelling adults (73 non-Hispanic White, 70 African American; mean age 45.9 years; 66% females). The first 3 cm of scalp-near hair were analyzed for cortisol concentration using enzyme-linked immunoassay analysis (ELISA). Perceived discrimination was assessed using the Everyday Discrimination Scale. Mean frequency of perceived discrimination was compared between racial groups, and the moderating effect of race on the relationship between perceived discrimination and hair cortisol was examined using hierarchical multiple regression.

Results: Mean perceived discrimination frequency did not differ between non-Hispanic Whites and African Americans (t = 1.34, p < .05; see Figure 1). Race moderated the relationship between perceived discrimination frequency and hair cortisol concentration (Discrimination x Race interaction: F = 3.98, p < .05; see Figure 2), such that perceived discrimination was positively associated with hair cortisol levels among African Americans (b = .14, p < .05), but not among non-Hispanic Whites (b = -.09, p > .05).

Conclusion: More frequent discrimination was associated with greater hair cortisol concentration among African Americans, but not non-Hispanic Whites. Perceived discrimination may thus be more physiologically detrimental to African Americans than to non-Hispanic Whites.

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16) Abstract 1435

DEVELOPMENT OF A BRIEF ASSESSMENT TOOL TO IDENTIFY PATIENTS AT HEIGHTENED RISK FOR CARDIAC-INDUCED PTSD

Mattie Boehler-Tatman, BA, Gaspar Cruz, BA, Talea Cornelius, PhD, Donald Edmondson, PhD, Center for Behavioral Cardiovascular Health, Dept. of Medicine, Columbia University Medical Center, New York, NY

Background: Cardiac-induced Post Traumatic Stress Disorder (PTSD) is prevalent (~16% of patients develop PTSD as a result of experiencing a cardiac event). These patients tend to have poorer health prognoses and increased re-hospitalizations, making early identification of at-risk patients important for research, prevention, and treatment. We developed a 7-item scale measuring Emergency Department (ED) threat perceptions at ED bedside, in both Spanish and English, to identify people at risk for developing cardiac-induced PTSD.

Methods: Participants were patients (N = 1000) evaluated for acute coronary syndrome (ACS) in an urban NYC hospital with the average age of 60.3 ± 13.2 . Almost half of the patient population reporting English not being their first language (47.7%). Participants answered 14 questions about Emergency Room Perceptions (ERP) both in the ED and as a recall questionnaire at bedside approximately 30 days later. We identified a short, unidimensional scale of ERP using factor analysis, and examined internal consistency and test-retest reliability. We also tested the external validity of this scale by examining its ability to predict cardiac-induced PTSD one-month post-discharge. Finally, we tested to see whether these associations differed for English- and Spanish-speaking patients.

Results: Factor analysis revealed one dominant factor comprised of seven items (loadings > .5 at each assessment). Example items include "I am afraid, I am worried that I am going to die," "I feel helpless," and "I am worried I am not in control." Items were scored from 1, not at all, to 4, extremely. The ERP scale was reliable at ED (α = .82) and recall (α = .83), and correlated at *r* = .61, *p* < .001. Controlling for depression and PTSD symptoms at baseline, ERP at ED predicted PTSD at one month, *OR* = 2.04, *p* < .001. In the second block, elevated ERP at ED continued to predict PTSD, *OR* = 1.75, *p* < .01; and recall ERP did not, *OR* = 1.30, *p* = .16. These effects did not differ for English- and Spanish-speaking patients, *ps* > .25.

Conclusion: This brief 7-item scale is a valid and reliable tool that can identify Spanish- and English-speaking patients at increased risk of developing cardiac-induced PTSD at ED bedside. This scale may be helpful for physicians to identify at-risk patients for early intervention.

17) Abstract 1349

PROMISES AND PITFALLS OF HOME-BASED VS. LAB-BASED HAIR COLLECTION - AN EMPIRICAL STUDY

Nadine Skoluda, PhD, Psychology, University of Vienna, Vienna, Austria, Austria, Isabell Piroth, MSc, Psychology, University of Marburg, Marburg, Germany, Clemens Kirschbaum, PhD, Psychology, Technical University of Dresden, Dresden, Germany, Urs M. Nater, PhD, Psychology, University of Vienna, Vienna, Austria, Austria

Background: Hair cortisol concentration (HCC) provides a retrospective marker of cumulative cortisol secretion over prolonged time periods, and thus allows insight into chronic HPA axis activity. In order to achieve a reliable and valid hair analysis, hair samples need to meet certain quality criteria. Thus, standardized hair collection procedures are commonly performed by trained professionals. Due to reasons of practicability, it is appealing to enable lay persons to collect hair samples at a participant's home by providing easy and clear step-by-step instructions. Preliminary findings are promising suggesting high correlations in HCC collected by instructed lay persons and trained research personnel (Ouellet-Morin et al., 2016). However, studies are scarce comparing quality of hair samples collected by lay persons vs. professionals.

Methods: Sixty young participants (23.9±3.9 yrs; 44 females) provided hair samples twice: 1. collected by instructed lay persons who were acquainted with the participant (HOME) and 2. by trained research personnel (LAB) at the same or following day of HOME assessment. All lay persons were given written instructions; half of them received an additional video instruction. Quality of hair samples were evaluated by an independent rater using 9 predefined dichotomous criteria (e.g., marking proximal end of hair sample on foil; hair strands fixed by thread loops). HCC was determined by using LC-MS/MS.

Results: Although the quality of HOME samples was rated lower compared to LAB samples (total score 6.7 vs. 8.7; p<0.01), all samples could be included for subsequent hair analysis. HCC did not significantly differ between HOME and LAB samples; furthermore, HOME and LAB HCC were highly correlated (r=0.76, p<0.01, final analysis n=58, after removing 2 participants with extreme values in order to avoid outlier biases). **Conclusions**: Our findings suggest slightly lower quality of hair samples collected by instructed lay persons compared to trained professionals. However, these differences might be negligible, with the majority of HOME samples being of good quality and

with a high correlation between HOME and LAB HCC. Thus, hair collection can be conducted by trained lay persons, e.g. in epidemiological studies, without any detriment to HCC reliability and validity.

18) Abstract 1376

SEX DIFFERENCES IN BRAIN ACTIVATION PATTERNS WITH MENTAL STRESS IN PATIENTS WITH CORONARY HEART DISEASE, WITH AND WITHOUT MENTAL STRESS INDUCED MYOCARDIAL ISCHEMIA

Nicole Kasher, MPH, Epidemiology, Emory University, Atlanta, GA, J Douglas Bremner, MD, Psychiatry, Jonathon Nye, PhD, Radiology, Emory University School of Medicine, Atlanta, GA, Carolina Campanella, PhD, Stacy Ladd, BS, Psychiatry, Emory University, Atlanta, GA, Muhammad Hammadah, MD, Medicine (Cardiology), Emory University School of Medicine, Atlanta, GA, Amit J. Shah, MD, MSCR, Epidemiology, Emory University, Atlanta, GA, Bruno Lima, MD, Arshed A. Quyyumi, MD, Medicine (Cardiology), Emory University School of Medicine, Atlanta, GA, Viola Vaccarino, MD, PhD, Epidemiology, Emory University, Atlanta, GA

Introduction: Exposure to acute psychological stress activates neural pathways connecting brain areas involved in stress perception and autonomic nervous system regulation with cardiovascular responses to stress. In susceptible individuals, stress can induce myocardial ischemia and contribute to progression of coronary artery disease (CAD). Research suggests that women are more vulnerable than men towards the adverse cardiovascular effects of psychological stress, and are more likely to develop mental stress induced myocardial ischemia (MSI).

Methods: We investigated sex differences in the neural correlates of mental stress in a sample of 53 female and 112 male participants (N= 165) with confirmed CAD, with and without MSI, which was assessed on a separate day with myocardial perfusion imaging. Subjects underwent 2 stressful arithmetic tasks and 2 public speaking tasks and 4 matched control tasks. Two brain scans during each condition were obtained using positron emission tomography (PET) and analyzed using statistical parametric mapping software. We identified brain regions of at least 11 continuous voxels with significantly (p<0.005) increased or decreased cerebral blood flow in women compared to men in the entire sample and after stratifying by MSI status.

Results: Men had a greater increase than women in average systolic blood pressure (p < 0.001) but not heart rate from control to mentally stressful conditions. In the entire sample, compared to men, women had significantly greater activation in the left superior temporal gyrus (Area 42) to mental stress compared to control conditions, but greater deactivation in several other regions, including bilateral anterior cingulate gyrus (Area 24, 32), right medial frontal gyrus (Area 8, 9) and right middle temporal gyrus (Area 21). Among those with MSI, however, women had significantly greater hyperactivation than men in the bilateral anterior cingulate gyrus (Area 24, 32) while these areas were deactivated in women without MSI compared with their male counterparts.

Conclusion: Stress is differentially associated with hyper- and hypo-activation of brain regions in men and women, particularly in the limbic system, and these functional responses differ by MSI status. Our results suggest that the cingulate gyrus may be involved in sex differences in MSI.

19) Abstract 1479 LIVING WITH A PARTNER: ACUTE CORONARY SYNDROME PATIENTS AND SLEEP QUALITY

Othanya G. Garcia, BA, Collin P. Buckley, BA, Gabriel Sanchez, BA, Donald E. Edmondson, PhD, MPH, Talea Cornelius, PhD, MSW, Medicine, Center for Behavioral Cardiovascular Health, Columbia University Medical Center, New York, NY

Background: Lack of sleep in Acute Coronary Syndrome (ACS) patients one month after diagnosis has been associated with greater inflammation, decreased insulin sensitivity, and a 50% higher likelihood of ACS rehospitalization or death within one year of the initial diagnosis. Anxiety sensitivity is associated with lower quality of sleep, yet support associated with living with a partner may promote longer sleep and reduce use of sleep medications. Further, sensitivity to, or anxiety about, ACS symptoms could be eased by the presence of a partner who could help in the case of an emergency.

Methods: Participants were 240 patients with complete data $(61.0\pm12.2 \text{ years old}; 84.6\% \text{ living with a partner/spouse}; 64.2\% male; 17.9\% Black, 54.2\% Hispanic) who were evaluated for ACS and enrolled in the REactions to Acute Care and Hospitalization (REACH) study, an observational cohort study of ED experience and PTSD. Relevant to this study, participants reported demographics and depression at baseline. At one month, participants completed self-report measures of anxiety and two questions about sleep: "In the past month, how many hours of actual sleep did you get at night?" and, "In the past month, did you take any sleep medications?"$

Results: Results are adjusted for demographics, cardiovascular health history, and depression. Higher anxiety sensitivity was not associated with sleep, p = .54, but tended to predict use of sleep medications, OR = 1.02, p < .07. Patients living with a partner slept longer, B = .65, p = .03, and were marginally less likely to take sleep medications, OR = .45, p < .10. Living with a partner trended towards buffering the association between one-month anxiety and use of sleep medications, OR = .94, p < .10.

Conclusion: ACS diagnosis can be a stressful experience for patients which can adversely impact sleep. Our findings suggest that social support can increase sleep and decrease the use of sleep medications. It may be beneficial for physicians to advise ACS patients to be near loved ones after ED discharge, and, perhaps, that an evening companionship from home health aides could improve the sleep of senior ACS patients, and, ultimately, health outcomes.

20) Abstract 1143

DAILY STRESS AND PHYSICAL ACTIVITY PREDICT POSITIVE AND NEGATIVE AFFECT: A 12-DAY ECOLOGICAL MOMENTARY ASSESSMENT STUDY IN YOUNG ADULTS

REBECCA C. RICE-LACY, BACHELOR OF SCIENCE (HON, YI YANG YAP, BACHELOR OF PSYCHOLOGY (, JOSHUA F. WILEY, PHD, PSYCHOLOGY, MONASH UNIVERSITY, MELBOURNE, Australia

Background: Affect is important for well-being and is an outcome in its own right. Affect fluctuates daily, yet little is known about the daily dynamics of affect with stress and physical activity, two factors implicated in affect regulation. Physical activity may also help buffer against the negative effects of stress in daily life.

Method: 101 healthy, young adults completed a 12-day, daily study and provided 3,093 observations. Ecological momentary assessment was used to measure overall perceived stress and positive and negative affect (4 items each) three times per day.

Physical activity was categorised as percent time in sedentary, light (LightPA), or moderate-to-vigorous (MVPA) activity, objectively measured by accelerometry. Analyses were multilevel models, adjusted for covariates (gender, age, body mass index, race, alcohol use, smoking status, education level, day of week and study day).

Results: Within participants, higher stress predicted higher negative and lower positive affect (both p < .05). Higher MVPA predicted higher positive affect, controlling for previous positive affect (p < .05). Further, MVPA interacted with stress such that higher engagement in MVPA weakened the relationship between stress and positive affect. Between participants, LightPA weakened the relationship between stress and negative affect, but within participants, LightPA strengthened the relationship between stress and subsequent negative affect (both p < .05).

Conclusion: These results demonstrate the importance of stress and physical activity for daily affect and suggest that minor within-day fluctuations in stress and physical activity impact individuals' mood. They also highlight the value of physical activity as a resilience factor that can help to regulate stress in everyday life. The findings may help guide future interventions to better manage stress, as even modest increases in physical activity may be an effective strategy to promote mental health during times of stress.

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21) Abstract 1457

LOWER SUBJECTIVE SOCIAL STATUS AND REDUCED ANTERIOR CINGULATE VOLUME: REPLICATION AND EXTENSION

Regina L. Leckie, PhD, Psychiatry, Dora C. Kuan, MS, Psychology, Stephen B. Manuck, PhD, Psychiatry, Matthew F. Muldoon, MD, Medicine, Peter J. Gianaros, PhD, Psychology, Univ of Pittsburgh, Pittsburgh, PA

Lower subjective social status (sSES) relates to poor physical health and has also been related to brain morphology, particularly reduced grey matter (GM) volume in the rostral anterior cingulate cortex (rACC; Soc Cogn Affect Neurosci, 2007, 2 :161-73). Yet, determinants of this relationship are unknown. It is possible that indicators of risk factors for poor health-such as insulin resistance and physical inactivity-might partly explain the putative association between sSES and rACC volume. This possibility was tested using cross-sectional and archival data from the Adult Health and Behavior, Phase 2 (AHAB2) registry. Participants were 409 healthy, community dwelling adults, aged 30-54 years (mean age 42.77). All participants completed the Paffenbarger Physical Activity Questionnaire (PPAQ), underwent phlebotomy to complete the homeostatic model assessment (HOMA) of insulin resistance, and completed a structural neuroimaging protocol. Freesurfer was used to total GM volume, as well as volume of the rACC and other regions of interest (amygdala, hippocampus). sSES was measured using the MacArthur Scale of Subjective Social Status. Objective SES indicators were number of years of education and family income. Insulin resistance via HOMA and physical activity via PPAQ correlated with sSES (HOMA pr = -0.091, p = 0.066; PPAQ pr =0.102, p = 0.039) and were tested as possible mediators. The Preacher and Hayes PROCESS model of mediation (Hayes, 2012. Retrieved from http://www.afhaves.com/ public/process2012.pdf) was used to test for mediation. In replication, sSES covaried positively with total GM (pr = 0.128 p= 0.021) and rACC volume (pr = 0.128, p = 0.006) after

controlling for age, sex, education, income, and intracranial volume. Despite significant main effects (pr = -0.164, p = 0.001), HOMA did not mediate the relationship between sSES and total GM. Main effects were also present between PPAQ and total GM (pr = 0.122, p = 0.013), though PPAQ was not a significant mediator. These results provide replicated evidence for rACC volume as a neural correlate of sSES. They also suggest that insulin resistance and physical inactivity are not mediators of this relationship, but may negatively affect GM in parallel. Future work is necessary to better understand the factors that may link sSES to brain morphology, as well the functional significance of this association.

22) Abstract 1156

TRANSCUTANEOUS VAGUS NERVE STIMULATION INCREASES EMOTION RECOGNITION

Samantha N. Brosso, BS, David Findley, BA, Teague R. Henry, PhD, Keely A. Muscatell, PhD, Barbara L. Fredrickson, PhD, Psychology and Neuroscience, University of North Carolina at Chapel Hill, Chapel Hill, NC

There is growing support for the social role of the vagus nerve; however, the majority of this literature comes in the form of either theories or correlational studies. For example, previous research has demonstrated that clinical populations (e.g., autism, depression) show simultaneous deficits in social abilities and vagus nerve activity. Here we present data using a novel research method, transcutaneous Vagus Nerve Stimulation (tVNS), to show that experimentally activating the vagus nerve causes increases in emotion recognition. 125 (86 female) young adults completed baseline measures and were randomly assigned to either an active tVNS or sham-stimulation condition. In the active tVNS condition, ear clip electrodes were attached to the left ear, where dense bundles of vagus nerve endings are located. In the control condition, ear clip electrodes were attached to the top of the left ear, where there is no known vagus nerve enervation. While receiving either active tVNS or sham-stimulation, participants completed social perception measures (e.g., the Reading the Mind in the Eyes task [RMET] and a trait rating task) and social motivation measures (e.g., the Pictorial Attitude Implicit Association Test [PA-IAT] and the Multi Motive Grid [MMG]). Although independent t-tests revealed no significant differences between the tVNS and control conditions on the trait rating task, PA-IAT or MMG, there were significant results for the RMET. When evaluating participants' ability to correctly identify emotions portrayed in images of people's eyes, we found that individuals who received the active tVNS (m=28.6 SD=3.4) scored significantly higher on the RMET than individuals who received the sham-stimulation (m=26.8 SD=4.6); t(124)=2.642, p=.009. This effect did not interact with gender and the effect remained when controlling for all baseline measures. These results provide preliminary support for the idea that vagus nerve stimulation with tVNS can increase emotion recognition accuracy, an important component of social functioning. Furthermore, our findings present the intriguing possibility that tVNS could be used outside of the lab to strengthen social connections, and thus improve well-being and physical heath.

23) Abstract 1251

INFLUENCE OF PRE-TRANSPLANT STRESS COPING STYLE ON POST-TRANSPLANT OVERALL SURVIVAL IN ALLOGENEIC HEMATOPOIETIC STEM CELL TRANSPLANTATION RECIPIENTS WITH HEMATOLOGIC MALIGNANCIES.

Seraki Miyamoto, M.D., Saki Harashima, M.D., Ryo Yoneda, M.D., Maiko Hiraide, M.D., Makoto Otani, M.D., Ph.D., Kazuhiro Yoshiuchi, M.D., Ph.D., Stress Sciences and Psychosomatic Medicine, The University of Tokyo, Tokyo, Japan The influence of pre-transplant psychosocial factors on posttransplant survival in allogeneic hematopoietic stem cell transplantation (HSCT) recipients with hematologic malignancies has been controversial. Therefore, the objective of the present retrospective observational cohort study was to investigate the relationships between psychosocial factors and post-transplant overall survival (OS) in allogeneic HSCT recipients with hematologic malignancies. Subjects are allogenic HSCT recipients included acute myelogenous leukemia (AML), chronic myelogenous leukemia (CML), acute lymphoblastic leukemia (ALL), myelodysplastic syndromes (MDS), mycosis fungoides (MF), and diffuse large B-cell lymphoma (DLBCL). The patients consisted of 56 male and 46 female patients, ranging in age from 20 to 72 years, with a mean of 47.8 years. The observation period ranged from 1 to 2892 days (the median period was 609 days). Pre-transplant psychosocial factors included anxiety and depressive mood by Hospital Anxiety and Depression Scale (HADS), social support, coping skills, and self-esteem. Covariates were investigated such as their age at the transplant, recipient sex, graft source, conditioning regimen intensity, HLA matching, recipient CMV serostatus, hematopoietic cell transplantation-comorbidity index (HCT-CI) ratings. Disease risk was assessed with the refined DRI. In 102 patients, Cox proportional hazard model was used to calculate hazard ratios of pre-transplant psychosocial variables on OS in allogenic HSCT recipients controlling for the covariates. The results showed that better OS was significantly associated with higher problemfocused scores in coping inventory (hazard ratio (HR) 0.95, p < 0.05). Depressive mood was not associated with OS in the HSCT recipients. In conclusion, pre-transplant stress coping might influence post-transplant OS in HSCT recipients with hematological malignancies. Future studies are necessary to investigate the effectiveness of intervening stress coping in those patients.

24) Abstract 1221

CAN PLACEBO EFFECTS BE LEARNED FOR ITCH? CONDITIONING OF ANTIHISTAMINERGIC EFFECTS

Stefanie H. Meeuwis, MSc, Henriët van Middendorp, PhD, Judy Veldhuijzen, PhD, Faculty of Social and Behavioural Sciences, Institute of Psychology, Health, Medical and Neuropsychology unit, Leiden University, Leiden, Netherlands, Gustavo Pacheco-Lopez, PhD, Departamento de ciencias de la salud, Metropolitan Autonomous University, Lerma de Villada, Mexico, Jan De Houwer, PhD, Department of Experimental Clinical and Health Psychology, Ghent University, Ghent, Belgium, Maarten Ninaber, MD PhD, Department of Pulmonology, Sjan Lavrijsen, MD PhD, Department of Dermatology, Nic van der Wee, MD PhD, Department of Psychiatry, Leiden University Medical Center, Leiden, Netherlands, Andrea Evers, PhD, Faculty of Social and Behavioural Sciences, Institute of Psychology, Health, Medical and Neuropsychology unit, Leiden University, Leiden, Netherlands

Current evidence suggests that it might be possible to classically condition the effects of antihistamines, which may lead towards reduction of symptoms in allergic patients. Discovering the psychoneuroimmunological mechanisms involved could provide a basis for new therapeutic possibilities and therapies. A randomized placebo-controlled conditioning paradigm consisting of 2 phases was applied. In the acquisition phase (3 sessions on 3 consecutive days) an association between an unconditioned stimulus (UCS; levocetirizine diHCl) and a conditioned stimulus (CS; a distinctively tasting beverage) was made. Conditioned effects were tested in the evocation phase (3 sessions on 3 consecutive days in the following week). Healthy volunteers (n=92) were randomly assigned to 1) a conditioning group, 2) an open label group (conditioning plus an explanation of the conditioning procedure), 3) a placebo group (no conditioning) or 4) a conditioned not evoked group (no elicitation of conditioned effects during evocation). At baseline and during the final evocation session, itch was induced experimentally by histamine iontophoresis. Preliminary analyses revealed no significant group differences for average itch experienced during histamine iontophoresis in the final evocation session, controlled for average itch at baseline. Data collection for the project has recently finished and the final results will be presented during the conference.

25) Abstract 1210

SOCIAL SUPPORT AND STRESS PREDICT ANXIETY, DEPRESSION, AND BINGE EATING IN BARIATRIC SURGERY CANDIDATES (BSC)

Tracy E. Brown, Ph.D., Larissa A. McGarrity, Ph.D., Christina M. Derbidge, Ph.D., Physical Medicine and Rehabilitation, Alexandra L. Terrill, Ph.D., Department of Occupational and Recreational Therapies, University of Utah, Salt Lake City, UT, Maija Reblin, Ph.D., Department of Health Outcomes and Behavior, Moffitt Cancer Center, Tampa, FL, Anna R. Ibele, M.D., Eric T. Volckmann, M.D., Surgery, Justin J. MacKenzie, Ph.D., Physical Medicine and Rehabilitation, University of Utah, Salt Lake City, UT

BACKGROUND: Among individuals with morbid obesity, bariatric surgery results in greater and better sustained weight loss than conventional lifestyle interventions. A variety of factors influence optimal weight loss following bariatric surgery including anxiety, depression, and binge eating. Social support has been strongly associated with health and a number of health behaviors including dietary patterns, disordered eating behaviors, and weight loss among persons with obesity. However, there have been limited investigations examining the association of social support and social stress as it relates to psychosocial risk factors identified among BSC. In a cross-sectional examination, we examined the influence of social support and social stress on disordered eating, depression, and anxiety in BSC. METHOD: A total of 545 individuals (410 women and 135 men) undergoing pre-surgical psychological evaluation for bariatric surgery participated in the study. Mean age was 44.17 (SD = 12.44) and mean body mass index (BMI) was 46.01 (SD = 8.80). As part of the pre-surgical evaluation, participants completed self-report measures of social support and stress (DUSOCS), binge eating (BES), anxiety (GAD-7), and depression (PHQ-9). RESULTS: Linear regression models were run separately for each criterion variable, with predictors (social support, social stress) and covariates (gender, BMI, age) entered simultaneously. Social support and social stress remained significantly associated in expected directions with binge eating (support: B = -.05, SE =.02, p < .01; stress: B = .09, SE = .02, p < .001), depression

(support: B = -.07, SE = .01, p < .001; stress: B = .07, SE = .02, p < .001), and anxiety (support: B = -.05, SE = .01, p < .001; stress: B = .08, SE = .01, p < .001) in these full models. **CONCLUSIONS:** Study findings suggest that social support predicts lower levels of binge eating, depression, and anxiety, while social stress is associated with higher levels of psychosocial risk factors for suboptimal outcomes among BSC. These findings support the interrelated nature of psychological and social factors as they relate to both risk and resilience. Among BSC, further evaluation and understanding of social networks may help inform healthcare providers' treatment recommendations and potential future interventions improving post-operative outcomes.

26) Abstract 1489

VAGAL MODULATION AND COGNITIVE DECLINE OVER 10 YEARS: THE WHITEHALL II COHORT STUDY

Vera K. Jandackova, Ph.D., Epidemiology and Public Health, University of Ostrava, ostrava, Czech Republic, Shaun Scholes, Ph.D., Annie Britton, Professor, Epidemiology and Public Health, Andrew Steptoe, Professor, Behavioural Science and Health, University College London, London, United Kingdom

Backgroud: Dysfunction of autonomic nervous system may contribute to neuronal damage. The research in this area is limited. We prospectively investigated whether decreased vagal modulation, indexed by high frequency heart rate variability (HF-HRV), in midlife predicts subsequent cognitive decline.

Method: Data from the fifth (1997-1999), seventh (2002-2004) and ninth (2007-2009) phases of the UK Whitehall II longitudinal population-based cohort study were analysed. The sample size was 4471 (1247 women). Cognitive function measures included memory, reasoning, vocabulary, executive function and global cognition. Heart rate variability was obtained during 5 min of supine rest. The values of HF-HRV at phase 5 were divided into quartiles. Random mixed models were applied.

Results: Over a 10 year period there was significantly greater decline in vocabulary (β =-0.15; p=0.001), reasoning, (β =-0.11; p=0.007), executive function (β =-0.09; p=0.033) and global cognition (β =-0.07; p=0.027) among men with baseline HF-HRV in the lowest quartile than others. Statistically insignificant associations were found in women. All models were adjusted for age, ethnicity and education. Further adjustments for known confounders including sociodemographic and lifestyle factors, cardiometabolic conditions and medication did not change the predictive effect of HRV on cognitive decline.

Conclusion: Findings support an etiological role of the autonomic nervous system in cognitive decline.

27) Abstract 1540

DEVELOPMENT AND PRETESTING COGNITIVE-BEHAVIORAL GROUP THERAPY IN A BIOFEEDBACK-ASSISTED PROGRAM FOR HYPERTENSION

Wei-Chien Hsu, M.S., Hong-Ru Chang, M.S., Clinical Psychology, National Chung Cheng University, Chiayi, Taiwan, Province Of China, Chih-Wei Chen, M.D, Chin-Lon Lin, M.D, Ming-Nan Lin, M.D, School of medicine, Tzu Chi University, Hualien, Taiwan, Province Of China, Chia-Ying Weng, Ph.D., Clinical Psychology, National Chung Cheng University, Chiayi, Taiwan, Province Of China, Tin-Kwang Lin, M.D, School of medicine, Tzu Chi University, Hualien, Taiwan, Province Of China **Objective:** This study aimed to develop and evaluate cognitivebehavioral group therapy (CBGT) in a biofeedback-assisted program, which would positively impact psychological factors, autonomic nervous system (ANS) function, and blood pressure (BP) levels among patients with hypertension (HT).

Methods: Thirty-five patients with HT (female, 65.7%; age range, 45-70 years) were recruited from the cardiology clinic of a general hospital and randomly assigned to receive CBGT (female, 60.0%; mean age = 57.20 ± 6.73 years) in addition to the standard medical care received by the wait-list control group (female, 61.5%; mean age = 58.98 ± 8.73 years). The 8-week intervention program incorporated psycho-education, biofeedback-assisted slow breathing training, stress management skills, and cognitive flexibility training. The Trait Anxiety Inventory, Beck Depression Inventory, Perceived Stress Inventory, ANS examinations, and BP measurements were assessed pre- (T1) and post- (T2) intervention, and at 3 (T3) and 6 months of follow-up (T4). The main outcomes analyzed were the changes in measures from T1-T2 between the 2 groups, and the changes in measurements from T1-T4 in the combined group (female, 50.0%; mean age = 56.50 ± 8.05 years). The participants of the two groups were included and the participants with changes in anti-hypertensive medication prescriptions were excluded. Results: In the experimental group, there was a significant reduction from T1-T2 in respiratory rate ($F_{(1, 21)} = 16.46, p < .001$) and a significant elevation from T1-T2 in log-transformed lowfrequency power ($F_{(1, 16)} = 5.99, p < .05$) compared to the wait-list control group. Long-term effects for psychological factors and BP levels were shown in the combined group; specifically, the participants who attended the program had significantly lower anxiety $(F_{(3, 21)} = 5.19, p < .01)$, depression $(F_{(3, 21)} = 6.84, p < .01)$, perceived stress ($F_{(3, 21)} = 4.34, p < .05$), lower levels of systolic BP $(F_{(3, 21)} = 4.94, p < .01)$, and improved vasodilation function, as indicated by blood vessel amplitude ($F_{(3, 21)} = 4.86, p < .05$) at T3 and T4 compared to T1. Discussion: The findings indicated that CBGT in a biofeedback-assisted program might improve BP levels by immediately promoting baroreflex function and subsequently reducing psychological distress and sympathetic activity for patients with HT.

28) Abstract 1432

STRESS AND MARRIAGE: AMBIVALENT RELATIONSHIPS, STRESS AND BLOOD PRESSURE

Wendy Birmingham, Ph.D., Psychology, Lori Wadsworth, Ph.D., Business, Brigham Young University, Provo, UT, Man Hung, Ph.D, Orthopedic Center, University of Utah, Salt Lake City, UT, Erin Kaseda, BS, Psychology, Tyler Graff, BS, Psycholgoy, Brigham Young University, Provo, UT

Background.Marital partners can be sources of support and understanding but can also be sources of negativity such as criticism, conflict, and jealousy. Supportive spouses have been associated with better health outcomes, particularly during support seeking while ambivalence relationships are associated with poorer health outcomes. Although ambivalent relationships may demonstrate high levels of supportiveness, the relationship negativity may negate the benefits found in more supportive relationships. One important biological pathway by which ambivalent marriage may negatively affect health outcomes is through cardiovascular (CV) functioning. Stress, along with heightened sustained daily blood pressure and heart rate are associated with increased CV risk. Support seeking from an ambivalent partner may increase stress, daily blood pressure and heart rate. Method.63 couples (n=126) completed questionnaires assessing their partners' behavior as supportive or ambivalent

when the participant was seeking support. Each individual was fitted with an ABP monitor worn for 24 hours, measuring ABP at work, at home and overnight. Daily activities were completed via smart phone or computer at each ABP reading, detailing stress levels and ABP needed variables (e.g., location, position, consumption). Each diary reading took approximately 2-3 minutes to complete. Results.SAS Proc Mixed was used to account for the interdependence between couples. 78% rated their partner's behavior as ambivalent, and 79% rated their own behavior as ambivalent. Most were white (90%), educated (44.6% college educated) and ranged from 21-59 in age (M=25.2, SD=5.3). Spouses who rated their partner during support seeking as behaving ambivalent showed higher daily heart rates (p=.01), higher daily diastolic blood pressure (p=.04) and experienced greater daily stress than those with supportive spouses (p<.01). A significant interaction between stress and relationship quality indicated those with ambivalent partners experienced greater diastolic blood pressure with higher daily stress (p=.04).

Conclusions. Ambivalent marital relationships may not offer the same protective benefits of more supportive relationships during support seeking and may increase stress when a partner is most in need of support.

29) Abstract 1533

FAMILY HISTORY OF ALCOHOLISM AND EARLY LIFE ADVERSITY CONTRIBUTE TO ANTISOCIAL TRAITS AS PREDICTORS OF SUBSTANCE USE DISORDERS IN THE OKLAHOMA FAMILY HEALTH PATTERNS PROJECT

William R. Lovallo, PhD, Psychiatry and Behavioral Sciences, Kristen H. Sorocco, PhD, Geriatric Medicine, Andrew J. Cohoon, MPH, Psychiatry and Behavioral Sciences, Andrea S. Vincent, PhD, Cognitive Science Research Center, University of Oklahoma Health Sciences Center, Oklahoma City, OK

The Oklahoma Family Health Patterns project is focused on understanding risk factors for alcoholism and other substance use disorders (SUD). To do so, we are comparing healthy, young adults with and without a family history of alcoholism (FH+, FH-) on psychiatric histories and personality traits, cognitive function and behavioral impulsivity, and physiological responses to mental stress, along with an examination of genetic polymorphisms and neuroimaging for brain structure and function. Two findings have emerged that will direct future work on this project. First, FH+ persons are far more likely than FHto have been exposed to early life adversity (ELA) ($X^2 = 18, p < 10$.0001) (physical or sexual abuse or separation from parents). Second, antisocial and disinhibitory traits are much more prevalent in FH+ persons relative to FH-, as indexed by low scores on the Socialization Scale of the California Personality Inventory (CPI-So), a composite measure of rule violation, impulsivity, and lack of empathy. We recently examined data from 727 persons screened for inclusion in the OFHP, with the aim of achieving a maximal discrimination between SUD+ and SUD- groups. To do so, we used FH status, exposure to ELA, and CPI-So scores as predictors of SUD status. We found that: (1) Low CPI-So scores proved to be the single best predictor of SUD status ($t_{725} = 11.2$, p < .0001), such that the CPI-So score was able to correctly classify SUD status in 68% of our study population; and (2) when we examined CPI-So scores among subjects classified by FH+ and ELA risk status, we found additive relationships, with progressively lower (more antisocial) scores in persons who were SUD+ (F = 14.6, p < .0001), FH+ (F = 4.21, p < .05), and ELA $(0, \ge 2, F = 10.0, p < .0001)$. Examination of ELA reports and items on the CPI-So scale

showed that the primary contributors to SUD were family disruption, rather than physical and sexual abuse. In several analyses, ELA appears to shape stress reactivity, cognitive function, and affective disposition. Our working model of risk for SUD indicates that FH+ persons carry a known genetic propensity toward future SUD, and that this propensity is worsened in relation to ELA exposure and the emergence of antisocial and disinhibitory traits. Future work will examine gene by environment interactions to identify potential genetic polymorphisms that confer vulnerability to maladaptive rearing conditions. The results point to poor socialization in early life as contributing to SUD vulnerability with greater exposure among FH+ persons and antisocial and disinhibitory characteristics emerging as an intermediate phenotype.

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30) Abstract 1239

OBJECTIVE SLEEP CHARACTERISTICS OF SELF-REPORTED SHORT SLEEPERS WITH PREHYPERTENSION/STAGE I HYPERTENSION

Kelly G. Baron, PhD, MPH, Behavioral Sciences, Rush University Medical Center, Chicago, IL, Jennifer Duffecy, PhD, Psychiatry, University of Illinois at Chicago, Chicago, IL, Johan Lane, MD, Internal Medicine, Olivia DeYonker, BS, Behavioral Sciences, Rush University Medical Center, Chicago, IL

It is estimated that 60% of the population has short sleep duration (<7 hours), which linked to the development of hypertension, diabetes and cardiovascular disease. However, little research has focused on methods of identifying individuals with short sleep duration and treatments to extend sleep duration. The goal of this study was to evaluate the prevalence of objective short sleep duration among adults with prehypertension, to determine the accuracy of self-reported screening procedures aimed at identifying participants who would benefit from a sleep extension intervention. Potential participants were identified from an electronic medical record search based on having at least one office blood pressure reading above 120/80 in the past year. Exclusionary criteria included antihypertensive or hypnotic medications, sleep disorder diagnosis based on chart review or high risk for a sleep disorder based on questionnaires (obstructive sleep apnea, insomnia or restless legs syndrome). Participants completed questionnaires, 24-h ambulatory blood pressure monitoring and 7 days of wrist actigraphy. The sample includes 24 participants (15 females, 9 males, age m= 44 SD=8 years). Average self-reported sleep duration was 5.8 (SD= 0.9) hours and average objective sleep duration was 6.4 (SD=0.8) hours. On average, participants' self-reported sleep duration underestimated objective sleep duration by 0.6 hours. The correlation between self-report and objective sleep duration was moderate (r= 0.40, p<.05) and the majority of participants who self-reported short sleep duration also had objective short sleep duration (74%). The strongest objective sleep predictors of objective short sleep duration were lower time in bed (r=0.94, p<0.001), later bedtime (r=-0.42, p<0.05) and lower sleep efficiency (r=0.46, p<0.05). Sleep duration was not associated with wake after sleep onset or sleep latency. Results suggest that the majority of participants with self-reported short sleep duration also have objective short sleep duration. Time in bed and late bedtime are key targets for interventions focused on extending sleep among individuals with short sleep duration in the absence of comorbid sleep disorders.

31) Abstract 1273

THE RELATIONSHIP BETWEEN DAILY SLEEP AND WORRY: ANALYSIS OF DIARY AND ACTIGRAPHY DATA IN THE STUDY OF WOMEN'S HEALTH ACROSS THE NATION (SWAN) SLEEP STUDY.

Ryan C. Brindle, PhD, Katherine A. Duggan, PhD, Psychiatry, Marrisa A. Bowman, BS, Psychology, Christina Mathyssek, PhD, Psychiatry, Christopher E. Kline, PhD, Health & Physical Activity, University of Pittsburgh, Pittsburgh, PA, Howard M. Kravitz, DO, MPH, Psychiatry, Rush University, Chicago, IL, Robert T. Krafty, PhD, Biostatistics, Martica Hall, PhD, Psychiatry, University of Pittsburgh, Pittsburgh, PA

Evidence suggests that stress and sleep may be strongly related. Yet, the extent to which a possible sleep-stress relationship generalizes across sleep measures and whether sociodemographic factors moderate this relationship remains less well understood. This study aimed to characterize the relationship between stress,

operationalized as nighttime worry, and diary- and actigraphyassessed sleep, as well as to determine the extent to which external factors may moderate the sleep-worry relationship. Participants were 352 midlife women (Mage=52.2, SD=2.1) enrolled in the Study of Woman's Health Across the Nation (SWAN) Sleep Study. A composite nighttime worry measure was created from morning self-reports of nighttime worry frequency and severity, ranging from 0 - 25. Sleep duration, efficiency, fragmentation, latency, and wake after sleep onset (WASO) were averaged across days of diary (M = 27 days, SD =9 days) and wrist actigraphy (M = 29 days, SD = 7 days) assessment. Hierarchical linear regression was used to test the relationship between sleep and worry variables and the moderating effects of perceived chronic stress, insomnia status, and race. Final models were adjusted for age, income, subjective health status, body mass index, self-reported depression, and site. There were significant univariate relationships between worry and some, but not all, sleep variables: actigraphy sleep efficiency, fragmentation, WASO, and diary sleep efficiency, latency, and WASO (β -range: -0.028 to 0.15, all $p \le .04$). Perceived chronic stress was typically a moderator when sleep was evaluated as a predictor of nighttime worry; the relationship between sleep and the worry composite was stronger in those reporting higher levels of chronic stress. Stress was seldom a moderator when nighttime worry was evaluated as a predictor of sleep. Race and insomnia status did not emerge as reliable moderators of the worry-sleep relationship. These results provide support for a relationship between sleep, assessed by actigraphy or diary, and nighttime worry. Perceived chronic stress was the most consistent moderator of these associations. Future work will use crosslagged panel analyses to model the daily, within-subject variation in the relationship between sleep and worry.

32) Abstract 1329

HOW DID I SLEEP? PLACEBO SLEEP QUALITY MEDIATES THE RELATION BETWEEN SLEEP AND RISK-TAKING BEHAVIOR

Giora Galili, Ph.D, Katerina Vainer, BA, Chana Vaxman, B.A candidate, Education and Psychology, Open University of Israel, Raanana, Israel

Background: Placebo effect can extend beyond its typical context in medicine to involve aspects of daily life, such as the effect of sleep on cognitive functioning (Draganich & Erdal, 2014). The goal of this preliminary study was to assess whether manipulating the perception of sleep quality would affect risk-taking behavior. Method: 38 adults (29 women, mean age 35.2, s.d=7.9) were asked to install a popular sleep-monitoring smartphone application ("Sleep as Android") and received a detailed explanation for operating it during a night sleep. On the next morning, following pseudo physical measurements and calculations, participants were randomly assigned into "above average" (n=18) or "below average" (n=20) sleep quality conditions. According to the assigned condition, participants were informed that their previous night sleep quality was high / not good at all in terms of sleep cycles and REM percentage and that their sleep characteristics are above/below the expected norms for a healthy adult. The two groups did not differ in female/male ratio, mean age, previous night's applicationassessed sleep efficiency, self-reported sleep quality, Barrat impulsiveness scale or the degree to which they trusted the sleep information (as ranked before debriefing). Risk-taking was assessed with the Balloon analog risk task (BART). Results: In contrast to our hypothesis, no effect was found for assigned sleep quality on average BART score. As can be expected, risk-taking behavior was negatively correlated with sleep efficiency (r=-.656, p<.0005). Assigned sleep quality moderated this linear correlation (r=-.451, p=.046 vs. r=-.838, p<.0005 in the "above average" and "below average" conditions respectively, Z=2.06, p=.039). A similar but milder trend was observed for the correlation between BART scores and self-reported sleep quality scores. Conclusions: These findings suggest that mindset can influence the effect of sleep on risk-taking behaviors, which has implications for one's health and well being.

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33) Abstract 1458 INSOMNIA AND T2DM ON CARDIOVASCULAR RISK PERCEPTION IN MENOPAUSE

Michele L. Okun, Ph.D., BioFrontiers, Leilani Feliciano, Ph.D., Kathrine Johanson, BA, Lauren M. Schneider, BS, Psychology, Kathy Prue-Owens, Ph.D., CCRN, RN, Nursing, University of Colorado Colorado Springs, Colorado Springs, CO

Cardiovascular disease (CVD) currently causes more deaths in women than any other major chronic condition including cancer and accidents. Mid-life may confer different risk factors for women than men, including higher risks for insomnia, diabetes, stress, depression, and menopause. As CVD among women continues to escalate as a major health issue, we contend that the methodology used to identify cardiovascular risk factors needs to address this complexity. Hence, we propose that understanding risk using the Biopsychosocial Model to understand CVD risk is particularly pertinent to women as it allows for the consideration of female specific events such as menopause, and emerging disorders such as insomnia and diabetes. This ongoing study presents pilot data on the assessment of biopsychosocial risk factors for CVD risk in women with and without diabetes. Participants include menopausal women (self-reporting no menstrual cycle for 12+ months) between the ages of 50-64, half with Type 2 Diabetes and half without. Health histories are collected, blood pressure, anthropometric data, level and type of physical activity, biomarker data, if known (e.g., cholesterol, LDL/HDL, glucose, and A1C if applicable), and current medications. Questionnaire data include the SCID, SLUMS, SDSCA, DASS-21, Berlin, Cardiovascular Risk Perception Survey (CRPS), and Insomnia Symptom Questionnaire (ISQ). All participants (N = 18) are self-identified as menopausal, are 58 \pm 3.0 years of age, 72.2% are married, 94.4% Caucasian, with an average BMI of 25.3 ± 6.6 . Thus far, we have 12 subjects without T2DM, 2 with T2DM, and 4 with pre-diabetes. All participants indicate high cognitive functioning with SLUMS scores (M = 27.78 \pm 1.77). According to the DASS-21, all women fell within normal ranges for depression (3.44 ± 2.97) , anxiety (3.11 ± 3.16) , and stress (8.0 \pm 4.90). In accordance with other data, 2/16 (12.5%) women met all diagnostic criteria (DSM-5) for insomnia. Scores on the CRPS which can range from 0-24 averaged $18.8 \pm$ 7.06 (range = 8-28) suggesting that a majority of this cohort of women perceives that they have a considerable risk for CVD. Assessing non-traditional risk factors that map onto the Biopsychosocial Model will likely advance our understanding of risk perception for CVD and allow for better and perhaps novel treatments and interventions.

34) Abstract 1094

THE PROGNOSTIC VALUE OF ANXIETY IN PATIENTS WITH DISTINCT PHENOTYPES OF HEART FAILURE

Bo-Cheng Hsu, M.S., Psychology, National Chung Cheng University, Chiayi, Taiwan, Province Of China, Chih-Wei Chen, M.D., Chin-Lon Lin, M.D., School of Medicine, Tzu Chi University, Hualien, Taiwan, Province Of China, Chia-Ying Weng, PhD, Psychology, National Chung Cheng University, Chiayi, Taiwan, Province Of China, Chiu-Tien Hsu, PhD, Center of Clinical Psychology, Dalin Tzu Chi Hospital, Chiayi, Taiwan, Province Of China, Shu-Shu Wong, PhD, Psychology, Wezhou University, Wenzhou City, China, Tin-Kwang Lin, M.D., School of Medicine, Tzu Chi University, Hualien, Taiwan, Province Of China

Background: Several studies have failed to support the impact of anxiety on mortality in patients with heart failure (HF); however, evidence has suggested differences in the clinical characteristics, etiologies, and prognoses of patients with HF with preserved ejection fraction (HFpEF) and those with reduced ejection fraction (HFrEF). While most of the prognostic studies focused on HFrEF, the association between anxiety and HFpEF remains unknown. The aim of this study was to compare the prognostic value of anxiety in patients with these distinct phenotypes of HF.

Methods: The cohort was composed of 212 patients diagnosed with HF (93 patients with HFpEF and 119 with HFrEF) who provided baseline demographic, clinical, and psychosocial characteristics during hospitalization, as well as the18-month follow-up endpoint for mortality from all-causes. The Spielberger State-Trait Anxiety Inventory (STAI) and the Beck Depression Inventory-II (BDI-II) scale were used at baseline.

Results: Patients with HFpEF were more likely to be female (weighted average 46.2 vs. 23.5 %), older (weighted average 63.08 vs. 58.87 years), hypertensive (weighted average 63.4 vs. 53.8 %), and to have higher pulse pressure (weighted average 63.4 vs. 53.8 %), and less coronary disease (weighted average 49.5 vs. 55.5 %), than patients with HFrEF. After controlling for age, gender, left ventricular ejection fraction (LVEF), and BDI scores, the results of logistic regression showed an increased 18-month mortality in patients with HFrEF (STAI, $\beta = 0.146$, p < .01; State-A, $\beta = 0.206$, p < .01; Trait-A, $\beta = 0.227$, p < .01; however, there was no significant association between anxiety and 18-month mortality in patients with HFrEF.

Conclusions: Manifestations of anxiety including STAI, State-A, and Trait-A, were independently associated with mortality from all-causes during an 18-month follow-up of patients with HFpEF, but not of patients with HFrEF.

35) Abstract 1375

PSYCHOLOGICAL FLEXIBILITY AND CARDIAC REHABILITATION COMPLETION

Brenna Boyd, B.A., Clinical Psychology, Washington State University, Pullman, WA

Cardiac rehabilitation (CR) programs have been shown to reduce both mortality and morbidity rates of cardiovascular disease. However, poor adherence rates are common in CR programs. Previous studies have identified a number of factors that predict adherence to CR programs including psychological distress, gender, age, and illness beliefs. A growing body of literature has linked the use of Acceptance and Commitment Therapy (ACT) with greater health behavior change. Psychological flexibility, the mechanism of ACT, is associated with making and maintaining health behavior changes. Given this body of literature, the current study sought to assess whether or not psychological flexibility predicted adherence rates to CR programs, which has yet to be studied.

Individuals seeking CR at a local hospital were recruited as participants. During the intake process, participants were asked to fill out the PHQ-9 (to assess for depression), the GAD-7 (to assess for anxiety), and the AAQ-II (to assess for psychological flexibility). The age, gender, and resting heart rate of each participant were also assessed. Whether or not an individual completed the program was assessed. Data for 41 participants were included in this analysis.

A hierarchical binary logistic regression was run to assess whether scores on the AAQ-II predicted adherence to CR over and above gender, age, resting heart rate, PHQ score, and GAD score. Results indicated that the six predictor model was statistically significant, $X^2(6) = 17.98$, p = .03. Nagelkerke pseudo R^2 indicated that the complete set of predictors accounted for 38.60% of the total variance in adherence to CR. However, AAQ-II did not predict adherence to CR after controlling for age, gender, resting heart rate, PHQ score, and GAD score, Wald $X^2(1) = 1.34$, p = .25. Only gender was a significant predictor of CR completion in the model after controlling for the other predictors, Wald $X^2(1) = 7.30$, p = .007.

Although previous studies have linked psychological flexibility to initiating and maintaining health behavior change, the current study did not find a relationship between psychological flexibility and adherence rates to CR. However, the current study did find evidence to support previous studies that have linked gender to adherence rates to CR.

36) Abstract 1304

THE EFFECT OF TYPE D PERSONALITY ON THE PROGNOSIS FOR MAJOR ADVERSE CARDIAC EVENTS IN PATIENTS WITH HEART FAILURE IN TAIWAN

Chun-Yuan Chiu, Master, Kai-Xun You, Master, Psychology, National Chung Cheng University, Chiayi, Taiwan, Province Of China, Chih-Wei Chen, M.D., Chin-Lon Lin, M.D., School of medicine, Tzu Chi University, Hualien, Taiwan, Province Of China, Chia-Ying Weng, Ph. D., Psychology, National Chung Cheng University, Chiayi, Taiwan, Province Of China, Chiu-Tien Hsu, PH.D, Center of Clinical Psychology, Dalin Tzu Chi Hospital, Chiayi, Taiwan, Province Of China, Shu-Shu Wong, Ph. D., Psychology, Wezhou University, Wezhou, China, Tin-Kwang Lin, M.D., School of medicine, Tzu Chi University, Hualien, Taiwan, Province Of China

Background: This study adopted major adverse cardiac events (MACEs) as clinical endpoints to investigate the influence of Type D personality on the prognosis of patients with heart failure (HF) in Taiwan, a non-Western culture.

Methods: Patients with HF (n=135) were refereed to this study by their cardiologists. At baseline, patients completed the Type D Scale Taiwanese version 14, (DS14-TR), the Chinese version of the Beck Depression Inventory II (BDI-II), and a basic information questionnaire to identify socio-demographic variables. Clinical data and follow-up data were obtained from the medical record or telephone follow-up.

Results: Over an 18 month follow-up period, 33 MACEs were recorded. The results of multivariate logistic regression analysis showed that negative affect (NA) ($\beta = .131, p < .01$), social inhibition (SI) ($\beta = .078, p < .05$) and NA*SI ($\beta = .009, p < .01$) were associated with MACEs after adjustment for age, gender, LVEF, and depression, but categorical Type D was not.

Conclusions: Our findings showed that NA, SI, and their product, a continuous dimension of Type D, were associated with MACEs. Nevertheless, the categorical variable of Type D was not. This may have been due to the low prevalence of Type D in our sample (11.9%).

37) Abstract 1272

DO CARDIAC HEALTH: ADVANCED NEW GENERATION ECOSYSTEM (DO CHANGE) - PRIMARY RESULTS OF A RANDOMIZED CONTROLLED TRIAL

Eva R. Broers, PhD Student, Mirela Habibovic, Assistant Professor, Jos Widdershoven, MD, Medical and Clinical Psychology, Tilburg University; TweeSteden Ziekenhuis Tilburg, Tilburg, Netherlands

Background: 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 behavioural 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 selfmanagement in cardiac patients.

38) Abstract 1506

A SYSTEMATIC REVIEW OF THE ROLE STATINS AND MOOD ON PLASMA LIPIDS IN ANIMAL MODELS

Hollie Pellosmaa, PhD, Psychology, Tusculum College, Knoxville, TN, Angela Liegey Dougall, PhD, Psychology, The University of Texas at Arlington, Arlington, TX

Background: One-third of Americans have high cholesterol, which is a risk factor for cardiovascular disease and stroke (CDC, 2012). As of 2012, more than 22% of Americans were taking statins to manage this disease (Gu et al., 2014). With such a large population taking statins, it is important to understand factors, such as negative mood disturbance, which could influence their effectiveness. Depression has been shown to decrease medication adherence, and some findings suggest statins may directly increase negative mood in humans. Negative mood is also accompanied by physiological changes that may impede drug action and contribute to poor health outcomes. Objective: To describe the relationships among statin use, mood, and plasma lipids in animal models. Specifically, it was expected that statin use would be associated with greater depression, anxiety, and stress, which would alter statin effectiveness, such that among animals on statins increased negative mood would be associated lower levels of HDL, as well with as higher LDL/triglycerides/total cholesterol. Method: A systematic review of the literature including 25 published studies was conducted. Results: Contrary to expectations, the relationships examined were not consistent and in many cases were not significant or

assessed, or too few studies examined these relationships, leaving only weak support. The majority of the findings for the relationship between statin use and depression found that depressive symptoms were lower with statin use rather than higher as some have cautioned. The most consistent relationship was that higher levels of stress were associated with worse total cholesterol and LDL, suggesting that stress may be an important moderator of statin effectiveness; however, no studies examined the relationship between statin use and stress. Depression was also associated with increased total cholesterol and lower HDL, although a small sample size results in only weak support. Conclusions: Addressing gaps in the literature (e.g. the relationship between statin use and stress) could lend to more homogenous results. Systematic examination of these relationships, and the extension to human studies, could potentially assist in the development of interventions which improve disease outcomes.

39) Abstract 1297

DISPARITIES IN INSULIN RESISTANCE BETWEEN BLACK AND WHITE AMERICANS: THE ROLE OF CHILDHOOD ADVERSITY AND CONTEMPORANEOUS STRESS

Thomas E. Fuller-Rowell, PhD, David Curtis, M.S., Lydia Homandberg, BA, Human Development and Family Studies, Auburn University, Auburn, AL

Disparities in the prevalence of type 2 diabetes between Black and White Americans are well documented. However, the social antecedents of group differences are poorly understood. In particular, although childhood adversity and contemporaneous stress have been associated with metabolic dysregulation, little is known about how these factors come together to influence disparities in glucose regulation. Focusing on insulin resistance as a marker of glucose metabolism, the current study sought to address this knowledge gap. Data were derived from the biomarker component of the Midlife in the US Study (N = 1107, 16% AA, 56% female, Mean age = 54.7 years, SD = 11.6). A homeostatic model assessment of insulin resistance (HOMA-IR) was calculated as the product of fasting glucose and insulin concentrations, divided by a constant. Seventeen risk factors relating to household dysfunction, socioeconomic disadvantage, childhood maltreatment were sum scored as an index of childhood adversity (Slopen et al., 2010). Five measures of adult stress were also examined: (1) major stressful events (e.g., death in family) (Dohrenwend, 2006); (2) major experiences of discrimination (e.g., denied housing) (Williams et al., 2008); (3) financial disadvantage (e.g., poverty, no home ownership) (Chapman et al., 2010); (4) family Strain (e.g., let you down) (Walen & Lachman, 2000); and (5) everyday discrimination (e.g., treated with less respect) (Williamset al., 1997). A series of linear regression models were estimated to consider mediators of race differences in insulin resistance. Consistent with prior research, Black adults had two fifths of a standard deviation higher levels of insulin resistance than White adults (B=.403, p<.001). Childhood adversity was also associated with higher levels of insulin resistance (B=.124, p<.001), and mediated 13% of the race difference. Each of the adult stressors also mediated a portion of the race difference, in total explaining approximately half of the racial disparity. These results are consistent with prior work showing that childhood adversity and adult stress are salient predictors of glucose metabolism, and extends this work by showing that these factors account for a significant portion of the Black-White disparity. Additional research is needed to explicate the mechanisms for racial disparities in type 2 diabetes.

40) Abstract 1168

A PSYCHOLOGICAL-BEHAVIORAL INTERVENTION FOR PHYSICAL ACTIIVTY IN PATIENTS WITH TYPE 2 DIABETES

Jeff Huffman, MD, Psychiatry, Massachusetts General Hospital/Harvard University, Boston, MA, Elizabeth Madva, MD, Taylor Gianangelo, B.S., Rachel Millstein, PhD, Psychiatry, Deborah Wexler, dwexler@partners.org, Medicine, Wei-Jean Chung, PhD, Christopher Celano, MD, Psychiatry, Massachusetts General Hospital, Boston, MA

Background: Most patients with type 2 diabetes (T2D) do not reach recommended levels of physical activity. Existing behavioral interventions for physical activity in T2D have only been somewhat effective, and have not addressed low motivation, positive affect, and optimism, all of which can impede engagement in behavioral interventions.

Methods: We developed a 16-week combined positive psychology-motivational interviewing (PP-MI) intervention that used a written PP-MI patient manual, along with weekly phone sessions with a study interventionist to reinforce intervention principles. We then tested the intervention in a proof-of-concept trial in T2D patients with low baseline physical activity. The study's primary outcome measure was feasibility (rates of intervention session completion), and secondary outcome measures included pre-post improvement in behavioral and medical outcomes, assessed using paired t tests. To assess changes in health behaviors, we used the Summary of Diabetes Self-Care Activities Assessment (SDSCA) scale items for diet and exercise, along with the overall scale, and we more comprehensively assessed self-reported activity via the 7-day International Physical Activity Questionnaire (iPAQ). Finally, activity was additionally assessed using accelerometers and we gathered data on body mass index (BMI) and hemoglobin A1c.

Results: A total of 12 T2D patients were enrolled. Participants completed a mean of 11.7/15 sessions, with 10 participants (83%) completing a majority of sessions. The intervention was associated with increased adherence to diet (mean SDSCA preintervention score 2.5 (SD 1.9) vs. post-intervention score 4.1 (SD 2.0); t=3.07; p=.01), exercise (pre-intervention: 0.9 (SD 1.3) vs. post-intervention: 4.3 (SD 1.5); t=10.5; p<.0001), and overall adherence (2.0 (SD 0.65) vs. 3.8 (SD 1.2); t=5.10; p=.0006). Using the iPAQ, the intervention was again associated with increased physical activity (pre-intervention: 2257 MET-minutes/week (SD 4135) vs. post-intervention: 3099 MET-minutes/week (SD 4866); t=2.61; p=.028); data from accelerometers is pending. Finally, BMI (37.3 to 37.3) and A1C (8.9 to 8.5) improved modestly over the 16 week study period.

Conclusion: A novel psychological-behavioral intervention was feasible in T2D patients and associated with improvements in self-reported adherence.

41) Abstract 1546

TYPE 1 DIABETES; ASSESSMENT AND TREATMENT IN EMERGING ADULTHOOD

Andrew E. Lima, M.S., Samantha Behbahani, PsyD, M.S. Clin Pharm, Psychology, Albizu University, Miami Campus, Miami, FL

Emerging adulthood is a challenging period for individuals, where the development of autonomy and identity are a constant reminder of responsibility and self-care. This is compounded for patients with diabetes, as the granular nature of treatment regimen of their chronic disease is a daily reminder of continued self-reliance and responsibility, as well as differences among their peers. Furthermore, the transition from pediatric endocrinology to adult diabetic care requires a shift in autonomy, as well as a shift in relationship with treatment teams. Research has displayed that the transition from pediatric diabetic care to more adult-centered care presents challenges, which often cooccur with multifarious physiological and psychosocial changes, including a deterioration in glycemic control, sub-optimal adherence to self-management treatment regimens, and poor adherence to endocrinology outpatient visits. As such, the combination of the aforementioned challenges leads to a greater risk of adverse outcomes for patients.

Given this known deficit, there still appears to be a dearth of standardized treatment options for these emerging adults from a psychological perspective. Additionally, psychiatric comorbidities are highly prevalent in the type I diabetic population, compounding the baseline greater risk for nonadherence and adverse outcomes. For example, the rates of anxiety and depressive disorders, eating disorders, and risky behaviors are often greater than that of the general population. As such, psychological assessment and intervention are vital components to the maintenance of health in the transition period from pediatric to adult endocrinology. The purpose of this poster is to investigate the most prevalent psychological conditions in the type I diabetic patient, specifically in emerging adulthood, which lead to poor adherence and adverse outcomes. Furthermore, the authors will present a number of viable assessment tools and treatment interventions to appropriately identify the presence of psychopathology and corresponding evidence-based interventions specific for the type I diabetic patient.

42) Abstract 1099

BRIEF POSITIVE AFFECT INTERVENTIONS & IMMUNITY: A SYSTEMATIC REVIEW & META-ANALYSIS

Kieran Ayling, PhD, Kanchan Sunger, MBChB, Kavita Vedhara, PhD, Primary Care, University of Nottingham, Nottingham, United Kingdom

Objectives

Brief positive affect interventions potentially offer a pragmatic approach to enhancing immune function for finite periods where this would be beneficial to health (e.g., in advance of vaccination or surgery). This review sought to systematically examine the evidence that brief, single-session interventions that improve mood also influence immunity.

Methods

Systematic searches of electronic databases were performed from earliest records to December 2016. We identified 34 interventions suitable for inclusion. Random effects metaanalyses were performed for pre-post experimental group immune outcomes measured in at least 5 intervention studies.

Results

While intervention forms were heterogeneous, 73.5% of interventions that improved mood resulted in a statistically significant change in at least one immune parameter. However, studies were, in general, of low-to-moderate quality with small sample sizes (median n=31) and did not examine the persistence, or clinical relevance of the immune changes observed. Random effects meta-analyses showed a significant medium-sized effect of interventions on secretory IgA concentration (g=0.52), and non-significant effects on NK cell activity (g=0.15) and IL-6 production (g=0.11). **Conclusions**

We conclude that brief positive affect interventions can influence some immune parameters in ways indicative of enhanced immune function. However, there is a need for higher quality research in this area that focuses on clinically relevant immune outcomes and mechanisms.

43) Abstract 1042

EXAMINING ETHNIC DIFFERENCES IN HEART RATE VARIABILITY AND DIFFICULTIES IN EMOTION REGULATION

Briana N. Brownlow, B.A., DeWayne Williams, PhD, Cameron Wiley, B.S., Psychology, The Ohio State University, Columbus, OH, John J. Sollers, PhD, Psychology, North Carolina Central University, Durham, NC, Julian Koenig, PhD, Psychiatry, University of Heidelberg, Heidelberg, Germany, Julian Thayer, PhD, Psychology, The Ohio State University, Columbus, OH

There is evidence suggesting that ethnic differences exist in heart rate variability (HRV), an indicator of parasympathetic nervous system cardiac modulation. Specifically, a recent meta-analysis found that when comparing African Americans and European Americans, African Americans exhibit greater HRV than European Americans (Hill et al., 2015). Resting HF-HRV is also associated with emotion regulation ability. A voluminous literature indicates that individuals with low resting HF-HRV demonstrate difficulties with emotion regulation (Appelhans & Luecken, 2006). As African Americans have greater resting HRV compared to European Americans, they should subsequently display less difficulties in emotion regulation. The present study investigated whether African Americans had greater HRV than European Americans, as established in previous literature, and whether they also showed lesser difficulties in emotion regulation. Participants' (European Americans = 311, African Americans = 91) HRV was collected via electrocardiogram (ECG) during a 5-minute resting baseline condition. Following this, participants completed a questionnaire battery including the Difficulties in Emotion Regulation Scale (DERS), where higher scores suggest greater problems with emotion regulation. Results indicated a significant ethnic difference in HRV, such that African Americans had greater HRV than European Americans, as expected (t = -2.19, p = .029). However, African Americans did not have a significantly lower mean score on the DERS (M=81.36), as compared to European Americans (M=82.63; t =.586, p = .56). Additionally, the correlations between HRV and difficulties in emotion regulation are not statistically different between African Americans and European Americans. Thus, although African Americans have greater HRV, this does not appear to correspond to their reporting a better ability to regulate their emotions as measured by the DERS. It has been previously described that greater HRV in African Americans may be needed to deal with racial stressors such as ethnic discrimination. Thus, the DERS may not be capturing African American's ability to regulate their emotions, as it does not necessarily measure responses to specific stressors such as discrimination. Implications for research surrounding the psychological effectiveness of vagal activity for African Americans will be discussed.

44) Abstract 1495

THE RELATIONSHIP BETWEEN RESTING HEART RATE VARIABILITY AND FACETS OF RUMINATION: AN UPDATE

Catalin Dragomirescu, Mr, Gina M. Gerardo, Masters of Arts, Psychology, The Ohio State University, Columbus, OH, Nicole R. Feeling, Masters of Arts, Psychology, The Ohio State University, Columbu, OH, Nicholas P. Joseph, Masters of Arts, Psychology, The Ohio State University, Columbus, OH, Jos F. Brosschot, PhD, Psychology, Leiden University, Leiden, Netherlands, DeWayne P. Williams, PhD, Psychology, Julian F. Thayer, PhD, Neuroscience and Psychology, The Ohio State University, Columbus, OH

Resting vagally mediated heart rate variability (vmHRV) is an indicator of self-regulation abilities, stress vulnerability and overall health. Perseverative cognition is the constant thinking about negative events, and is considered a primary mechanism that links stress vulnerability to poor health and disease. Rumination, a type of perseveration cognition, is thought to subsume three unique facets or types of rumination: depressive, brooding, and reflective. Our group previously demonstrated that resting vmHRV was associated with maladaptive (e.g., depressive rumination) but not adaptive (e.g., reflective rumination) facets of rumination using a sample of 203 participants (Williams et al., 2017). In the current study, we present an update of this relationship using a larger dataset of 583 participants (313 female, mean age = 19.40). A baseline period of five-minutes was used to assess the root mean square of successive differences (log transformed) in accordance with Task Force (1996) guidelines, and was used as the measure of resting vmHRV. Zero-order correlation results showed a significant negative association between resting vmHRV and ruminationtotal score (r= -.141, p= .030), depressive rumination (r= -.170, p < .001), and brooding rumination (r= -.110, p= .023), but not for reflective rumination (r= -.051 p= .288). However, when examining the relationship between resting vmHRV and each facet of rumination while controlling for the other two, only depressive rumination (r partial= -.151, p= .002) showed a significant negative correlation whereas reflective (r partial= .075, p= .121) and brooding (r partial= .013, p= .783) rumination did not. This data replicates results from our previous report (Williams et. al. 2017) and suggests that rumination, specifically depressive rumination, showed a significant negative correlation with resting vmHRV; however, the more adaptive reflective rumination showed a consistent null relationship with resting vmHRV. Overall, our data propose that theories and research surrounding perseverative cognition should consider various facets of rumination, as some may be more related to physiological processes than others.

45) Abstract 1275

PHYSIOLOGICAL AND EMOTIONAL RESPONSES TO SOCIAL STRESS IN SOCIALLY INHIBITED YOUNG ADULTS

Stefanie Duijndam, MSc, Johan Denollet, PhD, Nina Kupper, PhD, Medical and Clinical Psychology, Tilburg University, Tilburg, Netherlands

Background: Social inhibition (SI) refers to the stable tendency to inhibit the expression of emotions and behaviors during social interaction, and comprises three facets: inhibition, withdrawal, and sensitivity. It is unknown how these facets are related to mental stress. We therefore investigated the association of social inhibition with the physiological and emotional stress response.

Methods: 312 Undergraduate students completed the SIQ15 and participated in the Trier Social Stress Test, while BP, and ECG and ICG were recorded. Analyses were performed using repeated-measures-ANOVA, adjusted for the effects of task order and sex.

Results: There was a large within-subject effect of SI on the negative emotional response (F=42.62; p<.0001), with the

interpersonal sensitivity subscale contributing most (F=4.78; p=.03). SI showed a significant within-subject effect on the SBP stress response and recovery profile (F=4.07; p=.012). Interpersonal sensitivity had the strongest contribution (F=4.39; p=.037). Also, there was a trend for a linear within-subject effect on LVET reactivity (F=3.75; p=.054). No differences associated with social inhibition were observed for IBI, SDNN, PEP, RSA and respiration rate. Interestingly, a significant quadratic withinsubject association was found between social inhibition and tidal volume (F=5.15; p=.008), with tidal volume being reduced during stress with higher levels of inhibition and withdrawal. Significant between subject-effects on tidal volume were found for inhibition (F=4.76; p=.030) and withdrawal (F=5.20; p=.02). Discussion: Results suggest social inhibition (in particular interpersonal sensitivity) to be associated with increased blood pressure and negative mood reactivity and with reduced tidal volume (in particular inhibition and withdrawal subscales) reactivity.

46) Abstract 1179

HAPPY MUSIC FOR SAD PEOPLE?DAILY MUSIC LISTENING BEHAVIOR AND ITS IMPACT ON MOOD AND STRESS IN DEPRESSED WOMEN.

Anja C. Feneberg, M.Sc., Johanna M. Doerr, Ph.D., Psychology, Philipps University Marburg, Marburg, Germany, Ricarda Mewes, Ph.D., Urs M. Nater, Ph.D., Psychology, University of Vienna, Vienna, Austria

Background: Disturbances in mood state and mood regulation are core symptoms of depression and go hand in hand with changes in biological markers of stress in depressed individuals. Music listening is a powerful and widely used tool for mood regulation in everyday life. Moreover, music listening in the daily life of healthy individuals has been shown to predict reductions of both subjective and biological stress markers. However, knowledge on everyday music listening behavior and its impact on mood and stress variables in the daily life of depressed individuals is lacking.

Methods: The sample consisted of 29 female adults meeting the DSM criteria for current major depressive episode or dysthymia. Using pre-programmed iPods, subjects reported on five fixed time points per day on momentary subjective stress level, momentary mood (calmness, valence, energetic arousal) and music-listening behavior for 14 consecutive days. When subjects indicated music listening since the last data entry, they subsequently completed music-related questions concerning perceived music characteristics and reasons for music listening. Also, subjects were instructed to provide saliva samples following each data entry. Saliva samples were analyzed for cortisol and alpha-amylase. Hierarchical linear models were used to analyze effects of music listening on the outcome variables.

Results: Music listening was reported for 16.52 % of 2030 possible observations. Characteristics of selected music were described as predominantly positive in valence (M=65.69, SD=25.34) and high in arousal (M=59.98, SD=27.92). Music listening predicted higher energetic arousal (p< .001). When analyzing music episodes, increases in perceived musical valence predicted higher mood valence (p=.002) as well as calmness (p=.012). Reasons for music listening were differentially related to higher mood valence and calmness. Changes in energetic arousal were not associated with reasons for music listening. Data on subjective stress, salivary cortisol and salivary alpha-amylase will be presented at the conference.

Discussion: Although more research needs to be undertaken to unveil the complex mechanisms underlying the mood- and stressregulatory impact of daily music listening, the findings indicate that music listening might be a useful self-management tool for enhancing mood in the daily life of depressed individuals.

47) Abstract 1406

AN UPDATE ON THE SEX DIFFERENCE IN ASSOCIATIONS BETWEEN HEART RATE VARIABILITY AND RUMINATION

Gina M. Gerardo, M.A., DeWayne P. Williams, Ph.D., Nicole R. Feeling, M.A., Michael M. Vasey, Ph.D., Julian F. Thayer, Ph.D., Psychology, Ohio State University, Columbus, OH

Perseverative cognition, defined as repeated activation of cognitive representations of a stressor, is connected with poor outcomes in physical and psychological health. The Perseverative Cognition Hypothesis theorizes that lower heart rate variability (HRV) can predict whether an individual is more susceptible to perseveration. In a recent analysis, men and women differed in their association between HRV and the facets of rumination. Specifically, women exhibited significant negative correlations between HRV and total rumination, as well as each of the three facets of rumination while men did not - a difference that was particularly strong for reflective rumination. The present study reexamines sex differences in the relationship between (HRV) and the three different facets of rumination in an updated dataset with an additional 133 participants. Participants (n = 431) first completed a 5-minute resting-baseline period where resting HRV was recorded via electrocardiogram (ECG); and was quantified as the root mean square of successive differences. Participants then completed the Ruminative Responses Scale, designed to assess total ruminative tendencies, in addition to three subscales: depressive rumination (sadness and despair), brooding rumination (wallowing and sulking), and reflective rumination (problem solving and analyzing). Zero order correlations revealed significant negative correlations between HRV and total rumination (r = -.21, p < .01), depressive rumination (r = -.24, p <.01), and brooding rumination (r = -.14, p = .03), but not reflective rumination (r = -.21, p < .01) in women. There were no significant correlations (p > .05) between HRV and rumination among men in the sample. This pattern of data is similar to the aforementioned sex differences in the association between resting HRV and different facets of rumination. Overall, the current results suggest that the RRS may not capture facets of rumination most related to psychophysiological processes in men compared to women. Future directions and implications for sex differences in both HRV and psychophysiological pathways underlying perseverative cognition will be discussed.

48) Abstract 1135

EMOTIONAL REGULATION AS A MECHANISM LINKING BULLYING VICTIMIZATION TO DIURNAL CORTISOL RHYTHM AMONG CHILDREN AFFECTED BY PARENTAL HIV.

Yanping Jiang, M.A., Xiaoming Li, Ph.D., Department of Health Promotion, Education, & Behavior, University of South Carolina, columbia, SC, Lihua Chen, M.A., Institute of Developmental Psychology, Beijing Normal University, Beijing, China, Guangyu Zhou, Ph.D., Department of Psychology, Peking University, Beijing, China, Junfeng Zhao, Ph.D., Institute of Behavior and Psychology, Henan University, Kaifeng, China, Guoxiang Zhao, Ph.D., Department of Psychology, Henan Normal University, Xinxiang, China

Background: The dysregulation of the hypothalamic-pituitaryadrenal (HPA) axis activity has been demonstrated as one of the physiological mechanisms underlying the long-lasting effects of bullying victimization on physical and mental health. However, the mechanisms linking bullying victimization to dysregulations of HPA axis activity remain inadequately understood. The aim of the present study was to explore the role of emotional regulation as a psychological mechanism linking bullying victimization to HPA axis activity and to examine gender differences in the mediating effect of emotional regulation.

Method: Cross-sectional data were collected from a large community-based sample of 645 children (335 boys, Mage = 10.67 years) affected by parental HIV. Bullying victimization, emotional regulation, and saliva samples at four times of the day for three consecutive days were collected. Multilevel models were carried out to test the hypotheses, as well as accounting for the nested data structure.

Results: Bullying victimization was associated with a hypoactive cortisol profile, including low cortisol at awakening and flattened diurnal slope. Such associations were partially mediated by emotional regulation (indirect effect on cortisol at awakening = -0.005, SE = 0.002, p = .012; indirect effect on diurnal slopes = 0.0003, SE = 0.000, p = .032). Moreover, results from multilevel moderated mediation model (Figure 1) revealed that among girls, but not boys, bullying victimization was related to low emotional regulation, which in turn was associated with low cortisol at awakening (conditional indirect effect = -0.011, SE = 0.004, p = .003) and flattened diurnal slopes (conditional indirect effect = 0.001, SE = 0.000, p = .011).

Conclusion: The findings imply the promising avenues for resilience-strengthening interventions for bullied children by illustrating the protective effect of emotional regulation in relation to HPA axis activity. The findings also highlight the need of considering gender differences in future efforts of health promotion interventions through enhancing emotional regulation.

VIEW PDF

49) Abstract 1368

INDIVIDUAL DIFFERENCES IN AESTHETIC ENGAGEMENT AND STRESS RESILIENCE: THE ROLE OF POSITIVE REINTERPRETATION & GROWTH-ORIENTED COPING

Kimberley Johnson, B.S., Paula G. Williams, Ph.D., Daniel L. Bride, M.S., Brian Baucom, Ph.D., Sheila Crowell, Ph.D., Psychology, University of Utah, Salt Lake City, UT

The personality factor Openness to Experience, particularly the Aesthetics facet, has been associated with stress resilience. Individuals who describe themselves as being moved by art, nature, and beauty evidence attentive affect and parasympathetic nervous system (PNS) engagement during laboratory stressors. Further, experiences that evoke "awe" lead to positive health outcomes, including lower systemic inflammation. Prior research suggests that stress coping involving re-appraisal and/or learning from stressful experiences may be a potential mechanism underlying these associations. Examining individual differences in affective and physiological responses to novel, cognitively challenging aesthetic stimuli may inform our understanding of stress resilience. The current study examined positive reinterpretation and growth-oriented coping (PRGC) as a correlate of Openness and aesthetic engagement in a study of aesthetic stimulus exposure (film clip of the Grand Canyon). Participants were 246 adults (36% male; age range 18-63; M=23.9). Assessment included the NEO-Five Factor

Inventory, the NEO PI-R Openness scale, and the Positive Reinterpretation and Growth subscale of the COPE Inventory. Positive and negative affect were assessed using the Differential Emotions Scale, along with ratings of awe and goosebumps/chill (a putative marker of Openness) in response to the film clip. Autonomic nervous system physiology (pre-ejection period; respiratory sinus arrhythmia [RSA]) was measured continuously. Results indicated that the Aesthetics and Ideas facets of Openness were significantly associated with PRGC, rs=.16 and .16, respectively, ps=.01. Similar to Openness and Aesthetics, individuals who reported engaging in positive reinterpretation and growth-focused stress coping evidenced significant increases positive affect, r=.20, p<.001, higher ratings of awe, r=.19, p=.002, and greater experience of goosebumps, r=.18, p=.003. Higher scores in PRGC were also associated with increases in RSA on repeat viewing of the clip, $\beta = .16$, p = .02, indicating PNS engagement. These findings suggest that approaching stressful events as a learning experience and opportunity for growth may be a characteristic adaptation of high Openness to Experience and individual differences in aesthetic engagement.

50) Abstract 1013

IS PERCEIVED GROWTH ASSOCIATED WITH MOMENTARY INDICATORS OF HEALTH AND WELL-BEING?

Dusti R. Jones, MS, Biobehavioral Health, The Pennsylvania State University, State College, PA, Jillian A. Johnson, PhD, Jennifer E. Graham-Engeland, PhD, Biobehavioral Health, The Pennsylvania State University, University Park, PA, Crystal L. Park, PhD, Department of Psychological Sciences, University of Connecticut, Storrs, CT, Joshua M. Smyth, PhD, Biobehavioral Health, The Pennsylvania State University, State College, PA

Background: Perceived growth refers to perceptions of positive changes that occur in response to trauma or stress, such as greater appreciation for life and stronger relationships. Higher perceived growth is associated with better long-term health, but the process through which perceived growth influences health is unclear. The present study examines two potential pathways: 1) promoting momentary indicators of health and well-being in everyday life, and 2) buffering the consequences of everyday stress.

Method: In a micro-longitudinal design, 128 participants with chronic physical illness reported perceived growth using the Post-traumatic Growth (PTG) Inventory and subsequently completed ecological momentary assessments (EMAs) for one week. Participants were signaled five times a day to report on health and well-being related indicators, including affect, physical symptoms, social interactions, and stress.

Results: Multi-level modeling revealed that higher reported PTG was associated with less negative affect ($\beta = -.19$, SE = .07, p = .010) and greater positive affect ($\beta = .32$, SE = .08, p < .001). There were no significant associations between PTG and momentary disease symptoms, pleasantness of social interactions, or stress (p's>.05). Additionally, there was no evidence that PTG buffered against effects of stress on health and well-being related outcomes (p's>.05).

Conclusions: This research highlights the utility of examining the influence of perceived growth in everyday life. Results suggest that closer examination of momentary affect as a potential process by which perceived growth facilitates positive health outcomes is warranted.

51) Abstract 1052

CHRONIC FAMILY STRESS AND ADOLESCENT HEALTH: THE MODERATING ROLE OF EMOTION REGULATION

Emily J. Jones, MSEd, MPhilEd, Biobehavioral Health, Pennsylvania State University, University Park, PA, Phoebe H. Lam, BA, Lauren C. Hoffer, BS, Psychology, Edith Chen, PhD, Psychology; Institute for Policy Research, Northwestern University, Evanston, IL, Hannah M.C. Schreier, PhD, Biobehavioral Health, Pennsylvania State University, University Park, PA

Prior studies have independently linked chronic family stress and emotion regulation to adolescent well-being. However, no studies have considered the potential moderating effect of emotion regulation strategies, specifically cognitive reappraisal and suppression, on adolescent physiological outcomes in the face of chronic family stress.

261 adolescents (14.57 \pm 1.07 years) were interviewed about chronic family stress and completed an emotion regulation questionnaire. Outcomes included systolic (SBP) and diastolic (DBP) blood pressure, waist-to-hip ratio (WHR), and basal inflammation [interleukin-6 (IL-6) and C-reactive protein (CRP)] assessed in peripheral blood. Stimulated cytokine production (IL-1 β , IL-6 and IL-8) following in vitro lipopolysaccharide (LPS; 50 ng/mL) stimulation and glucocorticoid (GC) sensitivity (LPS + hydrocortisone; final concentration 2.76 x 10⁻⁵) were assessed in a subsample (n = 151). Standardized scores for the 3 cytokines were averaged to create a pro-inflammatory cytokine composite and a GC sensitivity composite. Regression analyses controlled for demographics; BMI was included when predicting inflammatory outcomes.

Although there were no main effects, cognitive reappraisal and suppression moderated the association between chronic family stress and physiological outcomes. As family stress increased, adolescents higher in cognitive reappraisal had lower SBP (B = .303, SE = .143, p = .035) and smaller WHR (B = -.003, SE = .001, p = .015), although there was no moderation effect on inflammatory outcomes and GC sensitivity (ps > .30). As family stress increased, those higher in suppression had greater stimulated pro-inflammatory cytokine production (B = .051, SE = .020, p = .010) and lower GC sensitivity (B = .054, SE = .021, p = .011), although there was no moderation effect on basal inflammation and metabolic outcomes (ps > .50).

Adolescent emotion regulation strategies may contribute to health outcomes associated with chronic family stress. Although this study shows differences in biomarkers within healthy ranges, these changes may accumulate over time and contribute to poorer health in adulthood. If corroborated in future longitudinal work, this suggests the importance of encouraging cognitive reappraisal strategies, and reducing suppression, particularly among adolescents exposed to high levels of chronic family stress.

52) Abstract 1010

TITLE: A PILOT STUDY OF A NOVEL EXPECTANCY EFFECT MANIPULATION IN THE CONTEXT OF MEDITATION DURING RECOVERY FROM STRESS.

Amy R. Borchardt, PhD, Psychology, Mercer University, Macon, GA

Recovering more quickly from stressors may benefit future cardiovascular health (Chida & Steptoe, 2011). There is limited published research on meditation's effects during recovery from stress. A novel expectancy manipulation is proposed to explore these effects. Forty-six undergraduates, with little to no

meditation experience, were randomly assigned to one of three groups: meditation with expectancy (MG), audiobook with expectancy (AG), or control (CG). All three groups read two mock newspaper articles: articles about the benefits of meditation (MG), articles suggesting that listening to audio books is as relaxing as meditation (AG), or articles unrelated to the study (CG). Participants attended a practice session where they were randomly assigned to groups and engaged in their respective task for 20 min. One week later, participants attended a testing session where they: sat for a 10-min baseline, read their group's articles, engaged in a 5-min mental arithmetic stressor, and then immediately engaged in their respective task for a 20-min recovery period. Blood pressure (BP) and pulse rate (PR) were collected every two minutes. There were no differences between groups during baseline for any of the dependent variables. All groups displayed significant increases in BP and PR from baseline to stressor and significant decreases in BP and PR from stressor to recovery (ps < .05). For systolic blood pressure (SBP), the MG remained above baseline for the recovery period, the CG returned to baseline around min 12, and the AG returned to baseline immediately (ps < .05); however, there were no differences between groups at any time points. For diastolic blood pressure (DBP), both the MG and CG remained above baseline during the recovery period, but the AG returned to baseline immediately; DBP was also significantly lower for the AG than it was for the MG and CG throughout the recovery period (ps < .05). For PR, all groups returned to baseline immediately following the stressor; PR was significantly higher for the MG than the AG for 5 of the 10 recovery time points (ps < ps.05). Results suggest that being told a passive activity can lead to "the same effects as meditation" actually helps participants recover more quickly from stress. Whereas, novices may find meditating in the laboratory arousing and therefore they may not initially reap cardiovascular benefits.

VIEW PDF

53) Abstract 1438

ASSOCIATIONS BETWEEN EUDEMONIC WELL-BEING AND INFLAMMATORY BIOLOGY FOLLOWING MINDFULNESS MEDITATION FOR BREAST CANCER SURVIVORS

Chloe C. Boyle, MA, Psychology, UCLA, Los Angeles, CA, Janine M. Dutcher, PhD, Psychology, Carnegie Mellon, Pittsburgh, PA, Steve W. Cole, PhD, Medicine, Naomi E. Eisenberger, PhD, Julienne E. Bower, PhD, Psychology, UCLA, Los Angeles, CA

Background: Eudemonic well-being, or a sense of purpose and meaning in life, is associated with reduced distress in breast cancer survivors, and with indicators of physical health, such as lower levels of inflammation. Previous work from our lab found that a mindfulness intervention for breast cancer survivors decreased pro-inflammatory gene expression and increased eudemonic well-being. However, the extent to which these processes are related is unclear. The goal of the current study was to replicate our prior findings, and further examine whether changes in eudemonic well-being predicted reductions in inflammation following a mindfulness intervention for breast cancer survivors.

Method: Participants were 22 women who had been diagnosed and treated for premenopausal breast cancer at least 6 months prior. Before and after a standardized 6-week mindfulness intervention, participants completed questionnaires and provided blood samples for evaluation of functional genomic and circulating markers of inflammation. Genome-wide transcriptional profiling was used to test for changes in the conserved transcriptional response to adversity (CTRA) which consists of up-regulated pro-inflammatory, and down-regulated antiviral and antibody-related genes. Circulating levels of inflammation were measured with plasma CRP and IL-6. Additional self-report measures were completed 3-months after the intervention. Eudemonic well-being was measured with the Mental Health Continuum scale.

Results: Eudemonic well-being increased from pre to postintervention, p=.004, and remained elevated at the 3-month follow-up, p=.04. Expression of the CTRA pro-inflammatory gene composite was significantly reduced from pre- to postintervention, p<.05. Increased eudemonic well-being was significantly correlated with reduced pro-inflammatory gene expression p<.05. Reductions in circulating levels of CRP and IL-6 were not significant and were not associated with eudemonic well-being.

Conclusion: Findings are consistent with our prior research, and further demonstrate an association between increased well-being and decreased pro-inflammatory gene expression. While in need of replication in a larger, randomized trial, these results contribute to our understanding of the psychological processes that underlie mindfulness effects on inflammatory biology.

54) Abstract 1062

EXAMINING THE RELATIONSHIPS BETWEEN MINDFULNESS, ANXIETY, AND THE STARTLE RESPONSE

Leah A. Brown, M.A., Clinical Psychology, West Virginia University, Morgantown, WV, Terry Blumenthal, Ph.D., Psychology, Wake Forest University, Winston-Salem, NC

Anxiety has been shown to have adverse effects on psychological and physical health, and the practice of mindfulness has been shown to decrease anxiety (Zeidan, Martucci, Kraft, McHaffie, & Coghill, 2014). The startle response is an automatic reflex that serves defensive functions and has been shown to increase with anxiety (Benke et al., 2015; Blumenthal, 2015). The current study explored the relationship between mindfulness and the startle response. Blumenthal and Brown (2015) suggested a positive relationship between mindfulness and startle response magnitude, which is contradictory to the anxiolytic effects of mindfulness and the positive relationship that has been found between startle response magnitude and anxiety. The current study explored these findings further by examining attentional control as a potential mediator of the relationship between mindfulness and startle response magnitude. Attentional control is a key aspect of mindfulness (Brown & Ryan, 2003; Walsh et al., 2009). Additionally, mindfulness consists of an enhanced state of attention, and attention has been shown to increase startle response magnitude (e.g., De la Casa, Mena, & Ruiz-Salas, 2016). We examined both trait and state mindfulness as predictors of startle response magnitude, and found that state mindfulness was a significant negative predictor of startle response magnitude, and that attentional control did not significantly mediate this association. These results suggest that state mindfulness may be more likely than dispositional mindfulness to influence startle response magnitude, and that attentional control is not a mediator of that influence.

55) Abstract 1511				
PSYCHOSOCIAL	R	ESOURCES	ME	DIATE
ASSOCIATIONS	OF	RELIGIOUSN	IESS	AND

SPIRITUALITY WITH DEPRESSIVE SYMPTOMS IN MOTHERS DURING THE FIRST POSTPARTUM YEAR

Alyssa C. Cheadle, PhD, Psychology, Hope College, Holland, MI, Christine Dunkel Schetter, PhD, Psychology, UCLA, Los Angeles, CA

Religion and spirituality are major forces in the lives of Americans and are especially salient for women and families in the time surrounding the birth of a child. A large and growing body of research indicates that specific aspects of religiousness and spirituality are associated with better physical and mental health. However, the mechanisms of these associations are not well understood, though many have been hypothesized. Psychosocial resources were tested as a mechanism of associations of religiousness and spirituality with depressive symptoms in a sample of postpartum women. Data came from a five site study conducted by the Community Child Health Network of low income mothers in the first year postpartum who were of diverse ethnicity. Results indicated that psychosocial resources composed of indices of mastery, self-esteem and optimism were associated with religiousness and spirituality. Furthermore, religiousness and spirituality were associated with depressive symptoms The psychosocial resource factor mediated the associations of religiousness and spirituality with depressive symptoms. These findings contribute substantially to existing knowledge by demonstrating psychological resources as mechanisms of associations of religiousness, spirituality, and health.

56) Abstract 1185

DOES DISPOSITIONAL MINDFULNESS CORRELATE WITH BLOOD PRESSURE CONSISTENTLY ACROSS DEMOGRAPHICS? BASELINE ANALYSES FROM THE SERENITY STUDY

Gabrielle Chin, A.B., Jeffrey Greeson, Ph.D., Psychology, Rowan University, Glassboro, NJ, Vanessa Anyanso, B.A., Jonathan Reda, B.S., Perelman School of Medicine, University of Pennsylvania, Philadelphia, NJ, Mary Keenan, B.A., Psychology, University of Memphis, Memphis, TN, Devin Barney, B.A., Psychology, University of Hawaii, Manoa, HI, Rosa Heryak, B.A., Megan Strowger, M.A., Psychology, Kent State University, Kent, OH, Monica Fallon, M.A., Mannheim Business School, University of Mannheim, Stuttgart, Germany, Joel Hughes, Ph.D, David Fresco, Ph.D, Psychology, Kent State Univ, Kent, OH

Mindfulness is associated with subjective mental health measures, yet few studies address the relationship between dispositional (trait) mindfulness and physical health. Using baseline data from the ongoing Serenity Study (NCT02371317), we examined if trait mindfulness correlates with systolic (SBP) and diastolic blood pressure (DBP) levels consistently across three demographic subgroups- race, gender, and socioeconomic status (SES). The Five Facet Mindfulness Questionnaire (FFMQ) was used to measure core qualities of mindfulness: Observing, Describing, Non-Judgment, Non-Reactivity, and Acting with Awareness. The Decentering subscale from the Experiences Questionnaire (EQ) was used to measure another core feature of mindfulness- viewing experiences and perceptions objectively without over-identifying with them. In African-Americans (n=59) DBP negatively correlated with two facets of mindfulness, Observing (r(59)=-.401, p=.002) and Non-Reactivity (r(59)=-.401, p=.002).374, p=.004). Caucasians (n=141) showed positive correlations with SBP across three mindfulness scales- Decentering (r(59)=.403, p=.0001), Non-Judgment (r(141)=.191, p=.02) and Non-Reactivity (r(141)=.174, p=.04). Subgroup differences for SBP were significant in Observing (Z=2.440, p=.015) and Non-

Reactivity (Z=2.323, p=.02); subgroup DBP differences were also significant in Observing (Z=3.577, p=.0003) and Non-Reactivity (Z=2.803, p=.005). Gender differences displayed mixed results; some facets of trait mindfulness correlated positively with SBP and DBP while others correlated negatively, as a function of gender. For SES, Observing correlated negatively with DBP for lower income households (r(52)=-.372, p=.007). Observing correlated positively with SBP in higher income households (r(138)=.213, p=.01). Subgroup differences were significant for Observing in both SBP (Z=2.314, p=.02) and DBP (Z=3.054, p=.002). Taken together, results show that trait mindfulness correlates with both SBP and DBP differently across demographic subgroups, at baseline, prior to mindfulness training. Therefore, future studies relating questionnaire measures of mindfulness and objective measures of health should consider examining such associations separately, by demographics, to elucidate relationships within each demographic and to not assume associations remain stable across diverse groups.

57) Abstract 1218

A PILOT STUDY CONCERNING THE EFFECTS OF MEDITATION ON AROUSAL BETWEEN DIFFERENT RUMINATION LEVELS

Saundra K. Latimer, 2018 Candidate BS Psy., Camille L. Karren, 2019 Candidate BS Neuro., Amy R. Borchardt, Ph.D., Health Psychology, Psychology, Mercer University, Macon, GA

People who meditate experience less ruminative thinking than those who do not meditate (Hemo & Lev-Ari, 2015). However, there is limited published research evaluating meditation's effects on ruminative thinking. In the current study, participants with little to no prior meditation experience were randomly assigned to either meditate (MG) or sit quietly (CG). During session one, participants filled out the Rumination Reflection Questionnaire (RRQ) and then engaged in their respective tasks for 20-min. During session two, participants sat for a 10-min baseline, engaged in a 5-min arithmetic stressor, and immediately completed their respective task during a 20-min recovery period. Participants' level of arousal was measured through Self-Assessment Manikin (SAM) questionnaires given during the baseline, after the stressor, and after the recovery period. High and low trait rumination groups were created by using the upper and lower thirds of the distribution. We hypothesized that following the recovery period, high trait ruminators in the MG would have significantly lower arousal compared to the CG and that low trait ruminators in the MG would have the lowest arousal of any of the groups. Results indicated no significant baseline differences in arousal between groups. There was a significant increase in arousal from baseline to stressor and a significant decrease from stressor to recovery for all groups (ps< .05). There was a significant group x rumination interaction. Follow-up analyses revealed no difference in arousal for the MG and CG for high ruminators (p = .232). However, for the low trait ruminators, the CG had significantly lower arousal than the MG (p = .031). Within the MG, high trait ruminators had significantly lower arousal than low trait ruminators (p = .029). In the CG, no significant differences were found at any point in time between high ruminators and low ruminators. Together these findings suggest that meditation can be beneficial in reducing arousal for those with high levels of rumination. Decreased arousal in those with high levels of rumination could lower anxiety and stress, resulting in improved well-being.

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58) Abstract 1290 ASSOCIATIONS BETWEEN PROSPECTIVE AND RETROSPECTIVE MEASURES OF CHILDHOOD ADVERSITY ARE MODEST

Karen P. Jakubowski, MS, Psychology, Laisze Lee, MS, Psychiatry, Karen A. Matthews, PhD, Psychiatry and Psychology, University of Pittsburgh, Pittsburgh, PA

Background: There is an explosion of research examining childhood adversity on health. However, extant data largely involves retrospectively-reported adversity and white samples. In order to inform ongoing research, we compared prospectivelyversus retrospectively-collected adversity data in a longitudinal sample of Black and White men.

Methods: Participants (n=335; 51% Black) enrolled in the Pittsburgh Youth Study had completed annual assessments when they were ages 13 through 16 on parental monitoring, communication, relationship quality, and involvement in the family; similar questions were asked of the primary caregiver at the same time. Prospectively-assessed household dysfunction (HD) included two or more changes in caretaker by age 10, substantiated CYS referral of family before age 12, and any caretaker incarcerated while living with the boy. Parenting variables were standardized and summed, with higher values reflecting worse parenting. Categorical HD variables were summed to create an index from 0-3. At age 19-20, men retrospectively-reported the stability of home life and how well they got along with both mother and father during elementary, middle, and high school using a 1-4 scale; responses were averaged across the three periods, with higher values reflecting less stability and worse relationships. Spearman's correlations examine associations between prospective and retrospective adversity.

Results: Overall, 29%, 10%, and 2% of the sample experienced 1, 2, or 3 forms of HD. Blacks prospectively-reported worse parenting and more HD. Prospectively-reported parenting was related to retrospective reports of less stable home life and poorer relationships with mother and father, for Blacks and Whites. However, prospectively-reported HD was related to retrospective reports of less stable home life and poorer relationships with mother and father, for Whites only (Table 1).

Conclusions: There are small but significant relationships between prospective and retrospective measures of parenting, with some race differences in the pattern of results. Findings are informative for the childhood adversity literature, which relies on retrospectively-assessed adversity. Future research, when feasible, should measure adversity prospectively and retrospectively, as these accounts may have differential associations with health.

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59) Abstract 1498

RESILIENCE RESOURCES SCALE (RRS): A NEW RESILIENCE SCALE FOR USE IN YOUNG ADULTS

Melissa Julian, B.A., Psychology, University of California, Los Angeles, Los Angeles, CA, Alyssa C. D. Cheadle, Ph.D., Psychology, Hope College, Holland, MI, Olivia Jurkiewicz, B.A., Psychology, California State University, Fullerton, Fullerton, CA, Robert M. Bilder, Ph.D., Kendra S. Knudsen, B.S., Semel Institute for Neuroscience and Human Behavior, Christine Dunkel Schetter, Ph.D., Psychology, University of California, Los Angeles, Los Angeles, CA

Researchers have used the term *resilience* to refer to either a set of outcomes, to specific types of responses, or to resources in the

context of stress or adversity. Resilience resources are factors at multiple levels of analysis that promote the capacity to withstand and cope with demands in various life domains while maintaining healthy functioning. These resources are important to study when young adults are navigating unique risks and new opportunities. How this developmental period is managed can have a significant impact on mental and physical health. Thus, it is crucial for researchers to be able to specify and reliably measure relevant resilience resources during this period of growth and development. This study presents the Resilience Resources Scale (RRS), a 12-item brief self-report measure that assesses multiple resources that contribute to resilience capacity. Specifically, the items assess self-esteem, mastery, optimism, familism, spirituality, and support seeking skills. This work also presents the reliability, validity, and factor structure of this instrument. The analytical sample included 635 undergraduate and graduate students who participated in the UCLA Stress and Resilience Assessment (SARA) Project. Participants completed the RRS at one of two time points eight weeks apart (n = 420), or at both time points (n = 215). The factor analysis results provide evidence for a single factor structure and the scale's internal consistency was high (α = 0.88). For the subset who took the instrument twice, the intra-class correlation coefficient was 0.77 (p<.001, 95% CI [.71, .82]). Results also indicated total scores on the resilience scale for the larger sample at the first time point were significantly correlated with standardized measures of life satisfaction (r =.57, p<.001), positive affect (r =.60, p<.001), depression (r =-.54, p<.001), anxiety (r =-.34, p<.001), and at the second time point, with negative affect (r = -.52, p < .001). Multiple regression analyses indicated that resilience scores predicted anxiety scores 8 weeks later (β = -.367, p<.001) above and beyond a measure of social support ($\Delta R^2 = .09, F(1, 218)$) =23.16,p<.001). In sum, the RRS has promising preliminary psychometric properties for further study, and may be valuable for assessing core psychosocial resources that contribute to the construct of resilience in young adulthood.

60) Abstract 1446

ACE INSIGHT EFFECTS ON STRESS REACTIVITY

Heidi A. Rued, BS, Clayton Hilmert, PhD, Psychology, North Dakota State University, Fargo, ND

Exposure to adverse childhood experiences (ACEs) has lasting repercussions throughout an individual's lifetime. An adult with a history of childhood trauma will be at increased risk for excessive stress reactivity, which exacerbates the development of chronic disease and other adverse health outcomes. A tenable intervention for adults with a history of ACEs is a "traumainformed care" approach. This approach is still in developmental stages, and it is important to investigate different ways we can use ACE information. A viable treatment option is assessing ACEs and then informing individuals they are at increased risk of chronic disease because of their past experiences, or providing "ACE insight." To date, research has not explored the psychological and physiological impacts of providing ACE insight. It is possible that ACE insight will relieve self-blame and reduce subsequent stress reactivity, or it will promote worry and anxiety, thereby increasing stress reactivity. In this study participants completed questionnaires about their childhood and were given false feedback that their childhood experiences put them at increased risk for excessive stress reactivity and the development of cardiovascular disease. Following this ACE insight, the participant underwent a stressor speech task during which cardiovascular reactivity was monitored and psychological responses were assessed. Results revealed that participants with

high ACE scores who were told that they are at risk reported feeling more stressed during the speech task. In addition, these actual high ACE participants had higher heart rate reactivity during the speech task. As anticipated, there was an interaction between false feedback (ACE insight) and actual ACE scores. Participants with higher actual ACE scores in the ACE insight condition had relatively high diastolic blood pressure reactivity, whereas those with actual low ACE scores in this condition had mitigated DBP reactivity. These results suggest that ACE insight might be detrimental for psychophysiological reactivity in individuals with high ACEs.

61) Abstract 1314

LIFETIME STRESS EXPOSURE IS ASSOCIATED WITH MENTAL AND PHYSICAL HEALTH COMPLAINTS IN YOUTH AT VARYING RISK FOR DEPRESSION

Stassja Sichko, B.A., Cousins Center for Psychoneuroimmunology and Department of Psychiatry and Biobehavioral Sciences, Meghan Vinograd, M.A., Department of Psychology, Theresa Q. Bui, B.S., George M. Slavich, Ph.D., Cousins Center for Psychoneuroimmunology and Department of Psychiatry and Biobehavioral Sciences, University of California, Los Angeles, Los Angeles, CA

Allostatic load theory posits that biological "wear and tear" resulting from cumulative exposure to acute and chronic stressors can lead to increased risk for poor health in adolescence and adulthood (Lupien, McEwen, Gunnar, & Heim, 2009; McEwen, 1998). Despite a very large literature documenting the negative effects of life stress on health (Goldberger & Berznitz, 2010), very few studies have actually assessed lifetime stress exposure, producing a need for additional research examining the cumulative effects of stress across the lifespan on health (Bush, Lane, McLaughlin, 2016).

To address this issue, as part of a larger study examining risk factors for depression, adolescent girls (N = 15) reported on their lifetime stress exposure as well as their mental and physical health complaints. Life stress exposure was measured using the Stress and Adversity Inventory (STRAIN; Slavich & Shields, in press), an online system for assessing the severity, frequency, timing, and duration of various stressors that are known to impact health. Mental health and physical health complaints were measured using the Kessler-6 item psychological distress inventory (K-6; Kessler et al., 2002), and the Physical Health Questionnaire (PHQ; Schat, Kelloway, & Desmarais, 2005), respectively.

As hypothesized, results suggested a strong association between lifetime stress exposure and both mental and physical health. Physical health complaints were associated with total number (r = .699, p = .004) and total severity (r = .668, p = .008) of stressors, as well as total number (r = .679, p = .005) and severity (r = .747, p = .001) of acute life events, and severity of chronic difficulties (r = .551, p = .033). In contrast, mental health complaints were only associated with the number of chronic difficulties (r = .596, p = .019).

Although preliminary, these findings reaffirm the importance of studying the effects of stress from a lifespan perspective. Key differences were evident not only between acute and chronic stress exposure, but also between "objective" (as measured by number of stressors) and "subjective" (as measured by perceived severity of stressors) stress exposure. These differences highlight the fact that stress is not a unitary construct. Instead, different types and aspects of stress exposure appear to have different effects on mental and physical health in adolescence.

62) Abstract 1216

THE IMPACTS OF THE GREAT RECESSION ON THE HEALTH OF MIDLIFE AND OLDER PARENTS OF INDIVIDUALS WITH DISABILITIES

Jieun Song, PhD, Waisman Center, Marsha R. Mailick, PhD, Jan S. Greenberg, PhD, Social Work, University of Wisconsin-Madison, Madison, WI

Parents whose son or daughter has a mental health problem or a developmental disability experience financial burdens and vulnerability due to the long-term demands of caregiving responsibilities and the related direct and indirect costs. These parents are also often exposed to chronic stress and are at increased risk of developing health problems. This study investigates whether the health of midlife and older parents of individuals with a mental health problem or a developmental disability was particularly vulnerable to the adverse impacts of the recession, which may have heightened their financial vulnerability. The data were drawn from Midlife in the U.S. (MIDUS), a longitudinal survey of a national probability sample of U.S. adults, wave II (2004-2006) and wave III (2013-2014). The analytic sample included 84 parents of individuals with a mental health problem (e.g., bipolar disorder, schizophrenia) [mean age = 56.7], 98 parents of individuals with a developmental disability (e.g., autism spectrum disorder, Down syndrome) [mean age = 52.6], and 2,029 parents of individuals without any conditions who served as a comparison group [mean age = 55.5]. Health was assessed by the number of chronic conditions experienced during the past 12 months (e.g., hypertension, stomach trouble, urinary/bladder problems). The findings showed that midlife and older parents who experienced higher levels of recession impacts and whose son or daughter had a mental health problem or a developmental disability had a greater number of chronic conditions than comparison parents, even after controlling for pre-recession financial status, sociodemographic characteristics, and pre-recession health status. In addition, the findings suggest that the adverse effects of the recession on health were particularly pronounced for parents of individuals with a mental health problem. The results indicate the need for policies that provide effective financial support and reduce restrictions on access to health services in order to relieve the financial burdens experienced by parents of individuals with a mental health problem and ameliorate the deleterious impacts of this burden on health.

Key words: Mental health problem, developmental disability, caregiving, the Great Recession

63) Abstract 1259

PREDICTING POST-OPERATIVE DISTRESS FOLLOWING TOTAL KNEE ARTHROPLASTY: INTERACTIONS BETWEEN CORTISOL AND INTERLEUKIN-6

Julie K. Cremeans-Smith, PhD, Psychological Sciences, Kent State University at Stark, N Canton, OH, Kenneth Greene, MD, Orthopedics, Cleveland Clinic, Medina, OH, Douglas L. Delahanty, PhD, Psychological Sciences, Kent State University, Kent, OH

Emotional distress following surgery is a common experience, which may interfere with the pace and quality of recovery. Patients undergoing total knee arthroplasty (TKA) are one such population: the experience of post-operative distress is frequent and consequences for recovery have been previously documented by our research group. Prior research, albeit with other populations, has suggested that levels of stress hormones and pro-

inflammatory cytokines can be used to predict the occurrence of psychological distress. However, much of this prior work has focused on measures of stress or immune activity without considering potential interactions between the two. The goal of the present study was to examine potential stress-immune interactions in the prediction of post-operative distress, focused specifically on cortisol and interleukin-6. Participants consisted of 110 patients undergoing unilateral, total knee arthroplasty (TKA; Summa Health System, Akron, OH). Pre-operative levels of urinary cortisol and plasma IL-6 were assessed 2-3 weeks prior to surgery (to coincide with preadmission screening). Postoperative distress was assessed 3 months following surgery using the Impact of Events Scale, referring to the surgery as the index event. Regression analyses control for gender, medication (i.e., beta blockers), volume of the urine sample, and baseline depressive symptoms. Predictor variables were squared (to correct for skew) and centered prior to the calculation of the interaction term. Despite the absence of main effects, the interaction between cortisol and IL-6 prior to surgery significantly predicted levels of post-operative distress (β = -.361, p= .019) three months later. Decomposition analyses revealed the slope of cortisol on post-operative distress to be significant at high levels of IL-6 (t[99]= -2.004, p<.05). Further, results illustrate that discordant levels of cortisol and IL-6 were associated with greater emotional distress 3 months following surgery. The combination of low cortisol / high IL-6 reflects a pro-inflammatory state, while high cortisol / low IL-6 characterizes hypersensitivity to stress. Each of these discordant profiles will be discussed in the context of previous research on the prediction of psychological distress.

64) Abstract 1428

TNF-ALPHA LEVELS PREDICT LIKELIHOOD OF HEALTHCARE SERVICE USE IN AGING SPOUSAL CAREGIVERS OF PERSONS WITH DEMENTIA

Gabrielle Decastro, B.A., Psychology, San Diego State University, San Diego, CA, Brent Mausbach, Ph.D., Igor Grant, M.D., Psychiatry, University of California, San Diego, San Diego, CA

BACKGROUND

TNF-alpha is a pro-inflammatory cytokine involved in the inflammatory immune response. TNF-alpha is correlated with poor health outcomes and mortality following serious injury. It has been shown that circulating levels of TNF-alpha in blood increase in response to acute stress. Further, dysregulation of the inflammation immune response has been linked to depression. Depression is associated with higher healthcare service use including emergency department (ED) visits and overnight hospitalizations. However, the relationship between cytokines, specifically TNF-alpha, and healthcare usage has not been thoroughly examined. This study investigated whether TNF-alpha was prospectively associated with risk of ED visit and overnight hospitalization in dementia caregivers.

METHODS

Participants were 82 (65 females and 17 males) spousal caregivers of persons with dementia. The mean age was 74.1 years (SD = 8.1 years). Blood was collected from participants at baseline, and ED visits and hospitalizations were collected at three months follow-up, nine months follow-up, and fifteen months follow-up. Blood was assayed for TNF-alpha and concentrations were used to predict 15-month follow-up healthcare use. Cox regression was used to determine the relationship between TNF-alpha and both ED visit and hospitalization, controlling for age, BMI, and sex.

RESULTS

TNF-alpha significantly predicted risk for inpatient hospitalizations (HR = 7.93; 95% CI = 1.28-49.28), but not ED visit (HR = 1.50; 95% CI = 0.53-4.26). Age, BMI, and sex were not significant predictors of either inpatient hospitalization or ED risk.

CONCLUSIONS

TNF-alpha predicts risk for healthcare use (i.e., hospitalization) in aging spousal caregivers of persons with dementia. Screening for levels of TNF-alpha may be useful in determining those with a greater need for hospital services. Because stress plays an integral part in TNF-alpha expression, interventions that reduce stress may reduce TNF-alpha, and subsequently reduce risk for hospital visits. Future research should consider a broader range of inflammation markers in predicting hospital visits, as well as rule out the role of health-related covariates (e.g., comorbid disease). If confirmed, inflammation markers may serve as a valuable determinant of future health behaviors.

65) Abstract 1396

PERIPHERAL IMMUNE ALTERATIONS IN MAJOR DEPRESSION: THE ROLE OF SUBTYPES AND PATHOGENETIC CHARACTERISTICS

Frank Euteneuer, PhD, Katharina Dannehl, PhD, Clinical Psychology and Psychotherapy, Adriana del Rey, PhD, Institute of Physiology and Pathophysiology, University of Marburg, Marburg, Germany, Harald Engler, PhD, Institute of Medical Psychology and Behavioral Immunobiology, University Hospital Essen, University of Duisburg-Essen, Marburg, Germany, Manfred Schedlowski, PhD, Institute of Medical Psychology and Behavioral Immunobiology, University Hospital Essen, University of Duisburg-Essen, Germany, Winfried Rief, PhD, Clinical Psychology and Psychotherapy, University of Marburg, Marburg, Germany

Depression has been associated with peripheral inflammatory processes and alterations in cellular immunity. Growing evidence suggests that immunological alterations may neither be necessary nor sufficient to induce depression in general, but seem to be associated with specific features. This exploratory study examines associations between depression subtypes and pathogenetic characteristics (i.e., melancholic vs non-melancholic depression, chronic vs non-chronic depression, age of onset, symptom dimensions) with plasma levels of C-reactive protein (CRP), interleukin (IL)-6, IL-10, and numbers of leukocyte subpopulations in 98 patients with Major Depression and 30 age and sex-matched controls. Patients with Major Depression exhibited higher CRP levels, higher neutrophil and monocyte counts, lower IL-10 levels and an increased neutrophil to lymphocyte ratio (NLR) than controls. Patient with later age of onset had higher levels of two inflammatory markers (CRP, NLR) and lower cytotoxic T cell counts after adjusting for sociodemographics, lifestyle factors and antidepressants. Furthermore, lower anti-inflammatory IL-10 levels were related to more severe somatic depressive symptoms. These results confirm and extent previous findings suggesting that increased levels of CRP are associated with a later onset of depression and demonstrate that also NLR as a sub-clinical inflammatory marker is related to a later onset of depression.

66) Abstract 1153 INCREASED SALIVARY LEVELS OF UROKINASE PLASMINOGEN ACTIVATOR RECEPTOR (UPAR)

FOLLOWING ACUTE STRESS AND CORRELATION WITH INFLAMMATORY MARKERS

Rafael Fernandez-Botran, Ph.D., Pathology & Laboratory Medicine, Yvette Z. Szabo, Ph.D., Keith B. Lyle, Ph.D., Tamara L. Newton, Ph.D., Psychological and Brain Sciences, University of Louisville, Louisville, KY

BACKGROUND: Inflammatory processes are tightly interrelated with coagulation and fibrinolysis. Acute and chronic psychological stress are known to trigger components of the inflammatory system, resulting in increased levels of proinflammatory mediators, such as the cytokines IL-1 β , IL-6 and TNF α . Stress can also result in the activation of the coagulation and fibrinolytic systems via the sympathoadrenal medullary system, resulting in net hypercoagulability.

OBJECTIVE: The aim of this study was to investigate the effects of acute stress on the levels of urokinase plasminogen activated receptor (uPAR), a key component of the fibrinolytic system, and determine the relationship with changes in pro- (IL-1 β , IL-6 and TNF α) and anti-inflammatory (IL-10) cytokines.

METHODS: Healthy subjects, ages 18-40 (74% female), were randomly assigned to complete a modified Trier Social Stress Test (TSST; n = 44) or to recall an angry autobiographical memory (n = 46). Saliva samples, taken at baseline and poststress (about 60-min apart), were analyzed using high sensitivity kits for cytokines and for levels of uPAR.

RESULTS: Overall, acute stress was found to result in a significant increase in the salivary levels of uPAR (p<0.0001) when comparing baseline (median [IQR]: 1.83 [2.31] ng/mL) to post-stress samples (2.57 [2.87] ng/mL). The magnitude of the increase in uPAR levels (1.5-fold) was similar to those seen for pro- and anti-inflammatory mediators. There were no significant differences between the two types of stressor. Statistical analysis (Spearman's) indicated moderate to moderate-high correlations with the salivary levels of pro-inflammatory, but not anti-inflammatory cytokines, particularly in the post-stressor samples (IL-1 β [r=0.617; p<0.0001], IL-6 [r=0.350; p=0.001], TNF α [r=0.366, p=0.0004], IL-10 [r=0.150, p=0.162]).

CONCLUSIONS: These results suggest that in addition to inflammatory markers, components of the fibrinolytic system may also influenced by acute stress, prompting further research into understanding their physiological implications. In addition, uPAR levels in saliva may have potential application as stress biomarkers in saliva.

67) Abstract 1176

A SYSTEMATIC REVIEW OF THE ASSOCIATION BETWEEN BEREAVEMENT AND BIOMARKERS OF IMMUNE FUNCTION

Lindsey M. Knowles, M.A., John M. Ruiz, Ph.D., Mary-Frances O'Connor, Ph.D., Department of Psychology, University of Arizona, Tucson, AZ

Background: Bereavement is associated with increased risk for morbidity and all-cause mortality across epidemiological, metaanalytic and clinical case-control studies. There is evidence of bereavement-related changes across many physiological systems. However, research on bereavement-related changes within the immune system has yet to be reviewed. The aim of the current systematic review is to synthesize findings on the association between bereavement and immune function, identify limitations of the literature, and suggest directions for future research.

Methods and Materials: The current review adhered to the PRISMA guidelines for systematic reviews to synthesize 40 years of research on the association between bereavement and biomarkers of immune function.

Results: Thirty-two publications were identified. Findings indicate that bereaved people show impaired cellular immunity as measured by in vitrolymphocyte proliferative response to mitogens, natural killer cell activity, and neutrophil function. Bereaved people also demonstrate high levels of systemic inflammation and maladaptive immune cell gene expression. There is evidence that individual differences in psychological response to bereavement (e.g. depression, grief) moderate the association between bereavement and impaired immune function. Discussion: The evidence supports multiple impairments in immune function following bereavement. The field would benefit from longitudinal research with larger sample sizes and advanced immunological methods that incorporate measures of psychological responses to bereavement. These studies would clarify psychological and physiological moderators of immune function impairment in bereaved populations. Evidence for the effect of bereavement on immune function is strong, and the field is poised to scale up its investigation of this common and important phenomenon.

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68) Abstract 1448 EXPLORATION OF DYADIC ASSOCIATIONS OF

ANXIETY AND DIURNAL CORTISOL AMONG PARKINSON'S DISEASE PATIENT/CAREGIVER DYADS Kala Phillips, M.S., Chelsea Siwik, B.A., Allison Hicks, B.A., Paul Salmon, Ph.D., Psychological and Brain Sciences, University of Louisville, Louisville, KY, Elizabeth Cash, Ph.D., Otolaryngology-HNS and Communicative Disorders, University of Louisville School of Medicine, Louisville, KY, Irene Litvan, M.D., Neurosciences, J V. Filoteo, Ph.D., Psychiatry, University of California San Diego, San Diego, CA, Kathleen van der Gryp, B.A., Sandra E. Sephton, Ph.D., Psychological and Brain Sciences, University of Louisville, Louisville, KY

Parkinson's disease (PD) patients, who are faced with the knowledge of impending decline in neurological functioning and motor control, demonstrate greater anxiety and more dysregulation of HPA functioning compared to healthy controls. Given the progressive and degenerative nature of PD, most PD patients ultimately require caregiving, often provided by family members. Chronic stress effects of caregiving for a family member are well-documented and include elevations in anxiety compared to age-matched controls. An abundance of research has examined biobehavioral relationships among individuals with illness; however, although caregiving occurs in a dyadic context, few studies have explored dyadic associations in biobehavioral relationships.

Eighteen dyads consisting of PD patients and their partner/caregivers were enrolled from a local movement disorders clinic. Self-reports of anxiety (BAI) were collected and participants provided saliva samples at waking, 30-minutes postwake, and bedtime over three days for assessment of diurnal cortisol slope, mean, and bedtime levels. Multi-level modeling was used to examine the degree to which an individual's anxiety and his/her partner's anxiety predicted the individual's diurnal cortisol slope (actor and partner effects, respectively). Within the model, role (patient vs. partner) was also examined as a potential moderating factor.

A significant association of cortisol slope with patient versus partner role was revealed (p=.032). Patients had significantly flatter diurnal cortisol profiles than partner/caregivers. No other significant results emerged within the model. However, visual examination of cortisol slopes by both patient and

partner/caregiver anxiety suggested some potential covariance of an individual's cortisol with his/her dyadic partner's anxiety.

Findings suggest that PD patients have greater baseline dysregulation of HPA functioning compared to their caregiving partners. Although other associations did not reach significance in this small sample, these pilot data suggest future studies with larger samples should explore potential effects of partner's anxiety on HPA function. Our findings highlight the importance of acknowledging PD patient-caregiver dyad functioning as it may relate to HPA axis dysregulation.

69) Abstract 1405

DOES MARRIAGE ENHANCE RESILIENCE? LOWER LEVELS OF INFLAMMATION IN MARRIED IRAQ AND AFGHANISTAN VETERANS

Mariya Smirnova, B.A., Thomas C. Neylan, M.D., Psychiatry, University of California, San Francisco, San Francisco, CA, Daniel Bertenthal, M.P.H., Research, San Francisco VA Medical Center, San Francisco, CA, Paige E. Tripp, B.A., Aoife O'Donovan, Ph.D., Psychiatry, University of California, San Francisco, San Francisco, CA

Background

Higher quality marriages are linked to greater satisfaction with life, lower stress, and better mental health. Meanwhile, in divorced, widowed and separated individuals, there is an increase in risk for coronary events and early mortality. Accumulating evidence indicates that elevated inflammation may contribute to the risk for both mental and physical health problems following divorce or death of a spouse. Marital problems and divorce as well as loss of a spouse are more common in military veterans than in other groups. Nonetheless, little is known about the connection between marital status and inflammation in military veterans.

Method

Our sample included 16,587 Iraq and Afghanistan veterans (15% women, M age=34.5±8.7 years) who entered the Veterans Affairs (VA) healthcare system between 2005 and 2012 and who had levels of the general systemic inflammatory marker high sensitivity C-reactive protein (hsCRP) measured for any reason. Sociodemographic and clinical data were derived from VA administrative databases. Generalized linear models were used to ascertain differences among groups in log-transformed hsCRP. All models were adjusted for age, race, education, body mass index, single versus multiple deployments, psychiatric diagnoses, and physical health as indexed by the Charlson Comorbidity Index.

Results

Most of the veterans with hsCRP measures had a psychiatric diagnosis (n = 13,023; 79%), and being divorced or widowed was more common in veterans with psychiatric diagnoses (6.4%) compared to those with no psychiatric diagnoses (5%). Divorced or widowed veterans had significantly higher levels of hsCRP than those who were married or never married (β = .21 [.07, .35], p = .004). Breaking the sample down into male and female veterans, divorced or widowed status was significantly associated with higher hsCRP in men (β = .21 [.05, .38], p = .009) and not women (β = .16 [-.13, .44], p = .27).

Conclusion

Our results showed elevated inflammation in divorced and widowed male military veterans. Previous research indicates that being married has greater benefits for men's compared to female's health. Interventions targeted at increasing marital quality to keep couples together, and to increase marital satisfaction could be an important protective factor against elevated inflammation, particularly for male veterans.

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70) Abstract 1468

ATTACHMENT GETS UNDER THE SKIN THROUGH SOCIAL SUPPORT: INVESTIGATION OF HEALTH-PROMOTING INTERPERSONAL FACTORS IN CANCER PATIENTS

Amanda Ting, B.S., Hannah-Rose Mitchell, MPH, Charles S. Carver, PhD, Youngmee Kim, PhD, Psychology, University of Miami, Coral Gables, FL

Adult attachment theory posits that encountering a threat triggers activation of internal working model, which predicts subsequent support-seeking behaviors and health outcomes. We tested this theoretical premise with patients who are newly diagnosed with cancer (threat encounter) and whose physical health is substantially compromised. We aimed to identify attachment relationship factors associated with better neuroendocrine health and to examine social support mediating the link between attachment and health among colorectal cancer patients.

Newly diagnosed colorectal cancer patients (Stage I to IV) provided data for study variables (N=86; 56% female; 56 years old; 52% Hispanic; 3 months post diagnosis). Adult attachment orientations (MAQ: secure, avoidant, anxious-ambivalent worry, and anxious-ambivalent merger) and perceived social support (ISEL) were self-reported. A neuroendocrine marker, alpha amylase (AA), was assayed from saliva samples that were collected at wake-up and bedtime on 2 consecutive days. Age and gender were covariates.

Patients overall reported high levels of secure attachment and social support, but low levels of insecure attachment orientations. SEM revealed that older age and female gender, but none of the attachment orientations, related to higher levels of awakening AA. Both secure and avoidant (unexpectedly) attachment directly related to greater changes in AA during the day (β s>.26, *p*s<.03). In addition, avoidant attachment related to less perceived social support (β =-.43, *p*<.01), which in turn, related to less changes in AA (β =-.22, *p*<.05). Anxious-ambivalent merger and worry attachment were not significantly related to AA.

Findings provide biobehavioral support for attachment theories, highlighting the significant role of dependence dimension of attachment quality in neuroendocrine health among newly and recently diagnosed cancer patients. Further investigations regarding psychosocial and contextual factors of interdependence that promote support-seeking behaviors and enhance resilience against compromised health for individuals facing cancer as a threat are warranted.

71) Abstract 1488

HOPELESSNESS AFTER THE LOSS OF A SPOUSE: IMPLICATIONS FOR SLEEP, GRIEF, AND DEPRESSION Pearly Zihua Ye, B.A., Christopher P. Fagundes, PhD, Psychology, Rice University, Houston, TX

Introduction: Bereavement is a significant life stressor that is associated with depression, sleep disturbances, and symptoms of grief. Understanding the factors that predict these outcomes is important. In the cognitive behavioral literature, hopelessness has been conceptualized as a major risk factor for psychosocial difficulties. In this study, we evaluated whether hopelessness was associated with both psychological difficulties and sleep disturbances after the loss of a spouse. Methods: We examined 44 bereaved individuals who lost a spouse in the last 3 months; all participants were married for at least three years before the death of their spouse. We evaluated perceptions of hopelessness as well as depression, grief, and sleep disturbances.

Results: Hopelessness was associated with poorer sleep (b = .37; p < .05). Hopelessness was also associated with more depression (b = .64; p < .001), and grief (b = .44; p < .01).

Conclusions: The findings show that hopelessness is an important factor for psychosocial difficulties after bereavement. In our future work, we will evaluate if hopelessness is also related to autonomic and immune dysregulation.

72) Abstract 1193

CORTISOL IN ASTHMA AND HEALTH: ASSOCIATIONS WITH COGNITION AND EXHALED NITRIC OXIDE

Juliet Kroll, MA, Ashton Steele, PhD, Psychology, Southern Methodist University, Dallas, TX, Amy Pinkham, PhD, School of Behavioral and Brain Sciences, University of Texas Dallas, Dallas, TX, E S. Brown, MD, PhD, Psychiatry, University of Texas Southwestern Medical Center, Dallas, TX, Thomas Ritz, PhD, Psychology, Southern Methodist University, Dallas, TX

Low levels of cortisol have been proposed as a risk factor for asthma exacerbation and disease progression, with authors theorizing that a less robust anti-inflammatory response may contribute to exacerbations of this chronic inflammatory disease. Previous research has observed greater cortisol responses to an acute laboratory stressor to be associated with reduced elevations of fractional exhaled nitric oxide (FeNO), a marker of airway inflammation; however, the relation between cortisol and FeNO outside of the context of a laboratory stressor has yet to be explored, and no study to date has examined the cortisol awakening response in adult asthma. Cortisol additionally plays a role in memory consolidation, and emerging research indicates an increased rate of cognitive deficits in asthma.

We therefore compared both evening salivary cortisol levels and awakening responses in otherwise healthy adults with and without asthma, and further explored their relations with FeNO and performance on the Montreal Cognitive Assessment (MoCA).

Thirty-six participants provided samples of saliva by cotton swab (*Salivette*) at bedtime, awakening, and 30 minutes after awakening, which were subsequently analyzed for salivary cortisol. FeNO was captured by steady exhalation with a handheld electrochemical analyzer (*Niox Mino*).

Compared to age and gender matched healthy controls, individuals with asthma had reductions in both evening cortisol levels and morning cortisol awakening response. For all participants, those with higher evening salivary cortisol levels had lower FeNO levels the following day. In individuals with asthma, higher awakening response was associated with better performance on the MoCA.

The present findings indicate that in young-adults with asthma, there is an overall dampening of Hypothalamic-Pituitary Axis activity. These findings are in support of a relation between asthma and endogenous cortisol in adults, and associations with FeNO and MoCA scores indicate potential beneficial influence of this stress hormone on both airway inflammation, a hallmark of this chronic disease, and cognitive performance. Future longitudinal research is needed to explore the influence of cortisol levels on FeNO, additional indicators of asthma exacerbation, and cognitive performance in asthma.

Funding was provided by the National Institute of Aging (NIA) R24AG048024.

73) Abstract 1073 FAMILY OBLIGATION AND ASTHMA IN YOUTH: THE MODERATING ROLE OF SOCIOECONOMIC STATUS

Phoebe H. Lam, BA, Cynthia S. Levine, PhD, Psychology, Northwestern University, Evanston, IL, Madeleine U. Shalowitz, MD, MBA, Center for Clinical Research Informatics, Rachel E. Story, MD, MPH, Medicine, NorthShore University HealthSystem, Evanston, IL, Makeda K. Austin, BA, Psychology, Robin Hayen, BA, Institute for Policy Research, Rebecca N. Sinard, BA candidate, Psychology, Edith Chen, PhD, Psychology & Institute for Policy Research, Northwestern University, Evanston, IL

Engaging in family obligations- providing instrumental help for the family and spending time with the family— is common in youths' day-to-day interactions with their families. However, the link between these obligatory behaviors and physical health remain unclear. The present research investigated whether family obligation was associated with asthma outcomes among youths, and whether these associations differed depending on the context in which the behaviors took place, namely family socioeconomic status (SES). Participants were 172 youths aged 8 to 17 years who had been physician-diagnosed with asthma. Youths reported on family obligations, completed a clinical measure of asthma control, and completed a measure of airway inflammation (fractional exhaled nitric oxide). Parents reported on family income and completed a measure of their child's asthma control. To test whether SES moderated the association between family obligation and asthma outcomes, a series of regression analyses were conducted. Results indicated that there were no main effects of family obligation on asthma outcomes. However, SES interacted with family obligation such that engaging in family obligations was associated with greater airway inflammation and poorer parent-reported asthma control, only among youth from lower SES backgrounds, but not among youth from higher SES backgrounds. Exploratory analyses suggest that these interactions were largely consistent across age and across the two dimensions of family obligation behaviors. These findings suggest that engaging in family obligation behaviors, while normative, may come with costs for youths from low SES backgrounds with asthma. One explanation for these results is that the meaning and experience of engaging in family obligations may be more burdensome and stressful for youths from low SES backgrounds, where conflicts and demands tended to be high, which would then have implications for asthma via biological and behavioral pathways. This research extends previous research by demonstrating that family obligations have relevance for chronic illness outcomes in certain groups. In addition, findings from this research build onto health disparities research by considering a novel family-level psychosocial factor that may have implications for our understanding of how family relationships contribute to childhood asthma disparities.

74) Abstract 1367

THE INTEGRATIVE RELATIONSHIP BETWEEN LIFE EVENTS, ANTIDEPRESSANT MEDICATION AND BREAST CANCER RISK

Avital Fischer, BSc, Epidemiology, University of California, Irvine, Irvine, CA, Argyrios Ziogas, PhD, Luohua Jiang, M.D., Ph.D, Epidemiology, University of California, Irvine, School of Medicine, Irvine, CA, Hoda Anton-Culver, PhD, Epidemiology, UC Irvine School of Medicine, Irvine, CA **Background:** Antidepressant (AD) medication use is increasingly common, especially among women. Breast cancer is the most prevalent female malignancy. Stress in the form of life events increases depression risk. However, the link between life event stress and breast cancer risk is speculative. Here we investigate the association between life events, anti-depressant use and breast cancer risk.

Methods: A case-control design including 609 cases 194 population-based controls was utilized. Participants completed a risk factor questionnaire that obtained information regarding breast cancer and depression covariates, life events and antidepressant medication use. Participants were asked if they had ever used antidepressant medication and for what duration. Two multivariate logistic regression models were used to calculate ORs and 95% CIs for the association between AD medication use and breast cancer risk while adjusting for (1) known breast cancer risk factors and (2) further adjusting for stress parameters: adverse life events or history of personal illness. All analyses were performed using SAS version 9.4 (SAS Institute, Cary, NC, USA).

Results: Breast cancer cases began use of ADs 5 years later (44.3 years) than population-based controls (39.3 years) (P<0.05). 'Ever' use of ADs was associated with a 43% reduction in breast cancer risk (OR=0.57; 95% CI=0.34-0.97) in the multivariate model controlling for previous personal illness or negative life event sum. When analyzing the effect AD medication duration of use on the risk of breast cancer, use of '1 year or less' was associated with a 51% reduction in breast cancer risk compared to 'never use' ($_{adj}$ OR=0.49; 95% CI=0.25-0.96). This protective effect was no longer observed for '2 or more years' of AD medication use ($_{adj}$ OR= 1.07; 95% CI=0.58-1.98) and persisted in all models.

Conclusions: Controlling for physical and psychological stress is important when analyzing the influence of AD use on breast cancer risk. AD medication differentially influence breast cancer risk based on duration of use. A beneficial balance between pro and anti tumorigenic properties might exist at shorter durations of AD use. However at longer durations, the pro-tumor properties might counterbalance the anti-tumor properties of AD drugs. Further investigating the optimal duration of AD use and type of AD is recommended.

75) Abstract 1024

MATURITY OF DEFENSES, DIURNAL CORTISOL PROFILES, AND DEPRESSIVE SYMPTOMS IN WOMEN WITH PRIMARY BREAST CANCER

Codie Rouleau, Ph.D., Psychology, TotalCardiologyTM Rehabilitation and Risk Reduction, Calgary, AB, Canada, Naomi-Rose Dutta, B.Sc., Psychology, Yong Li, M.A., Oncology, University of Calgary, Calgary, AB, Canada, Sandra E. Sephton, Ph.D., Psychological & Brain Sciences, University of Louisville, Louisville, KY, Lianne Tomfohr-Madsen, Ph.D., Psychology, University of Calgary, Calgary, AB, Canada, Mitch Golant, Ph.D., Research and Training Institute, Cancer Support Community, Los Angeles, CA, Carol Kronenwetter, Ph.D., Breast Health Center, California Pacific Medical Center, San Francisco, CA, David Spiegel, M.D., Psychiatry and Behavioral Sciences, Stanford University, Stanford, CA, Janine Giese-Davis, Ph.D., Oncology, University of Calgary, CANMORE, AB, Canada

Objective: We examined the psychodynamic concept of immature defenses in primary breast cancer patients, and its association with salivary cortisol levels and depressive symptoms. *Methods:* We used secondary analysis of baseline

data from a group-therapy trial of English-speaking adult women with Stages I-III breast cancer. Participants completed the Response Evaluation Measurement-44 measure of immature/mature defenses, the Center for Epidemiologic Studies-Depression Scale (CES-D), and provided saliva samples three times over two consecutive days. Separate multiple linear regressions assessed cortisol slope, waking, bedtime, mean diurnal cortisol, and CES-D as dependent variables. Immature defenses, mature defenses, and their interaction were simultaneously entered independent as variables. *Results:* Participants (n = 69) with higher immature defenses had higher waking cortisol levels, b=0.24, t(57)=2.14, p=.037. higher mean diurnal cortisol, b=0.26, t(58)=2.32, p=.024, and greater depressive symptoms, b=8.53, t(59)=5.93, p< .001. Post-hoc analyses indicated higher waking cortisol levels correlated with acting out (r=0.32), passive-aggression (r=0.30), and projection (r=0.28). Mean diurnal cortisol correlated with passive aggression (r=0.26). Conclusions: The findings suggest immature defenses such as acting out, projection, and passive-aggression may relate to depressed mood and HPA activity in primary breast cancer patients. Future work is required to clarify the clinical relevance of defenses to psychosocial and disease outcomes.

76) Abstract 1410

CANCER-SPECIFIC DISTRESS AND WEEKDAY VERSUS WEEKEND DIFFERENCES IN CIRCADIAN REST/ACTIVITY RHYTHMS IN HEAD AND NECK CANCER PATIENTS

Courtney Brinkman, BA, Psychological and Brain Sciences, University of Louisville, Louisville, KY, Whitney Rebholz, PhD, Christina Albert, BS, Jeffrey M. Bumpous, MD, Otolaryngology-Head & Neck Surgery & Communicative Disorders, university of Louisville School of Medicine, Louisville, KY, Sandra E. Sephton, PhD, Psychological and Brain Sciences, University of Louisville, Louisville, KY, Elizabeth Cash, PhD, Otolaryngology-Head & Neck Surgery & Communicative Disorders, university of Louisville School of Medicine, Louisville, KY

A diagnosis of head and neck cancer (HNC) introduces numerous unique stressors (e.g., facial pain, trouble eating). Our group has previously shown that cancer-specific distress near the time of breast cancer diagnosis is significantly associated with disruption to circadian rest/activity rhythms. We set out to replicate this finding in a sample of HNC patients. We hypothesized that greater cancer-specific distress would be associated with greater circadian rest/activity disruption. We also stratified circadian data for weekday (WD) vs. weekend (WE) assessment given prior research documenting differential effects of distress, with the expectation that WD data would exhibit greater circadian disruption.

Patients (N=63) with a new primary HNC diagnosis presenting to a multidisciplinary clinic for treatment planning reported on cancer-specific distress (IES-R). Patients wore an actigraphy device for six consecutive days, and documented time in bed each day. For all patients, data collection began on a Friday and ended the following Thursday. Paired t-tests compared WD to WE circadian data. Hypotheses were tested using linear regressions, first considering all six days of circadian data, and then for WD vs. WE separately.

Patients (54% male, M age=56) presented with mostly (62.9%) advanced staged oral, oropharyngeal, hypopharyngeal, or laryngeal cancer. Patients reported generally low levels of cancer-specific distress (M intrusions=1.10, M avoidance=1.05, M hyperarousal=0.82; possible range 0-4). No significant

associations were noted between cancer-specific distress and circadian rest/activity disruption. Though rest/activity rhythms were significantly more disrupted on WD (M r_{24} =.14) vs. WE (M r_{24} =.18) days (t(1,38)=-2.37, p=.023), associations with distress were again non-significant.

In this sample of recently diagnosed HNC patients experiencing only mild symptoms of cancer-specific distress, we did not observe significant associations with circadian rest/activity rhythm disruption. Differences in WD vs. WE activity rhythms suggest the maintenance of some flexibility or regulation in the circadian systems of these cancer patients. Further examination is required to confirm these findings. (Support: University of Louisville Multidisciplinary Research Grant)

77) Abstract 1486

LUNG CANCER-RELATED DISTRESS IS ASSOCIATED WITH ELEVATED MEAN DIURNAL CORTISOL LEVELS

Kathleen A. van der Gryp, BA, Chelsea Siwik, BA, Lauren Zimmaro, MA, Kala Phillips, MS, Whitney Rebholz, PhD, Elizabeth Cash, PhD, Allison Hicks, BA, Psychology, University of Louisville, Louisville, KY, Sandra E. Sephton, PhD, Psychology, University of Louisville, Louisville, KS

Non-small cell lung cancer patients (N=56) diagnosed within the previous five years provided self-reports on cancer-related distress via the Impact of Events Scale – Revised (IES-R), which assesses for symptoms of avoidance, intrusive thoughts, and hyperarousal over the previous week in relation to a diagnosis of cancer. Over a ten-day home-based collection period, patients provided saliva samples at waking and bedtime for assessment of cortisol, yielding measures of diurnal cortisol slope, diurnal mean, and mean bedtime cortisol levels. Relationships between cancer-related distress and cortisol variables were assessed using hierarchical regressions adjusting for age and cancer stage at diagnosis.

Results revealed a statistically significant association between cancer-related distress and mean diurnal cortisol levels (p=.039). However, no significant relationships emerged between cancer-related distress and the diurnal cortisol rhythm or mean bedtime levels.

Patients who reported greater cancer-related distress had elevated mean cortisol levels. Elevated mean cortisol has been associated with poor sleep and depression in lung cancer, and with advancing stage and metastatic spread in other cancer types. Our findings highlight the importance of psychosocial intervention strategies targeted at reducing cancer-related distress. These interventions have the possibility to improve cortisol regulation and lead to better psychological and physiological cancer outcomes. Further research is needed to define relationships between psychosocial factors and physiological disruption. In addition, studies should explore the efficacy of psychosocial interventions with regard to cancer progression, physiological mediators, and relevant outcomes such as depressed mood and sleep in the context of lung cancer.

78) Abstract 1313

INFLUENCE OF PATIENTS' CANCER-RELATED STRESS PERCEPTION AND FAMILISM ON SALIVARY Α­-AMYLASE

Patricia B. Pedreira, BS, Hannah-Rose Mitchell, MPH, Amanda Ting, BS, Marcella May, MA, Youngmee Kim, PhD, Psychology, University of Miami, Miami, FL

Background: Patients' stress from perceiving that their cancer imposes psychosocial burden on their family may compromise patients' neuroendocrine functioning. A possible contributing factor to this stress perception is familism, a cultural value that emphasizes close family relationships and that family be prioritized over the self. Although familism has been associated with positive psychological health outcomes, it could also lead to increased stress. The current study aimed to examine the relations between patients' cancer-related stress perception to the family and familism on salivary alpha-amylase.

Method: Newly diagnosed colorectal cancer patients were asked to complete a questionnaire (N=79, age M=54, 54% female, 60% Hispanic, time since diagnosis M= 3 months). Predictors were self-reported cancer-related stress perception to the family (CSP-F; Appraisal of Cancer Experience Scale) and familism subscales (familial obligations, perceived support and emotional closeness, and family as referent; Familism Scale). Saliva samples were collected at awakening and bedtime for two consecutive days to assay salivary alpha-amylase (sAA). Gender, education, and income served as covariates.

Results: General linear modeling, controlling for covariates, revealed that females had greater levels of awakening (p<.01) and bedtime (p=.01) sAA than males. Patients with greater familial obligation values had lower awakening (b=-44.48, p<.01) and bedtime (b=-35.56, p=.01) sAA. Lower awakening sAA was also related to greater family as referent beliefs (b=-10.42, p<.05) and greater CSP-F (b=-259.26, p<.04). On the other hand, higher awakening sAA was related to greater perceived support/emotional closeness (b=19.30, p=.03). Interaction analyses showed that those with lower CSP-F, but high familial obligation values, had lower levels of awakening sAA (b= -43.14, p<.01).

Conclusion: Findings provide preliminary evidence of the influence of patients' cancer-related stress perception to the family and familism on neuroendocrine functioning. Future research should examine other attitudinal factors that influence the paradoxical relationship between higher perceived support beliefs and higher alpha-amylase. Understanding the physiological effects of familism and other sources of patients' perceived cancer-related stress may help inform stress-reducing psychological interventions.

79) Abstract 1090

EXAMINING HOW SOCIAL BARRIERS SHAPE PHYSICAL BARRIERS TO HEALTHCARE WITHIN THE BLACK COMMUNITY

Oluwagbotemi Olafunmiloye, B.S., Vanessa Volpe, Ph.D, Psychology, Ursinus College, Collegeville, PA

<u>Background:</u> The National Institute on Minority Health and Health Disparities presents a research framework that is critical to understanding the various levels that influence health disparities. Much research has been conducted on how the different domains of influence affect the Black community's access to good quality health care, yet research lacks an understanding of how these levels jointly impact health. Therefore, this investigation examines how one interpersonal influence (relationship with physician) shapes physical access to health care.

<u>Methods</u>: Nineteen participants aged 18 to 65 who self-identified as Black were recruited via professional listervs, email, and word of mouth to complete an online survey and interview. Participants were predominantly middle to upper class (74%) and female (74%). A convergent parallel mixed method approach was used to collect data separately but concurrently. The survey and phone interview questions measured distance, trust in physician, treatment preferences, social support, and views on complementary and alternative medicine.

<u>Results</u>: The average distance from a participant's home to a primary care physician was 3.4 miles (SD=.66). Participants indicated that distance was not a barrier for their health care access (47%). On average participants had more trust than distrust in their physicians (M= 3.38, SD=0.81). The Attitudes on Complementary and Alternative Medicine Scale showed that participants were less likely to have a dissatisfaction with conventional medicine on average (M=2.78, SD=0.284). According to the Social Support Scale (M=6.27, SD=1.3), 73.7% obtained a score of high support.

<u>Conclusion</u>: Results showed that distance from the doctor was not a large factor in terms of access to health, but access was impacted by insurance. Participants stated that their trust in their physician came from having an established relationship. This relationship also shaped the distance that some participants chose to travel in order to receive quality health care services that fit their needs. Taken together, results suggest that social factors shape perceptions of and responses to physical healthcare access barriers for a higher income adult sample. This study adds to a larger understanding of how Black individuals make meaning of their health care opportunities and experiences, informing policy and practice.

80) Abstract 1048

REMOTE PATIENT MONITORING OF IMPLANTABLE CARDIOVERTER DEFIBRILLATORS: PATIENT SATISFACTION AND PREFERENCES FOR FOLLOW-UP *Ivy Timmermans, MSc, Mathias Meine, MD, PhD, Cardiology, University Medical Center Utrecht, Utrecht, Netherlands, Edgar Zitron, MD, PhD, Cardiology, Universitätsklinikum Heidelberg, Heidelberg, Germany, Philippe Mabo, MD, PhD, Cardiology, Centre Hospitalier Universitaire Rennes, Rennes, France, Johan Denollet, PhD, Medical and Clinical Psychology, Tilburg University, Tilburg, Netherlands, Henneke Versteeg, PhD, Cardiology, University Medical Center Utrecht, Utrecht, Netherlands*

Background: Patient satisfaction with remote patient monitoring (RPM) of implantable cardioverter defibrillators seems to be high, but knowledge on patients' follow-up preferences is scarce. This study 1) examined whether patients on RPM preferred remote or in-clinic follow-up, and 2) identified socio-demographic, clinical, and psychological determinants of their preference.

Methods: European heart failure patients with a cardioverter defibrillator, participating in the REMOTE-CIED study and randomized into the RPM arm (N=300; mean age 66 years (IQR=59-74), 22% female) completed questionnaires at time of implantation and 6, 12 and 24 months thereafter. Clinical data was obtained from patients' medical records. Currently, 12-months follow-up data is available for analyses, and 24-months follow-up will be completed in December 2017 to be presented at the APS conference.

Results: At 12 months after implantation, median patient satisfaction with RPM was 8/10 (IQR= 7-10). Of 244 patients who reported their follow-up preferences, 44% preferred RPM, 16% preferred in-clinic, and 40% expressed no preference. Patients with in-clinic preference more often received cardiac resynchronization therapy (p=.018) compared to patients with

RPM preference. Patients with RPM preference more often reported a good health status (p=.02 and p=.017) at baseline and were more satisfied with their RPM system (p

Conclusion: Despite high satisfaction with the RPM system, a subgroup of patients expressed their preference for in-clinic follow-up. Type of device, patient-reported health status and satisfaction with the RPM system seem to be associated with patients' preferences for follow-up.

81) Abstract 1174

PATIENT-PROVIDER LANGUAGE CONCORDANCE AND HEALTH OUTCOMES: A SYSTEMATIC REVIEW, CONCEPTUAL FRAMEWORK, AND RESEARCH AGENDA

Loretta Hsueh, MA, Adam T. Hirsh, PhD, Psychology, Indiana University-Purdue University Indianapolis, Indianapolis, IN, Gerardo Maupomé, PhD, Dentistry, Indiana University School of Dentistry, Indianapolis, IN, Jesse C. Stewart, PhD, Psychology, Indiana University-Purdue University Indianapolis, Indianapolis, IN

Although facilitating patient-provider language concordance has the potential to reduce health disparities for people with limited English proficiency, no previous work has synthesized this literature. The objectives of our systematic review are: (1) to describe the characteristics of studies examining relationships between language concordance and health outcomes; (2) to summarize the nature of associations observed in these studies; and (3) to propose a conceptual framework and future research agenda. This review focuses on four health outcome domains: patient behaviors (e.g., treatment adherence), provider behaviors (e.g., perceived discrimination), and clinical outcomes (e.g., glycemic control).

Methods: We conducted a comprehensive search of published articles between the earliest possible date and September 8, 2017, using Medline, ScienceDirect, Web of Science, PsycInfo, EMBASE, and CINAHL. Forty-one quantitative studies were selected for inclusion.

Results: Studies were largely cross-sectional (59%), conducted in primary care (42%), concentrated in California (44%), and focused on Spanish speakers (71%). Language concordance was primarily assessed via provider report (46%), and health outcomes were primarily assessed via patient report (66%). The most frequently examined outcome was interpersonal processes of care (48%), followed by clinical outcomes (27%), provider behaviors (14%), and patient behaviors (11%). Results were split between supporting a positive association versus no association of language concordance with patient behaviors (25% vs. 75%), provider behaviors (33% vs. 67%), interpersonal processes of care (49% vs. 50%), and clinical outcomes (37% vs. 56%).

Conclusions: Findings support the notion that language concordance may facilitate information-sharing and may decrease perceptions of language-based discrimination (interpersonal processes of care); however, evidence for other health outcome domains is currently lacking. Based on these results, we developed a conceptual framework (Figure 1), identified key knowledge gaps, and proposed a future research agenda. Critically, there is a need for quasi-experimental, prospective studies with well-characterized samples. This review should increase stakeholders' awareness of the potential benefits of language-concordant healthcare.

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82) Abstract 1508

PRENATAL MATERNAL DEPRESSION AND NEONATAL IMMUNE FUNCTION

Jill Hahn, MS, Social and Behavioral Sciences, Diane R. Gold, MD, MPH, Brent A. Coull, PhD, Environmental Health, Marie C. McCormick, MD, ScD, Social and Behavioral Sciences, Harvard T.H. Chan School of Public Health, Boston, MA, Patricia W. Finn, MD, Medicine, University of Illinois College of Medicine, Chicago, MA, David L. Perkins, MD, PhD, Medicine, Surgery, University of Illinois College of Medicine, Chicago, IL, Janet W. Rich-Edwards, ScD, MPH, Epidemiology, Harvard T.H. Chan School of Public Health, Boston, MA, Sheryl L. Rifas-Shiman, MPH, Emily Oken, MD, MPH, Division of Chronic Disease Research Across the Lifecourse, Department of Population Medicine, Harvard Medical School, Boston, MA, Laura D. Kubzansky, PhD, MPH, Social and Behavioral Sciences, Harvard T.H. Chan School of Public Health, Boston, MA

Maternal depression during pregnancy has been associated with adverse outcomes at birth and in childhood. Mechanisms have not yet been clearly identified, but one hypothesized pathway is through altered biological processes related to immune regulation. This study tests the hypothesis that maternal depression is associated with higher levels of pro-inflammatory cytokines and lower levels of anti-inflammatory cytokines produced by cord blood mononuclear cells (CBMC) collected at delivery. We also assessed cytokine production upon stimulation of CBMCs with three immune stimulants, as increased cytokine production in response to stimulant exposure can be interpreted as a measure of immune system competence.

Data are from women recruited in early pregnancy into the Project Viva longitudinal cohort (N = 463). Women reported depressive symptoms (Edinburgh Postnatal Depression Scale) and depression history by questionnaire in mid-pregnancy. Immune responses were measured by assaying concentrations of three cytokines (IL-6, TNF-a, and IL-10) after incubation of CBMC either in medium alone or stimulated with phytohemagglutinin (PHA), cockroach extract (Bla g 2), or house dust mite extract (Der f 1). We examined associations of maternal depression with these measures, using tobit regression models when $\geq 9\%$ of samples were below assay detection level, or linear regression otherwise. We imputed missing depression and covariate data using a chained equation multiple imputation model. 75 women (20.8%) reported history or current probable depression during mid-pregnancy. After adjustment for basic confounders (mother's age, race/ethnicity, education, household income, season of birth, and child sex), levels of IL-10 after stimulation with Bla g 2 (-0.57, p=0.019) or Der f 1 (-0.45, p=0.068) were substantially lower in cord blood from women who had ever vs. never experienced depression. A similar nonsignificant trend was evident in IL-10 stimulated with PHA (-0.32, p=0.265). No significant differences were seen in levels of TNF- α or IL-6. These data show that neonates whose mothers experienced depression have significantly lower levels at birth of an anti-inflammatory cytokine that plays an important role in preventing inflammatory and autoimmune diseases. Our findings support the hypothesis that maternal prenatal depression may alter immune-related processes early in life.

83) Abstract 1341

CONCOMITANT HABITUAL SNORING AND INSOMNIA ARE ASSOCIATED WITH ADVERSE PREGNANCY OUTCOMES

Michele L. Okun, Ph.D., BioFrontiers, University of Colorado Colorado Springs, Colorado Springs, CO, Louise M. O'Brien,

Ph.D., Obstetrics and Gynecology, University of Michigan Ann Arbor, Ann Arbor, MI

A substantial percentage of pregnant women report disturbed sleep. These frequently include increased awakenings, long periods of wake after sleep onset, and poor sleep quality. Recent data indicate that sleep disordered breathing (SDB) and insomnia appear to be on the rise. The co-occurrence of habitual snoring and insomnia have been described in non-pregnant cohorts with a prevalence of 30%-55%. Independently, each is associated with increased risk for cardiovascular disease and psychiatric disease. When co-morbid, risk for morbidity substantially increases above and beyond their independent presentation. To date, no study has examined the co-morbid status or impact in pregnant women. We examined the prevalence of insomnia and symptoms of SDB in women in the third trimester $(34.1 \pm 3.7 \text{ weeks})$. A sample of 439 women completed questionnaires on snoring and "stoppage of breathing or gasping for air". If a participant reported snoring at least 3-4 times per week (habitual), she was deemed HS+. Insomnia was determined using the Insomnia Symptom Questionnaire (ISQ). Women were classified as HS-/ISQ-(n=161; 36.7%), HS-/ISQ+ (n=146; 33.3%), HS+/ISQ- (n=63; 14.4%), HS+/ISQ+ (n=69;15.7%). Logistic regression models controlling for confounders revealed that while both INS alone and HS alone were associated with excessive daytime sleepiness (aOR 3.8, 95%CI 2.3-6.5, p

84) Abstract 1207

ATTACHMENT ANXIETY IN MOTHER-FATHER DYADS AND MATERNAL ALLOSTATIC LOAD AT ONE YEAR POSTPARTUM

Kharah M. Ross, PhD, Psychology, University of California, Los Angeles, Los Angeles, CA, Heidi S. Kane, PhD, School of Behavioral and Brain Sciences, University of Texas at Dallas, Richardson, TX, Christine Guardino, PhD, Psychology, Dickinson College, Carlisle, PA, Christine Dunkel Schetter, PhD, Psychology, University of California, Los Angeles, Los Angeles, CA

Attachment theory posits that working models of close relationships developed early in life inform expectations of adult partner relationships. Attachment anxiety (i.e. fear of abandonment or rejection) is associated with poor outcomes, and could be detrimental during the postpartum period when the partner relationship is central to navigating physical and psychosocial changes. Pietromonaco et al (2013) propose a model in which attachment anxiety affects health, as mediated by dyadic processes, such as perceived partner responsiveness (feeling valued, understood, cared for by an intimate partner). Allostatic load is an index of the body's ability to maintain stability through stress. Higher allostatic load suggests greater wear-and-tear on the body, posing risk for poor health outcomes. The purpose of this study was to examine associations between maternal and partner attachment anxiety, independently and interactively, with maternal postpartum allostatic load, and to test maternal perceived partner responsiveness as a mediator of these associations.

A total of 705 mother-father dyads were recruited from 5 US sites through the Community Child Health Network, and assessed at 1-year postpartum. Mothers and fathers completed an attachment anxiety measure, and mothers completed a perceived partner responsiveness scale. Ten maternal biomarkers (blood pressure, adiposity, blood metabolites, inflammation, diurnal cortisol) were measured. Clinical cut-offs for each biomarker were used to create an allostatic load index, scored as total clinical cut-offs met.

In mediation models adjusted for demographics, breastfeeding, and partner marital status, an interaction between mother and father attachment anxiety emerged, b(SE)=3.82(1.87), p=.042. Mothers above-average in, and with partners above-average in, attachment anxiety had highest allostatic load. Greater maternal perceptions of partner responsiveness predicted lower maternal allostatic load, b(SE)=-.176(.099), p=.075. Responsiveness did not mediate links between attachment anxiety and maternal allostatic load.

In sum, mother-father dyad attachment anxiety is associated with postpartum allostatic load. However, perceived partner responsiveness did not explain this association. These findings have implications for understanding how attachment anxiety may be associated with maternal health over the postpartum period.

85) Abstract 1195

THE PERSPECTIVES OF PSYCHIATRY ON IRRITABLE BOWEL SYNDROME

Jason Patel, MD, Psychiatry, Case Western Reserve University, Metrohealth Medical Center, Cleveland, OH, Glenn Treisman, MD, PhD, Psychiatry, Johns Hopkins University, Johns Hopkins Hospital, Baltimore, MD

Convergences of treatments by gastroenterology and psyschopharmacology has helped clarify the relationship between the gut and the brain. Psychological pathology in the form of psychiatric diseases, elements of temperament, behavioral disorders, and life experiences all play a role with evaluation and treatment of patients with IBS or other GI conditions. We developed a method of case formulation based on the Perspectives of Psychiatry model, which delineates psychiatric disorders essential to understanding and effectively treating refractory patients with IBS.

Psychiatric diseases such as major depression, general anxiety, post traumatic stress, and obsessive-compulsive disorders are comorbid in the IBS cohort. Also chronic fatigue syndrome, fibromyalgia, and migraine occur at a higher frequency. Identification of these comorbid conditions is necessary to achieve optimal response. Neuromodulators and emerging field of psychbiotics are of utility.

Temperament describes the enduring traits of affective dimensions that can be measured in individuals. Factors such as neuroticism are risk factors for developing irritable bowel syndrome, particularly after infectious exposure. Negativism can impair treatment adherence and pain threshold. Understanding the person with the illness allows guidance and provision of hope.

Behavioral conditioning, learned responses, and conditioned physiological responses can maintain symptoms. Abnormal patterns of food consumption can be learned and conditioned but may then persist over time and provoked by enviornmental cues. Evaluating conditioned responses to food, GI distension, and bowel function, as well as the development of exaggerated reflexes can enhance the effectiveness of gut rehabilitation.

Life experiences give meaning to environemntal stimuli and the experiences which teach coping skills can influence GI function. Traumatic experiences including sexual assault and military deployment increase predisposition to IBS. The condition itself impedes multiple spheres of life thereby amplifying its impact. In some patients, IBS has onset in childhood and may be related to experiences and psychological development as well as GI dysfunction.

Integration of psychiatry with gastroenterology at our liason clinic has allowed us to succeed with patients who have struggled for years with IBS and inadequate response to GI treatment alone.

86) Abstract 1186

A POSITIVE PSYCHOLOGY-BASED INTERVENTION TO PROMOTE HEALTH BEHAVIORS IN HEART FAILURE: THE REACH FOR HEALTH PROOF-OF-CONCEPT TRIAL

Christopher M. Celano, M.D., Psychiatry, Harvard Medical School, Boston, MA, Eleanor E. Beale, B.A., Psychology, Case Western Reserve University, Cleveland, OH, Melanie Freedman, B.A., Psychiatry, Massachusetts General Hospital, Boston, MA, James L. Januzzi, M.D., Medicine, Jeff C. Huffman, M.D., Psychiatry, Harvard Medical School, Boston, MA

Background: Positive psychology (PP) interventions have been shown to improve health behavior adherence in patients with medical illness but have never been examined in patients with HF, who often struggle with such adherence. We developed a 10week, telephone-delivered intervention that combines PP exercises (e.g., writing a letter of gratitude) with health behavior education and systematic goal setting. In this proof-of-concept trial, we examined the intervention's feasibility, acceptability, and preliminary efficacy at improving positive psychological states, physical outcomes, and adherence in 10 patients with mild to moderate HF.

Methods: Participants set health behavior goals and performed PP exercises weekly, then reviewed their progress with a study trainer in weekly phone calls. Intervention feasibility was assessed by the number of sessions completed, and acceptability by ratings of ease and utility on Likert-type scales (0=not easy/useful, 10=very easy/useful). Self-report outcomes were measured using validated scales, and physical activity (steps) was measured by accelerometer. Changes in outcome measures from baseline to post-intervention were assessed using paired t-tests, and effect sizes (Cohen's d) were calculated.

Results: Participants completed 7.8 of 9 (87%) possible PP exercises and found the exercises to be easy to complete (ease=7.7 [SD 2.0]) and subjectively helpful (utility=7.9 [1.7]). The intervention led to large improvements in positive affect (d=0.81), optimism (d=0.94), health behavior adherence (d=1.02), and HF symptoms (d=0.99), and small to medium-sized increases in objectively measured physical activity (~700 steps/day, d=0.44) and mental health-related quality of life (d=0.54).

Conclusions: The intervention was feasible, acceptable, and efficacious at improving health behavior adherence and both physical and psychological outcomes. Larger, randomized trials are needed to evaluate the intervention's efficacy in a controlled setting.

87) Abstract 1357

EFFECTIVITY OF MUSIC-BASED INTERVENTIONS FOR THE REDUCTION OF PAIN AND STRESS: STUDY PROTOCOL OF A RANDOMIZED CONTROLLED TRIAL

Anja C. Feneberg, M.Sc., Mattes B. Kappert, M.Sc., Bettina K. Doering, Ph.D., Psychology, Philipps University Marburg, Marburg, Germany, Urs M. Nater, Ph.D., Psychology, University of Vienna, Vienna, Austria

Background: Music-based interventions are gaining more and more attention in medical and therapeutic settings due to their potential benefits of reducing pain and stress. Commercial providers offer specially designed music postulated to stimulate the autonomic nervous system via modulation of music frequencies, resulting in an improved stress regulation. Although previous evidence supports the beneficial effects of music listening on health, many open questions remain concerning e.g., the effectivity of frequency-modulated music, the superiority of participant- vs. researcher-chosen music, and the long-term effects of music-based interventions on pain and stress.

Methods: The current study is a randomized controlled (single) blinded intervention study with three conditions: a) researcherchosen, frequency-modulated music b) researcher-chosen, unmodulated music c) participant-chosen, unmodulated music. Healthy adults (N = 90) will be randomized to one of the three conditions and will be invited to attend 10 sessions of music listening (1 hour per session). Pain is experimentally induced by using the cold pressor test (CPT) at baseline, sessions 1, 3, 6, 10, post-intervention, and at follow-up. Pain tolerance (in seconds) and pain intensity are the primary outcome variables and subjective stress experience and biological stress markers (e.g. HRV) are secondary outcome variables. Outcomes are assessed at baseline, post-intervention, and follow-up measurements. Differential effectivity of the three conditions will be compared by testing for differences from baseline to post-intervention using analyzes of covariance with repeated measurements. The study is pre-registered (clinicaltrials.gov; Identifier: NCT02991014).

Discussion: The findings will increase knowledge on the beneficial effects of listening to music on pain and stress. In particular, the results will help to guide well-informed recommendations on selection of music (frequency-modulated vs. unmodulated; participant- vs. researcher-chosen). Furthermore, the short vs. long-term stability of the beneficial health effects of music listening on pain and stress variables will help to design optimally tailored music-based interventions in the future.

88) Abstract 1144

THE GREAT RECESSION AND CARDIOVASCULAR HEALTH: USING LATENT CLASS ANALYSIS TO IDENTIFY SUB-GROUP VULNERABILITY AND RESILIENCE

Julie A. Kirsch, M.S., Psychology, University of Wisconsin, Madison, Madison, WI, Jennifer Boylan, Ph.D., Health and Behavioral Sciences, University of Colorado, Denver, Denver, CO, Carol Ryff, Ph.D., Psychology, University of Wisconsin, Madison, Madison, WI

The Great Recession of 2007-2009 is regarded as the severest economic downturn since the 1930's, exposing many American's to prolonged periods of multiple hardships, including job insecurity and financial loss. These hardships may have farreaching impacts and may thus present many challenges to improving cardiovascular health in America, a primary goal of the American Heart Association. Many studies have focused on the health impacts of Recession hardships in isolation from each other (e.g., examine job loss only). Less is understood regarding the cumulative impacts of recession hardships on health. Thus, we used a novel approach to classify individuals into different groups based on their degree of exposure to multiple recession hardships. Further, group differences in cardiovascular (CV) health were examined.

Data were analyzed from the Midlife in the United States study (MIDUS), a national study of adults. In 2011, participants (ages 25-75) reported exposure to Recession hardships (e.g., home foreclosure, job loss, and financial hardship). A subset of participants (N = 863) completed a medical interview. Cardiovascular health was defined as the presence of healthy

behaviors and healthy levels of biological risk factors. Individuals were assigned points (2, 1, or 0) for meeting criteria for ideal, intermediate, or poor CV health, respectively, on seven metrics. These points were summed to create an index of CV health (0 to 14, higher values reflect better CV health; Lloyd-Jones et al., 2010).

Using MPlus 7, latent class analysis categorized participants into four different groupings based on their responses to the Recession hardship measure. These groupings are: Low overall impact(60.2%), moderate job and financial impact (19%), high financial impact (12.7%) and high overall impact (7.7%). Further, younger adults, women, African Americans, and high school educated were more likely to be categorized into the high Recession impact groups. Latent class regression tested mean differences in CV health across each of the latent classes. The high financial impact and high overall impact groups had significantly poorer CV health than the low and moderate impact groups. In summary, these findings underscore the utility of latent class analysis in identifying vulnerable subgroups that are more at risk for the negative health consequences of the Great Recession.

89) Abstract 1209

CORRELATES OF ADVERSE CHILDHOOD EXPERIENCE IN ADULTS IN PRIMARY CARE WHO HAVE CARDIOVASCULAR DISEASE OR ARE AT ELEVATED RISK

Robert G. Maunder, MD, Psychiatry, David Tannenbaum, MD, Family and Community Medicine, Sinai Health System and University of Toronto, Toronto, ON, Canada, Joanne Permaul, MA, Family and Community Medicine, Sinai Health System, Toronto, ON, Canada, Melissa Nutik, MD, Family and Community Medicine, Sinai Health System and University of Toronto, Toronto, ON, Canada, Cleo Haber, MSW, Family and Community Medicine, Sinai Health System, Toronto, ON, Canada, Jonathan Hunter, MD, Psychiatry, Sinai Health System and University of Toronto, Toronto, ON, Canada

Adverse Childhood Experiences (ACE), including abuse, neglect and other severe stressors are common and associated with a wide range of health problems in adults, including health behaviors and cardiovascular diseases (CVD). While these associations have been studied in the general population and in primary care, little is known about the correlates of ACE in adults who are known to be at elevated risk of CVD or who already have CVD.

Methods: We surveyed 286 primary care patients with CVD (history of myocardial infarction, stroke, angina or re-vascularization, N=143) or CVD risk (body mass index>30, current smoker, hypertension, high cholesterol, diabetes or family history of CVD before age 60, N=143) using a survey with validated measures of ACE, quality of life (QOL), depression, anxiety, attachment anxiety, and attachment avoidance, as well as stage of change, smoking status, body mass index, and HbA1c. Participants also completed a survey to assess behavior change plans and preferred behavior interventions.

Results: Among 159 women, 126 men and 1 other gender, ACE was common (zero ACE 39%, one 23%, two 14%, three or more 24%). Linear regression analyses indicated that controlling for sex, age, and risk/CVD, ACE was associated with QOL (β -.36, p<.001), depression (β .28, p<.001), anxiety (β .26, p<.001), attachment anxiety (β .25, p<.001) and attachment avoidance (β .19, p=.002). ACE was not significantly associated with body mass index, smoking or HbA1c. Increasing ACE exposure was associated with less likelihood of choosing diet or physical

activity as behavior change goals. ACE was not related to stage of change or preferred behavior change resources.

Conclusions: Among primary care patients with CVD or at elevated risk, a history of ACE is relevant for its relationship to QOL, important psychological correlates of illness and behavior change goals. Contrary to what is found in the general adult population, ACE did not distinguish between smokers and nonsmokers and was not related to body mass index or glycemic control. This may indicate that determinants of risk behavior are different in people at known cardiac risk than in the general population or may be related to behavioral inclusion criteria for the study, which bias the cohort towards inclusion of participants with problematic health behaviors and thus diminish differences between groups.

90) Abstract 1180

NEUROHUMORAL ACTIVATION, HEALTH-RELATED QUALITY OF LIFE AND VITAL EXHAUSTION IN PATIENTS WITH CARDIOVASCULAR RISK OR HEART FAILURE

Monika Sadlonova, Doctor of Medicine, Psychosomatic Medicine and Psychotherapy, Maria Stark, Bachelor of Statistics, Medical Statistics, Rolf Wachter, Doctor of Medicine, Cardiology, Christoph Herrmann-Lingen, Doctor of Medicine, Psychosomatic Medicine and Psychotherapy, University of Göttingen, Göttingen, Germany

Background:

Chronic heart failure (HF) is one of the most important health problems in the industrialized world. Its prevalence and incidence is steadily increasing. Nearly 50% of HF patients have a preserved ejection fraction. Several hormonal systems are involved in the pathophysiology of HF. **GDF-15** rises during inflammatory stress and tissue injury. **Galectin-3** can be connected to cardiac remodeling and inflammation. GDF-15, Galectin-3 and CTpro-AVP independently predict HF hospitalization and mortality. In the general population, elevated galectin-3 levels are also associated with de novo development of HF. Furthermore, it can be used as a target of HF therapy.

Methods:

We included 1510 patients with risk factors for HF or a verified diagnosis of HF, including HF patients with LVEE50%, from the observational Diast-CHF study. We analyzed the associations of biomarkers (CTpro-AVP, GDF-15 and Galectin-3) with vital exhaustion (VE) and health-related quality of life (QoL), using the Maastricht-Questionnaire and SF-36.

Results:

The mean age of our population was $66,8\pm8,0$ years and 51.3% were men. **CT-proAVP** was significantly associated with poor SF-36 physical functioning (Rho (r)=-.105, p<0.001), physical role function (r=-.068, p=0.015) and general health (r=-.087, p=0.001). There was a positive association between **galectin-3** and SF-36 emotional role function (r=.064, p=0.033) and emotional wellbeing (r=.063, p=0.028). **GDF-15** correlated with VE (r=.155, p=0.029) and SF-36 physical function (r=-.232, p=0.001). The association between CT-proAVP, GDF-15 and physical functioning was independent of NT-proBNP, LVEF, grade of diastolic dysfunction, age, gender, diabetes, CHD, sleep apnea, previous myocardial infarction and heart rate (R²=0,25, p<0,001).

Conclusion:

In this study we show correlations between biomarkers, VE and QoL in patients with HF risk factors or diagnosed HF. These biomarkers are important predictors of severity and prognosis of HF, which could explain the association between CT-proAVP, GDF-15 and poor physical functioning and between GDF-15 and VE. In contrast, galectin-3 was positively correlated with SF-36 emotional wellbeing and emotional role function. Further research is clearly needed to delineate the complex underlying mechanisms.

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91) Abstract 1331

DISEASE KNOWLEDGE AND ILLNESS UNCERTAINTY ARE ASSOCIATED WITH PSYCHOLOGICAL DISTRESS AND QUALITY OF LIFE AMONG ADULTS AND ADOLESCENTS WITH CONGENITAL HEART DISEASE Steven E. Schiele, M.A., Charles F. Emery, Ph.D., Department of Psychology, The Ohio State University, Columbus, OH, Jamie L. Jackson, Ph.D., Center for Biobehavioral Health, Nationwide Children's Hospital, Columbus, OH

Patients with congenital heart disease (CHD) may experience elevated symptoms of anxiety and depression as well as poorer health-related quality of life (HRQoL). Disease knowledge (i.e., future health risk and general health information) is predictive of psychological well-being and HRQoL among patients with CHD, but patients with CHD often have limited understanding of their heart condition. Uncertainty related to illness events is associated with psychological distress and poorer HRQoL among patients with chronic disease, but this association has not been evaluated among patients with CHD. This cross-sectional study examined the association of disease knowledge and illness uncertainty with depressive and anxiety symptoms and HRQoL among adults and adolescents with CHD (N = 169, ages 15-39; 56% female). Patients were recruited during routine medical visits and completed measures of general disease knowledge, diseaserelated risk knowledge, illness uncertainty, depressive symptoms, anxiety symptoms, and HRQoL (mental component and physical component). Moderation analyses were conducted to test the conditional effect of illness uncertainty in the relationship of disease knowledge with mental component score (MCS), physical component score (PCS), anxiety symptoms, and depressive symptoms. Results demonstrated that greater knowledge of risk in the context of higher illness uncertainty was associated with lower MCS (b = -.53, p = .03, 95% CI = [-1.02, -.05) as well as elevated anxiety symptoms (b = .41, p = .03, 95% CI = [.04, .77]). Moderated mediation analyses demonstrated that greater knowledge of risk interacted with higher illness uncertainty to predict more anxiety symptoms, which predicted lower MCS (48.79; point estimate = -5.89, 95% CI = [-10.84, -1.60]). Thus, knowledge of disease risk was associated with poorer HRQoL and greater anxiety in the context of greater uncertainty about illness. Greater disease knowledge among patients with CHD may not always be associated with better psychological well-being; when patients are less certain about their disease, greater disease knowledge may be associated with higher levels of distress. Addressing illness uncertainty along with disease knowledge may be important for clinical research evaluating well-being among patients with CHD.

92) Abstract 1344

FIRST RESPONDERS FOR HEARTS: CONGRUENCE IN DESIRED VERSUS RECEIVED SOCIAL SUPPORT AND THE ASSOCIATION WITH HOSPITAL READMISSION FOR PERSONS WITH HEART FAILURE

Melanie P. Schrader, PhD, Nursing, University of Louisville, Owensboro, KY, Muna H. Hammash, PhD, Nursing, University of Louisville, Louisville, KY, Misook L. Chung, PhD, Nursing,
University of Kentucky, Lexington Ky, KY, Jennifer Hatcher, PhD, Nursing, University of Kenucky, Lexington, KY, Graham Rowles, PhD, Gerontology, University of Kentucky, Lexington, KY, Debra K. Moser, PhD, FAAN, Nursing, University of Kentucky, Lexington, KY

Background: The challenges and stressors of patients with CVD have the potential to be mitigated through the "buffering" effect of social support(SS).

Aims: The specific aims of this study were to (1) determine if sociodemographic (i.e., age, race, education, living with another) and psychosocial and behavioral (i.e., anxiety, depression, adherence) characteristics differed based on congruency between desired and received SS in patients hospitalized with HF, and (2) determine if discrepancy between desired and received support was associated with all-cause event-free survival.

Methods: Data were collected while patients (n=157, 51% female; mean age $63\pm$ 13) were hospitalized with a HF exacerbation. Differences between received and desired SS were determined using the UCLA Social Support Instrument (UCLA-SSI). The Brief Symptom Index (BSI) measured anxiety, Patient Health Questionnaire-9 (PHQ-9) depression, and the Medical Outcomes Study Specific Adherence Scale (MOS-SAS) measured adherence. All-cause event-free survival data were collected at 1- month and 3- month after discharge. After calculating the UCLA-SSI, participants were divided into 3 groups based on differences in the scores between desired and received UCLA-SSI (received more SS than wanted, received as much as wanted, and received less than wanted groups). Multifactoral ANOVA and chi-square were conducted to determine differences in sociodemographic, psychosocial and behavioral variables among groups. Cox proportional hazards modeling was conducted to determine whether congruence group was independently associated with all-cause event-free survival.

Results: There was no interaction or main effects of SS discrepancy group by gender on age, education, living alone, MOS score, and BSI-A score. Depressive symptoms were associated with congruence group in a dose response manner. Those who received more than wanted were the least depressed, and those receiving less than wanted were the most depressed. SS congruency group was not predictive of all-cause event-free survival.

Conclusion: SS is a powerful predictor of depression, so much so, that even when receiving more SS than desired (commonly thought to produce cardiac invalidism) patients have the lowest levels of depression. Although SS group did not predict event-free survival, this may be an artifact of the short follow-up period in this study.

93) Abstract 1338

ASSESSING THE RELATIONSHIPS AMONG INTRUSIVE THOUGHTS, CARDIAC ACTIVITY, AND POSTTRAUMATIC STRESS DISORDER IN ACUTE CORONARY SYNDROME PATIENTS

Redeana C. Umland, B.A., Othanya Garcia, B.A., Gabriel Sanchez, B.A., Donald E. Edmondson, Ph.D., MPH, Jeffrey L. Birk, Ph.D., Center for Behavioral Cardiovascular Health, Columbia University Medical Center, New York, NY

Background. The Enduring Somatic Threat (EST) model posits that PTSD due to acute coronary syndrome (ACS; myocardial infarction or unstable angina) is maintained by threatening appraisals of physiological reminders of cardiac risk. In ACS patients, intrusive thoughts about the ACS and future risk may acutely increase heart rate (HR), a threat cue which may increase intrusions in a vicious cycle. To test the EST model, we used ecological momentary assessment (EMA) of intrusions in ACS patients with and without PTSD. EMA of intrusions is rare, due to concerns that EMA may influence intrusions. We report an initial test of the validity of EMA of intrusions. We compared EMA data on cardiac threat-related intrusions in participants with and without ACS-induced PTSD over the course of 2 weeks, between 1.5 and 6 months after hospital discharge.

Method. Of the 200 ACS patients we plan to enroll [100 with high PTSD symptoms (PCL-5 >= 20), and 100 with low PTSD symptoms (PCL-5 <= 5)], 62 have been enrolled to date (n=17 high PTSD, 45 no PTSD). At 1 month after discharge, participants in the large parent cohort study complete a PTSD screen (PCL-5: PTSD Checklist, keved to the index ACS event) by telephone, and are deemed eligible for the Zio Patch study if they score above or below the 2 PCL-5 eligibility cutoffs. Once consented, participants are scheduled for a clinic or home visit to be fitted with a ZIO Patch ambulatory ECG patch and an Actiwatch wrist-worn actigraphy device. The Actiwatch is programmed to prompt participants 5x daily for up to 2 weeks to report an intrusive thought about their cardiac event and/or cardiac risk since the last prompt (yes/no) and its intensity (range: 0-6), using a button on the watch. We compared the 2 groups on the proportion of intrusive thoughts reported during the study.

Results. As predicted, high-PTSD participants reported intrusive thoughts twice as often as no-PTSD participants, M = 32.9% (35.4%) vs 16.4% (19.6%), t(19.8) = 1.83, p = .08.

Conclusion. PTSD symptoms are common after ACS, and intrusive thoughts may be important targets for reducing both PTSD and risk for recurrent ACS. EMA appears to be a valid tool for assessing intrusions in these patients, in that participants with PTSD reported intrusive thoughts twice as frequently as those without PTSD in this preliminary test.

94) Abstract 1256

A NOVEL APPROACH TO ACCOUNTING FOR WEAR TIME IN ACCELEROMETRY

Ipek Ensari, PhD, Cardiology, Columbia University Medical Center, New York, NY, Joseph E. Schwartz, PhD, Medicine/Psychiatry, Columbia University Medical Center/Stony Brook University, Stony Brook, NY, Keith M. Diaz, PhD, Cardiology, Columbia University Medical Center, New York, NY Background:Quantifying physical (in)activity patterns via accelerometer-based systems is becoming increasingly popular; however, there is no consensus on the optimal approach to accounting for wear time (i.e., the number of minutes a device is worn), which can have substantive influence on daily physical activity summary estimates. One existing approach, which has limitations, is the standardization to a given wear time (e.g. 16 hours) by using the residuals obtained from a linear regression of measured activity on wear time. We present a method for estimating total minutes(mins) of moderate-to-vigorous activity (MVPA) that 1) does not assume MVPA mins are proportional to or linearly related to wear time, but 2) assumes the observed count of MVPA mins has a Poisson distribution with offset equal to estimated duration of wear time. Methods:Data included 19,171 person-days accrued from a sample of 79 participants who completed 12 months of daily activity monitoring by wrist-based accelerometry (Fitbit Flex) as a part of an observational study. We fit a multilevel Poisson model predicting observed MVPA mins from wear time adjusting for individual differences in mean MVPA by treating the intercept as a random effect. Resulting estimates of mean ln(MVPA/wear time) were then plotted against wear time and best-fitting curves with 2- and 3-parameters were identified. Results: A 3-parameter curve had the best fit (see

Figure). In contrast, the conventional standardization approach that estimates wear time over 16 hours using a linear regression equation yields a R^2 of ~0.00, suggesting that accounting for overdispersion improves model fit. The figure shows estimates of MVPA plotted against wear time using the 3-parameter best-fit curve and summarize the relationship across all participants. Discussion: Lack of consensus on accounting for wear time limits the accuracy of the physical activity estimation during accelerometry data processing. We tested a model that accounts for overdispersion in the data, using a large dataset representing a broad spectrum of intensities (i.e., low to vigorous intensity) and durations of daily activity. This approach has advantages over the traditional approaches, and can advance the existing practices for accounting for wear time. These findings can inform future studies that rely on accelerometers to assess daily physical (in)activity.

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95) Abstract 1543 DAILY MORNING APPRAISALS AND THE CORTISOL

AWAKENING RESPONSE IN MOTHERS OF CHILDREN WITH AUTISM

Melissa Hagan, PhD, Psychology, San Francisco State University, San Francisco, CA, Elissa Epel, PhD, Michael Coccia, BA, Aric Prather, PhD, Psychiatry, University of California, San Francisco, San Francisco, CA, Lucy Moctezuma, BA, Psychology, San Francisco State University, San Francisco, CA, Eli Puterman, PhD, Kinesiology, University of British Columbia, Vancouver, BC, Canada

There is evidence that caregivers of children with a neurodevelopmental disorder or delay experience increased psychological stress, greater burden in day to day activities, and altered physiological responses (Ruiz-Robledillo & Moya-Albiol, 2013; Seltzer et al., 2010). Less attention has been paid to characteristics of resilience in this population - particularly in regard to associations between positive appraisal and neurobiological functioning. Two groups of premenopausal mothers of children ages 2-16 were recruited: those with children diagnosed with a neurodevelopmental disorder (n=81) and those with neuro-typical children (n=85). All mothers provided daily morning reports of positive (e.g., joy, sense of control, looking forward to the day) and negative appraisals (worry about the day, perceived unpredictability of the upcoming day, and stress) and completed the Inventory of Depressive Symptoms. On two consecutive days, mothers also provided three saliva samples at waking, 30 minutes post-waking, and 45 minutes post-waking and all three values were included in analyses to estimate the cortisol awakening response (CAR). Mixed models with restricted likelihood estimation were used to estimate group differences in appraisals, waking cortisol, CAR, and associations between appraisals and cortisol. There were no group differences in regard to daily levels of positive or negative morning appraisal, statistically adjusting for depressive symptomatology, nor were there group differences in waking cortisol or CAR, adjusting for depression, age, and body mass index. Among all mothers regardless of caregiver status, positive appraisals were associated with higher cortisol at wake (p = .001) and negative appraisals were associated with lower cortisol at wake (p < .001). Split group analyses revealed a closer connection between daily reports of positive and negative appraisal and CAR in caregivers, however. Among caregivers, greater positive appraisals in the morning were associated with a lower CAR (p = .01) and greater negative morning appraisals were associated with a higher CAR (p = .003). Findings will be discussed in the context of interpreting indicators of neurobiological risk and resilience in low and high stress populations.

96) Abstract 1481

CORTISOL HABITUATION MEDIATES THE RELATIONSHIP BETWEEN POSITIVE TRAIT COPING AND PLASMA INTERLEUKIN-6 HABITUATION

Johanna Janson, MS, Sarah Sturmbauer, MS, Chair of Health Psychology, Institute of Psychology, Friedrich-Alexander--Universität Erlangen-Nürnberg, Erlangen, Germany, Lydia G. Roos, BS, Health Psychology PhD Program, University of North Carolina at Charlotte, Charlotte, NC, Nicolas Rohleder, PhD, Chair of Health Psychology, Institute of Psychology, Friedrich--Alexander-Universität Erlangen-Nürnberg, Erlangen, Germany Background: Repeated exposure to psychosocial stress represents an unavoidable burden in daily life and requires effective coping strategies. While associations between trait coping and responses of biological stress systems (i.e. the hypothalamic-pituitaryadrenal axis; HPA) have been well described earlier, it still remains unclear, whether coping further determines stronger habituation of HPA axis activity which has been proposed as adaptive response to repeated stress. To further understand the role of coping as determinants of better health outcomes, we set out to assess whether trait coping predicts stronger habituation of HPA axis and pro-inflammatory responses to repeated stress. Methods: Twenty-eight healthy adults (53.6% female, $M_{age} =$ 24.25 years) underwent the Trier Social Stress Test (TSST) on two consecutive days and provided saliva samples 1 min before as well as 1, 20, 30, 45, and 60 minutes after stress. Plasma interleukin-6 (IL-6) was assessed repeatedly 1 min before as well as 30 and 120 minutes after stress. Trait coping was evaluated German-language using coping the questionnaire "Stressverarbeitungsfragebogen" (SVF 120) prior to the TSST. Results: Results revealed a non-significant day by time interaction for cortisol (F = 1.71, p = .19) and IL-6 (F = 0.00, p =.98). Independent of age and negative trait coping, positive trait coping emerged as a significant predictor of cortisol habituation $(\beta = .0349, SE = .0160, LLCI = .0019, ULCI = .0680)$, but not of IL-6 habituation (β = -.0161, SE = .0308, LLCI = -.0796, ULCI = .0475). However, an indirect effect between positive trait coping and IL-6 habituation was found (β = .0247, SE = .0136, LLCI = .0065, ULCI = .0643) suggesting cortisol habituation as mediator. Discussion: The present results revealed positive trait coping to predict stronger cortisol habituation which, in turn, serves as mediator between conscious coping processes and inflammatory responses that do not underlie direct executive control. Using coping strategies such as active or distractive coping efforts might be stress-buffering, at least in situations without sufficient control. Future investigations should take into account, whether the same stress-buffering relationship with positive coping extends to anti-inflammatory biomarkers such as interleukin-10.

97) Abstract 1088

CHRONIC LONELINESS AMPLIFIES AGE-RELATED DIFFERENCES IN DIURNAL CORTISOL TRAJECTORIES

Lisa M. Jaremka, PhD, Naoyuki Sunami, MA, Megan A. Nadzan, BA, Psychological and Brain Sciences, University of Delaware, Newark, DE

Objective: Loneliness is strongly linked to poor physical and mental health, particularly chronic conditions of the aging. Understanding the mechanisms linking loneliness to age-related health problems is thus a critical endeavor. One novel possibility is that loneliness may exacerbate the impact of age on hypothalamic-pituitary-adrenal (HPA) axis function.

Methods: Participants were 579 men and women from the National Study of Daily Experiences (NSDE) component of Midlife in the United States (MIDUS), a large study of U.S. adults. Chronic loneliness was assessed during MIDUS 2 and daily loneliness was measured each day of the 8-day NSDE. Salivary cortisol was collected 4 times per day for 4 days during the NSDE.

Results: Independent of a variety of confounds, older people had a flatter diurnal cortisol trajectory than younger people, and this age-related difference was amplified among people experiencing more chronic loneliness relative to those more socially connected. On the other hand, daily loneliness did not moderate the link between age and diurnal cortisol patterns. The chronic and daily loneliness effects were robust to three sets of sensitivity analyses. Specifically, the results were consistent in a model unadjusted except wake time and another model that excluded imputed wake times. In addition, the effect of chronic loneliness remained the same when controlling for daily loneliness and vice versa.

Conclusions: Loneliness is a risk factor for a variety of agerelated diseases. The current study demonstrated that chronic loneliness may have age-related physiological costs and provides a glimpse into the pathways through which loneliness can impact health and well-being.

98) Abstract 1418

DIURNAL CORTISOL PROFILES AND INDICES OF PHYSICAL HEALTH: A STORY OF AGE AND DYSREGULATION

Jennifer R. Piazza, Ph.D., Health Science, California State University, Fullerton, Fullerton, CA, Natalia O. Dmitrieva, Ph.D., Psychological Science, Northern Arizona University, Flagstaff, AZ, Gabriel A. Orona, MPH, Education, University of California, Irvine, Irvine, CA

Objective: The current study examined age differences in the association between diurnal cortisol profiles and physical health indices. Methods: Participants (N = 799; age 34-84 during initial data collection) completed Waves 2 (between 2004-2006) and 3 (between 2013-2015) of the Midlife Development in the United States (MIDUS) Survey. At Wave 2, participants also provided saliva samples across four consecutive days, from which cortisol was assayed. Growth mixture modeling with latent time basis was used to categorize diurnal cortisol profiles as normative, flattened, or elevated. These profiles, in turn, were used to predict both concurrent (inflammation) and longitudinal (functional limitations) physical health indices. Results: Compared to individuals who had normative profiles across all interview days, older adults who had dysregulated profiles across all interview days (i.e., all days elevated, flattened, or a combination of elevated and flattened) showed greater concurrent inflammation and more functional limitations at follow-up. Variable profiles (i.e., a mix of normal and flattened and/or elevated) did not confer increased risk for these outcomes. Conclusions: Among older adults, consistently dysregulated cortisol profiles may be indicative of underlying health issues and/or HPA dysfunction, whereas variable profiles may reflect an HPA axis that is responsive to the challenges of life. Findings, which support the theory of Strength and Vulnerability Integration (SAVI), illustrate the importance of taking age into account when examining physiological biomarkers and health indices.

99) Abstract 1104 THE ROLE OF EMOTION REGULATION STRATEGIES IN HPA AXIS HABITUATION TO ACUTE STRESS

Lydia G. Roos, B.S., Health Psychology, University of North Carolina at Charlotte, Charlotte, NC, Johanna Janson, MS, Sarah Sturmbauer, MS, Health Psychology, Institute of Psychology, Friedrich-Alexander-Universität Erlangen-Nürnberg, Erlangen, Germany, Jeanette M. Bennett, PhD, Health Psychology, Psychological Sciences, University of North Carolina at Charlotte, Charlotte, NC, Nicolas Rohleder, PhD, Health Psychology, Institute of Psychology, Friedrich-Alexander-Universität Erlangen-Nürnberg, Erlangen, Germany

Repeated exposure to similar psychosocial stressors is a common occurrence. Undergoing stress can be advantageous when it leads to adaptation and growth. Conversely, failure of the stress systems to habituate (i.e., nonhabituation) involves continuing to become highly activated in response to a repeat exposure of the same stimulus. Nonhabituation of the hypothalamic-pituitaryadrenal (HPA) axis leads to wear and tear and is linked with poor health outcomes; thus, it appears to be a maladaptive pattern. Although 50-75% of individuals adaptively habituate to repeated stress, variability in habituation suggests psychological processes used in response to stress may play a role, such as emotion regulation (ER). Trait-use of two ER strategies, cognitive reappraisal and expressive suppression, can heighten HPA axis reactivity to novel social-evaluative stressors. However, it is unclear how these strategies influence reactivity to stress over time. As part of a larger study investigating physiological habituation to stress, we examined the influence of trait reappraisal and suppression on HPA axis habituation to a standardized experimental stress paradigm, the Trier Social Stress Test (TSST). Healthy young adults (N=37, female=49%) aged 18 to 35 years (average age 24.19 yrs \pm 4.43) and within normalweight BMI range completed the TSST on two consecutive days. HPA axis habituation indices were calculated by subtracting second TSST salivary cortisol responses from first TSST. Possible confounding factors (i.e., BMI, sex, age, chronic stress) were examined via zero-order correlations; only sex was associated with cortisol habituation (p < .01). Multiple regression analyses revealed that trait suppression was not significantly associated with habituation to repeated stress (n.s.), however trait reappraisal significantly predicted greater habituation $(\Delta R^2 = .13, p = .03)$. An interaction between reappraisal and sex revealed that these results appear to be driven by males $(\Delta R^2 = .10, p = .03)$. This investigation provides preliminary data suggesting that reappraisal may promote HPA axis habituation to stress, particularly for males, and contributes to the understanding of how ER strategies may lead to stress-related health outcomes. This research was partially supported by the 2017 APS Health and Behavior International Collaboration Award (LGR).

100) Abstract 1395

NOCTURNAL CORTISOL RISE AND NIGHTTIME BLOOD PRESSURE: ETHNICITY DIFFERENCES AND CHRONIC STRESS

Shaoyong Su, PhD, Population Health Sciences, Augusta University Medical College of Georgia, Augusta, GA, Frank Treiber, PhD, Center of Economic Excellence, Medical University of South Carolina, College of Nursing, Charleston, SC, Harold Snieder, PhD, Epidemiology, University Medical Center Groningen, Groningen, Netherlands, Michael Stefanek, PhD, Psychology, Augusta University College of Science and Mathematics, Augusta, GA, Gregory Harshfield, PhD, Xiaoling

Wang, MD PhD, Population Health Sciences, Augusta University Medical College of Georgia, Augusta, GA

Background: Ethnicity difference in hypertension has been well documented with African Americans (AAs) starting to have a higher nighttime blood pressure (BP) than European Americans (EAs) from age 10. However, it remains unclear whether chronic stress related HPA axis activation can explain the ethnic differences in BP. This study aims (1) to assess the ethnic difference in the HPA axis activation and whether the difference can be explained by psychosocial factors, and (2) to determine the role of HPA axis in mediating the ethnic difference in BP.

Methods: A total of 188 AA and 280 EA youth and young adult twins (mean age: 21.8) enrolled in Georgia Cardiovascular Twin cohort provided four salivary cortisol samples in the evening at bedtime and 0, 30 and 60 minute after awakening. They completed the Adolescent Resources Challenge Scale (ARCS), a measure of chronic stress, and the Hollingshead Four Factor assessment, an index of parents' socioeconomic status. Ambulatory BP in 24 hours was measured in 275 subjects. Nocturnal cortisol rise (NCR = the average of cortisol level at morning – cortisol level at bedtime) was calculated as an index of HPA axis activity. Nighttime SBP was used as a measurement of BP regulation. Generalized estimating equations were used to account for twin correlation for the association test.

Results: AAs reported higher ARCS (9.8 vs. 8.7) and lower Hollingshead scores (39.5 vs. 49.4) than EAs. NCR was negatively associated with ARCS scores, while positively associated with Hollingshead scores, indicating chronic stress may blunt HPA axis activation from nighttime to morning time. Ethnicity was independently associated with NCR, whereby AAs had lower NCR compared with EAs (5.5 nmol/L vs. 7.0 nmol/L, p=0.01). In addition, AAs showed higher levels in nighttime SBP than EAs (b=0.024, p=0.02). The ethnic difference was significantly attenuated after adding NCR into the model (b=0.018, p=0.07), while NCR was negatively associated with nighttime SBP (b=-0.004, p<0.001). Mediation test showed that 25% of ethnic difference in nighttime SBP could be explained by NCR (p=0.03).

Conclusion: Our findings suggest that AAs display a blunted HPA axis activation from nighttime to morning time, which can partially explain the ethnic difference in nighttime SBP. The measured chronic stress cannot explain the ethnic difference in HPA axis activation.

101) Abstract 1046

IT'S FOR THEIR HEALTH: ENCOURAGING VS. DISCOURAGING AUTONOMY DURING ADOLESCENCE

Moriah B. Geller, Undergraduate Student, Psychology, Chapman University, Orange, CA, Julia K. Boehm, Ph.D., Psychology, Chapman Unviersity, Orange, CA

Chronic diseases are widespread, but most are preventable with healthy behaviors. Creating effective interventions to improve health behaviors—especially those of adolescents—is no easy task. Adolescence is a critical period for the development of health behaviors due to adolescents' cognitive capability to understand health information and the malleability of their developing brains. Thus, the objective of this research is to create an effective health intervention that harnesses the common adolescent desire for autonomy. 75 young adult participants in the experimental condition will engage in a writing task that emphasizes an internal health locus of control (i.e., they will describe ways in which they—rather than others—are in control of their health). It is expected that, compared to 75 young adults in a neutral control condition, those in the experimental condition will not only have higher internal health locus of control scores post-intervention, but that they will also make healthier food choices post-intervention when presented with a variety of options. Establishing healthy behaviors during adolescence is crucial because it may lead to the formation of healthy habits that last for life.

102) Abstract 1006

INTERPERSONAL GOALS INFLUENCE HOW TRAUMA AFFECTS HEALTH AMONG EMERGING ADULTS

Jeanette M. Bennett, PhD, Psychological Science, Lydia G. Roos, BS, Health Psychology PhD Program, Christopher Penley, H.S. Diploma, Amy B. Canevello, PhD, Psychological Science, UNC Charlotte, Charlotte, NC

Chronic diseases lead to poorer quality of life and premature death, developing at an accelerated rate among highly stressed individuals. Consequently, examining factors that buffer stressful experiences, like traumatic events, on physical and mental health may delay chronic disease onset. Indeed, social support and other positive relationship factors appear to attenuate stress' negative influence on health; however, the effects may not be universal. We examined how interpersonal goals modify the link between interpersonal traumatic experiences and self-reported mental and physical health among emerging adults (19.4 + 1.6 yrs old). Participants (N=641) completed psychosocial and health questionnaires via an online Qualtrics survey in their preferred environment. We replicated previous reports that compassionate goals to support others and not harm them protected mental health (p<.001), while self-image goals to construct, maintain, and defend desired images of the self, diminished mental health (p < .001). As an extension, these same associations were observed with self-reported physical health (p<.001 and p=.003, respectively), along with a 3-way interaction among trauma exposure, compassionate goals, and self-image goals predicting physical health (p=.02). Specifically, the expected relationship, greater trauma exposure linked to decreased physical health, occurred for two types of individuals: those who reported higher compassionate goals and higher self-image goals and those who had lower compassionate goals and higher self-image goals. Individuals who reported higher compassionate goals and lower self-image goals had greater physical health regardless of trauma exposure, while those who reported lower compassionate goals and lower self-image goals had poorer physical health independent of trauma exposure. These data suggest that compassionate goals are health-protective, and being generally lower in interpersonal goals can be detrimental to health overall. Taken together, an individual's intentions toward others may influence mental and physical health. These goals appear to buffer or exacerbate how interpersonal traumatic experiences are related to health. The next steps include the reproduction of our findings with objective health markers, such as heart rate variability or systemic inflammation, and beginning to tease apart potential mechanisms.

103) Abstract 1350

EARLY CHILDHOOD ADVERSITY, ATTACHMENT, AND HEALTH OUTCOMES: FINDINGS FROM THE FRAGILE FAMILIES DATASET

Ruichen Sun, N/A, Psychology, Connecticut College, New London, CT, Elaine O. Cheung, PhD, Medical Social Sciences, Northwestern University, Chicago, IL

Background

Childhood adversity has been repeatedly linked with worse health outcomes. Psychosocial factors have been proposed to both exacerbate and protect against the downstream physiological effects of early adversity. The present study examined the potential protective role of attachment security, by conducting secondary analyses of a public use dataset from the Fragile Families and Child Wellbeing (FF) Study. We hypothesized that early adversity would predict worse health outcomes, and that this relationship would be moderated by attachment security. Method

The FF study was a longitudinal study that included about 5000 families with nonmarital birth. Early childhood adversity (ECA) was operationalized based on the adverse childhood experiences (ACE) traditionally assessed, including abuse, neglect, and household dysfunction. Numbers of ACE--as reported by mothers when children were one year old--were added up as the ECA score. Attachment was assessed through a Q-sort paradigm when the child was three years old. The health outcomes data were from the primary caregiver report when the child was nine years old. Three indicators were included: number of diagnosed medical conditions, number of health problems in the past year, and emergency room (ER) visits in the past year. Results

We conducted logistic regressions predicting the three health outcomes from early adversity score (ECA), attachment security (AS), and their interaction. ECA had a significant main effect predicting all three health outcomes. The main effect of AS was significant for medical conditions, marginally significant for health problems (p = .072), and non-significant for ER visits. The interaction between ECA and AS emerged as significant for ER visits (p = .038) but was not significant for the other outcomes. Specifically, children categorized as insecure were more likely to have had ER visits when their ECA was high; however, ER visits were not associated with ECA for securely attached children. Moreover, ECA predicted lesser probability of secure attachment. Conclusion

Early childhood adversity predicted worse health outcomes later in childhood. Although children who experienced ECA were more likely to be insecurely attached, a secure attachment, when present, moderated the effect of ECA on ER visits, suggesting that it may buffer against the negative impact of early adversity on health.

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104) Abstract 1246

LIFELONG EFFECTS OF CHILDHOOD ABUSE: CHALLENGING THE NOTION OF RESILIENCE

Korrina Duffy, Ph.D., Paige Green, Ph.D, M.P.H., F.A.B.M.R., Basic Biobehavioral and Psychological Sciences Branch, National Cancer Institute, Rockville, MD

Background: Childhood abuse increases the risk of poor mental and physical health outcomes in adulthood. Although researchers have long noted that a significant portion of adults exposed to childhood abuse appear to be resilient (e.g., McGloin & Widom, 2001), no research has examined whether those categorized as resilient truly are. Methods: Participants who were in all three waves of the Midlife in the United States (MIDUS) study were included. Childhood emotional and physical abuse was measured using the Conflict Tactics Scale. Resilience was operationalized based on McGloin & Widom (2001) to measure the following

domains across waves all three waves: psychiatric disorders, substance use, education, employment, homelessness, crime, and social isolation. Resilience was defined as successfully meeting criteria on all domains across all three waves. Because participants were included in the sample regardless of whether or not they were exposed to childhood abuse, resilience is referred to as whether someone "meets criteria for healthy development." All analyses were run controlling for age, sex, race, and education. Results: Of the total sample, 32.8% met criteria for healthy development while 67.2% did not. Childhood abuse increased the likelihood of not meeting criteria for healthy development, OR = 1.53, 95% CI (1.29, 1.82). In the group that met criteria for healthy development, abuse predicted many negative outcomes. In an eight-day daily diary study, abuse predicted greater negative affect in response to stressors, greater daily negative affect, and lesser daily positive affect. At wave 3, abuse predicted higher self-reported stress reactivity, lower selfesteem, and less supportive friendships and romantic relationships. Conclusions: These findings challenge the notion that those categorized as resilient truly are. Given the benefits of mindfulness in decreasing negative affect (Sedlmeier et al., 2012), increasing positive affect (Brown & Ryan, 2003), improving emotion regulation (Coffey & Hartman, 2008), decreasing relationship distress (Barnes et al., 2007), and improving relationship satisfaction (Barnes et al., 2007; Carson et al., 2004), we recommend mindfulness as an intervention for all who have been exposed to childhood abuse as a way to remediate its longterm negative psychological and social effects.

105) Abstract 1351

FROM ADVERSE CHILDHOOD EXPERIENCES TO PHYSICAL SYMPTOMS: ATTACHMENT, STRESS, AND RESILIENCE

Ruichen Sun, N/A, Jefferson Singer, PhD, Psychology, Connecticut College, New London, CT Background

Adverse childhood experiences (ACEs) have been repeatedly linked to worse adult health outcomes. The present study sought to investigate one potential pathway from ACEs to physical problems, and what differentiated individuals who experienced ACEs but had fewer than expected physical symptoms (resilience factors). We hypothesized that attachment insecurity and chronic stress mediated between ACEs and physical symptoms, such that ACE affects lifelong health through exacerbating attachment insecurity, which predisposes individuals to chronic stress. Elevated stress then increases the risk for multiple physical problems. We further hypothesized that, cases falling below the regression line of ACEs on physical symptoms (the "resilience" cases--those who reported fewer symptoms than predicted by the regression equation), vs. those above the line, would report more social support, less attachment insecurity, and less chronic stress. Method

205 participants were recruited on Amazon Mechanical Turk (51.2% female, 79% white, mean age=36.8). They completed a battery of questionnaires on ACEs, attachment anxiety and avoidance (ECR-R), perceived chronic stress (PSQ), physical symptoms (PHQ-15), health anxiety (HAI), and perceived social support during childhood (SPS). Results

Path analysis revealed that ACE had a direct (β = .12) and indirect effect (through social support, $\beta s = -.44$ and -.52) on attachment insecurity; attachment insecurity had an indirect effect on physical symptoms through perceived chronic stress ($\beta s = .53$ and .43) and through health anxiety ($\beta s = .40$ and .35); health anxiety had a direct effect on chronic stress ($\beta = .36$) and indirect effect

on physical symptoms through chronic stress. The model demonstrated good fit (CFI = .96, RMSEA = .11). R-square for physical symptoms was .49. T-tests compared individuals who fell below and above the regression line for ACEs and physical symptoms. Although not differing in numbers of ACEs reported, the former (the "resilience" group) reported significantly more childhood social support, less attachment anxiety and avoidance, and less chronic stress.

Conclusion

The findings provide preliminary support that attachment insecurity and chronic stress form a pathway from ACEs to physical symptoms, and that social support, secure attachment, and lower chronic stress are potential sources of resilience.

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106) Abstract 1493

INCREASES IN PAIN RESILIENCE ARE RELATED TO IMPROVED QUALITY OF LIFE AND REDUCED PAIN

Brett Ankawi, MS, P. Maxwell Slepian, MS, Christopher R. France, PhD, Psychology, Ohio University, Athens, OH

Psychosocial factors that offer protection against negative painrelated outcomes have received increasing attention over the past 15 years. We recently developed the Pain Resilience Scale (PRS) to measure pain resilience, defined as the ability to protect oneself from physical harm and emotional distress when faced with prolonged pain. To date, however, studies using this measure have been exclusively cross-sectional. Seeking to address this limitation, the present study investigated changes in pain resilience and pain outcomes over a three-month period.

Participants (N = 343) who reported an episode of back pain over the past two weeks were recruited using Amazon's Mechanical Turk. They completed a number of questionnaires, including the PRS, Pain Catastrophizing Scale (PCS), World Health Organization Quality of Life (WHOQOL), and McGill Pain Questionnaire Short Form 2 (MPQ-SF2). They completed these measures at recruitment and three months post-recruitment. To investigate increases in the PRS and PCS, change scores were created by subtracting baseline scores from follow-up scores.

Three hierarchical regressions were used to determine the relationship between changes in pain resilience and psychological quality of life, physical quality of life, and pain. Baseline scores on the MPQ-SF2 were entered into the first block, changes scores for the PCS were entered into the second, and change scores for the PRS were entered into the third block. Positive PRS change scores were related to higher psychological quality of life ($\Delta F = 8.228$, $\beta = 0.149$, p < 0.01), higher physical quality of life ($\Delta F = 8.450$, $\beta = 0.142$, p < 0.01), and lower reported pain ($\Delta F = 5.836$, $\beta = -0.103$, p = 0.02,) at follow-up, whereas positive PCS change scores were related to lower psychological quality of life ($\Delta F = 18.131$, $\beta = -0.199$, p < 0.01), lower physical quality of life ($\Delta F = 32.255$, $\beta = -0.257$, p < 0.01), and higher reported pain ($\Delta F = 34.673$, $\beta = 0.237$, p < 0.01) at follow-up. These results persist when controlling for depressive symptoms and gender.

These findings provide preliminary validation of the PRS in a longitudinal context. Further, they confirm previous findings that the PRS and PCS are uniquely associated with both positive and negative pain outcomes.

107) Abstract 1270

USING FATIGUE AND PAIN INTERFERENCE TO PREDICT PAIN STATUS 3-7 YEARS LATER:

LONGITUDINAL INSIGHTS IN CHRONIC OROFACIAL PAIN POPULATIONS

Ian A. Boggero, M.S., Psychology, Marcia V. Rojas Ramirez, D.D.S., M.P.H., M.S., Public Health, Charles R. Carlson, Ph.D., Psychology, University of Kentucky, Lexington, KY

Chronic orofacial pain is a broad term referring to pain disorders felt in the mouth, jaw, face, and head that last longer than three months, and affect approximately 10% of the population in the United States. Cross-sectionally, fatigue and pain interference, defined as pain-related disruptions with social, recreational, and occupational activities, are associated with worse pain outcomes in orofacial pain population. However, little is known about how these factors longitudinally predict pain. To test this, data were collected from 288 patients seeking treatment for orofacial pain at a tertiary university pain clinic. At their initial appointment, patients provided data on pain intensity, pain interference, and fatigue. Approximately 3-7 years following their initial appointment (mean = 5.01 years, SD = 1.6 years, range = 2.4 -7.9 years), patients provided online follow-up data about their pain. Of the 288 patients, 78 no longer reported any pain at follow up (27.1%). Binomial logistic regressions tested whether fatigue and pain interface at the initial visit predicted whether patients reported pain or not at follow-up. All models controlled for pain intensity at the initial visit. Results revealed marginally significant effects for fatigue such that for each unit increase in fatigue at the initial timepoint, the likelihood of being in pain at follow-up increased by 1.6% (Wald $\chi^2(1) = 3.74$, p = .053). For each unit increase in pain interference at the initial timepoint, the likelihood of being in pain at follow-up increased by a significant 3.7% (Wald $\chi^2(1) = 9.06$, p = .003). These results suggest that pain interference and fatigue are important predictors of pain over time in orofacial pain populations. Early interventions targeting pain interference may be particularly helpful for improving pain outcomes over time and for promoting pain resilience.

108) Abstract 1091

BIOPSYCHOSOCIAL CORRELATES OF PAIN INTENSITY AND DAILY FUNCTIONING IN INDIVIDUALS WITH CHRONIC PAIN

Katrina Hamilton, BA, Peggy M. Zoccola, PhD, Psychology, Ohio University, Athens, OH, Laura Jensen, MPH, Family Medicine, David Drozek, DO, Specialty Medicine, Ohio University Heritage College of Osteopathic Medicine, Athens, OH

Background: Chronic pain is a costly and hard to manage issue for patients, health professionals, and society. With the current opioid epidemic in the United States, it is crucial to understand chronic pain and what factors should be targeted to create comprehensive biopsychosocial treatments.

Methods: Sixty-seven individuals with chronic pain ($Mage = 57 \pm 9.09$, 74.6% female, 95.5% White) provided blood samples and answered questionnaires for this study. On average, participants reported suffering from chronic pain for 12.50 years. Measures of depression, rumination, perceived stress, and inflammation (plasma CRP), pain intensity, and daily functioning were included in analyses.

Results: Hierarchical linear regressions were used to examine potential correlates of pain intensity and functioning, with step one of each model entering significant covariates (BMI, income, and education) and the following steps using a forward procedure to select most significant correlates among depression, rumination, stress, and inflammation. In model 1, greater income was related to reduced pain intensity $\beta = -.289$, p < .05. Step two

revealed that depression was related to greater pain intensity, $\beta = .364$, p < .01 in the presence of rumination, stress, and inflammation. In model 2, increased BMI and lower income were related to inability to function ($\beta = .288$ and $\beta = -.289$, ps < .05). Step two of this model indicated that increased depression and BMI were correlated with lessened ability to function ($\beta = .547$ and $\beta = .314$, p < .05) in the presence of rumination, stress, and inflammation. Additionally, step three revealed increased BMI ($\beta = .321$), depression ($\beta = .412$), and tendency to ruminate ($\beta = .265$) were correlated with interference with daily functioning in the presence of stress and inflammation.

Conclusion: Results lend additional support for an interdisciplinary approach to adequately treat chronic pain. It is possible that a focus on how intensely one feels their pain and how much it affects their ability to function could be improved by providing concurrent treatment for depression, rumination, and obesity. To lessen the suffering associated with chronic pain, steps must be taken to implement biopsychosocial based care for these co-occurring symptoms.

109) Abstract 1181

OPTIMISM AND PAIN INTERFERENCE IN AGING WOMEN

Stephanie T. Judge, BS, Psychology, Jody L. Clasey, PhD, Kinesiology and Health Promotion, University of Kentucky, Lexington, KY, Leslie J. Crofford, MD, Medicine & Pathology, Microbiology, and Immunology, Vanderbilt University, Nashville, TN, Suzanne C. Segerstrom, PhD, MPH, Psychology, University of Kentucky, Lexington, KY

Every three months for two years, community-dwelling middleand older-age women (N = 199) completed online daily diaries at home for a seven-day period (i.e., a total of nine waves), in which they reported their daily pain, pain interference, and activity. Optimism was measured at the start and end of the study. Multilevel models tested the between- and within-person relationships among pain, optimism, and pain interference or activity. Pain best predicted pain interference (person: $\gamma_{001} = .227$, SE = .022, p < .0001; wave: $\gamma_{010} = .267$, SE = .014, p < .0001; day: $\gamma_{100} = .246$, SE = .010, p < .0001), and optimism best predicted activity ($\gamma_{002} = .684$, SE = .101, p < .0001). There were subtle interactions between optimism and pain predicting interference ($\gamma_{011} = -.064$, SE = .029, p < .025) and activity ($\gamma_{011} =$ -.064, SE = .029, p < .025). Linear regression predicted change in optimism over two years from accumulated pain interference and activity across the study. Higher baseline optimism ($sr^2 =$ 0.560, p < .0001), less pain interference ($sr^2 = 0.064$, p < .0001), and more activity ($sr^2 = 0.015$, p = .013) were associated with higher end-of-study optimism. Although pain was the strongest predictor of pain interference, optimism may play a protective role in disruptions caused by pain on a day-to-day basis, leading to decreased daily pain interference. More optimistic women were significantly more active than less optimistic women, and more optimistic women had a slight but significant decrease in activity during waves when they experienced higher pain. Over time, less interference and more activity fed forward into increased optimism, resulting in a virtuous cycle that enhances optimism and well-being among older women.

110) Abstract 1021

PERIPHERAL INFLAMMATION AND RECENT PHYSICAL PAIN: MODERATION BY AGGREGATED MOMENTARY NEGATIVE AFFECT

Ambika Mathur, MS, Biobehavioral Health, Martin J. Sliwinski, PhD, Human Development and Family Studies, Dusti R. Jones, MS, Biobehavioral Health, Christopher G. Engeland, PhD, Biobehavioral Health and College of Nursing, Joshua M. Smyth, PhD, Biobehavioral Health, The Pennsylvania State University, University Park, PA, Richard B. Lipton, MD, Neurology; Psychiatry & Behavioral Sciences; Epidemiology & Public Health, Mindy J. Katz, MPH, Neurology, Albert Einstein College of Medicine, Bronx, NY, Jennifer E. Graham-Engeland, PhD, Biobehavioral Health, The Pennsylvania State University, University Park, PA

Background: Pain symptomatology (pain intensity and interference from pain) has been linked with peripheral inflammatory biomarkers, albeit inconsistently among individuals without chronic illness. Further, negative affect (NA) is associated with worse pain, and NA has been linked with inflammation, although results vary between studies. Conceptualizing both pain and NA as stressors that can be interactive, we hypothesized that the highest levels of inflammatory markers would be observed among those with higher NA and either higher pain intensity or higher pain interference. Method: Self-reported pain intensity and interference were assessed at baseline of an ongoing longitudinal study among a midlife community sample of socioeconomically and racially diverse adults (N=230; 60% African-American, 27% Hispanic; 62% female) neither selected for nor excluded on the basis of pain disorders but with considerable variability in pain. Circulating inflammatory markers - C-reactive Protein (CRP) and cytokines IL-1β, TNF-α, IL-6, IL-10, IL-4, IL-8, and IFNγ were determined from a blood draw at the end of a 14-day ecological momentary assessment (EMA) protocol, during which momentary NA was assessed 5x a day. Momentary NA was aggregated across the 14 days. Regression was used to examine cross-sectional associations between pain intensity and interference with NA and log-transformed inflammatory markers, controlling for age, gender, and BMI. Results: There were no significant main effects. NA moderated the associations between pain symptomatology and CRP ($\beta s=.12-.15$, ps<.05), such that each pain variable was significantly and positively associated with CRP for individuals with higher NA. These results held when also controlling for race/ethnicity, education, and income. NA did not interact with pain symptomatology to predict levels of any inflammatory cytokine. Conclusion: These findings help to clarify the complex relationship between pain symptomatology and inflammation, highlighting the potential role of NA as a moderator. Specifically, pain indicators may be more strongly related to CRP in individuals with higher NA. Future research should examine such associations prospectively and in other samples to improve causal inference and generalizability.

111) Abstract 1203

PAIN RESILIENCE SHOULD BE INCLUDED AS A COMPONENT OF THE FEAR-AVOIDANCE MODEL OF PAIN.

Peter M. Slepian, MS, Brett A. Ankawi, MS, Christopher R. France, PhD, Psychology, Ohio University, Athens, OH

The Fear-Avoidance Model of Pain holds that individuals who catastrophize after injury will develop pain-related fear, which, through avoidance, leads to depression, disuse, disability, and further pain. Although research has largely supported this model, it nonetheless accounts for limited variance in pain-related outcomes, possibly because it fails to consider individual differences in resilience in the face of pain. We tested this notion using the Pain Resilience Scale, which measures an individual's

ability to maintain behavioral engagement and regulate emotions and cognitions despite prolonged or intense pain. We hypothesized that catastrophizing and resilience would each contribute unique variance in the prediction of pain-related outcomes.

Individuals (N = 343) who experienced back pain within the previous two weeks were recruited through Amazon's Mechanical Turk. Participants completed the following measures at recruitment (T1) and again one month (T2) and three months (T3) later: Pain Resilience Scale (PRS), Pain Catastrophizing Scale (PCS), Tampa Scale of Kinesiophobia (TSK), and current back pain, depressive symptoms, and physical functioning.

Structural Equation Modeling was used to assess the addition of the Pain Resilience Scale to the Fear Avoidance model. The initial model was specified with pain, PRS, and PCS at T1 predicting TSK at T2, and TSK, in turn, predicting pain, depressive symptoms, and physical functioning at T3. The initial model was not a good fit to the data, RMSEA = 0.229 (95%CI = 0.20, 0.25), CFI = 0.72, SRMR = 0.128. Examination of modification indices supported the addition of direct paths from the PRS and PCS at T1 to depressive symptoms at T3, and from pain at T1 to pain and physical function at T3. The resulting model, illustrated in Figure 1, was a good fit to the data, RMSEA = 0.064 (95%CI = 0.02, 0.10), CFI = 0.99, SRMR = 0.037. A nested model, with paths from the PRS constrained to 0, was not a good fit to the data (Δ AIC/BIC > 10), indicating that pain resilience was an important contributor to the overall model.

These findings provide further support for the predictive validity of the Pain Resilience Scale. Moreover, these data provide preliminary evidence that the Fear Avoidance Model of Pain is enhanced when individual differences in both pain-related vulnerability and protective resources are considered.

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112) Abstract 1248

EMOTION REGULATION IN SOCIAL INTERACTION: PHYSIOLOGICAL AND EMOTIONAL RESPONSES OF SOCIALLY INHIBITED INDIVIDUALS

Stefanie Duijndam, MSc, Nina Kupper, PhD, Medical and Clinical Psychology, Tilburg University, Tilburg, Netherlands

Background: Individual differences in emotion regulation (ER) may be associated with social inhibition (SI). Psychological and physiological mechanisms relating ER with SI are largely unknown. We therefore aim to investigate whether there is a change in physiological and emotional responses during different styles of ER (suppression and reappraisal). In addition, individual changes in response patterns associated with SI will be investigated.

Methods: We used data of a sample of 119 undergraduate students (Mean age=20.7±78.2% female). Participants watched a neutral film clip, and then two sad emotion induction (EI) film clips (the Lion King, and the Champ), after which they had to suppress (Lion King) or reappraise (Champ) their emotions during a conversation with a confederate. During the experiment, ECG, ICG, and EDA were recorded to obtain Inter-Beat Interval (IBI), RMSSD, pre-ejection period (PEP), and skin conductance level (SCL) to gauge parasympathetic and sympathetic cardiac drive. Participants reported perceived negative and positive emotional states during all phases of the experiment. SI was assessed with the SIQ15 (median split for high vs. low SI). The difference between responses during EI and the neutral film were considered EI effects, and the difference between the responses of the ER assignment and the responses during EI were considered ER effects. Analyses were performed using repeatedmeasures-ANOVA, adjusted for the effects of sex. **Results:** We found a main EI effect for emotional responses, in which participants reported significantly more negative emotions and less positive emotions during EI. In addition, a main EI effect was found for most physiological responses. Repeated-measures ANOVA showed an ER effect in which the high SI group had lowered sympathetic activation during reappraisal compared to suppression (see Figure 1). However, no ER effects were found for the other physiological measurements or emotional states. **Conclusion:** These findings suggest that there is change in sympathetic activation in SI individuals during different styles of ER. SI individuals seem to benefit from reappraisal, because they show less sympathetic activation compared to suppression.

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113) Abstract 1387

IMPACT OF RECEIVED SOCIAL SUPPORT ON PUPILLARY STRESS RESPONSE

Tyler Graff, BS, Wendy Birmingham, Ph.D., Steven Luke, Ph.D., Psychology, Brigham Young University, Provo, UT

BACKGROUND: Supportive marital relationships can ameliorate the potentially pathogenic impact of stressful events, although the specific physiological pathways by which this occurs are not yet fully understood. An examination of immediate stress response, and the buffering effects of a supportive spouse on that response could provide additional insight into the mechanisms of support on health outcomes. Pupillometry allows for the investigation of stress response in real time. Pupil size is regulated by the autonomic nervous system, so that when a stressor is presented, the pupils quickly dilate (within 200ms of stimulus onset) allowing for an examination of the immediate effects of a stressor, and the moderating effects social relationships may have in buffering stress. METHODS: We randomly assigned 44 married couples (Age; M = 31.38, SD = 10.6) to spouse-present or spouse-absent conditions. Participants were presented with a Stroop task. Spouse-present couples were instructed to hold hands throughout the duration of the tasks (thus providing emotional and tangible support). Spouse-absent couples attended separate sessions independent of their spouse. Pupil data was acquired using the Tobii TX300 eye-tracking system, controlled by E-Prime software. **RESULTS:** An analysis of pupil diameter showed significant changes from baseline in response to each Stroop trial with a significant difference between the incongruent words vs the congruent words (β = 2.48E-02, p < .001), indicating that the Stroop task elicited a physiological response. Examination of support on the stress response via spouse condition (i.e. spouse-absent vs spousepresent) found a significant difference between the spouse conditions; those in the spouse-present condition showed less pupil dilation ($\beta = 3.89, p < .001$) in response to the incongruent stroop stimulus. CONCLUSION: Findings provide evidence of the immediate physiological response of psychological stressors as seen via pupillary response, and provides additional evidence of the benefits of received support from a close other. This pilot study did not find evidence for the mediating effects of relationship quality, but future research should consider utilizing pupillometry to investigate the effect relationship quality may have on the potential immediate buffering effects of social support.

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114) Abstract 1476

A SELF-REPORT OF SUPPORTIVE PARENTAL BEHAVIORS AND SELF-CONTROL AMONG ADOLESCENTS WITH ADHD

Erin Kaseda, N/A, Neuroscience, David Sardoncillo, N/A, Wendy C. Birmingham, PhD, Psychology, Brigham Young University, Provo, UT

Background: It is estimated that between 5-10% of children and adolescents in the United States have been diagnosed with attention-deficit/hyperactivity disorder (ADHD). Adolescents with ADHD may experience increased parent-child conflict. Interpersonal difficulties among family members put children with ADHD at risk for comorbid disorders. Very little research has been done on children's own perception of parental support. Understanding which supportive behaviors are perceived as the most helpful may allow clinicians to target interventions to best improve the resilience of adolescents with ADHD.

Methods: 10 adolescents aged 14-19 (mean age =17; N= 7 female) with a verified diagnosis of ADHD completed surveys on their attitudes towards each of their parents and participated in a semi-structured interview. Participants discussed perceptions of self-control in school and in home settings, how relationships with their parents influence their self-control, and their overall perceptions of their parent-child relationships. Interviews were transcribed and coded for factors that improve adolescents' comfort in confiding in or sharing their feelings with their parents.

Results: Participants were mostly white (50%) or Latino/a (40%) and from middle to high income families. Participants reported low relational distress with their mothers (M=28.1/100) and their fathers (M=32.2/100). When asked how comfortable they felt confiding in their parents, only 33% of subjects reported feeling very comfortable. Participants reported on specific actions their parents take that make it easier or more difficult to confide in them. Responses included, "Putting their words away for a minute to just listen;" and If they give me advice that was too judgmental, I'll probably not come back to them."

Conclusions: Understanding adolescents' own perception of parental support and factors that influence confiding in their parents has significant potential for clinicians in creating family-based interventions for adolescents with ADHD. In particular, applying factors that improve adolescent comfort in confiding in parents has the potential to support adolescents with ADHD who are facing problems with self-control both at school and at home. Further research needs to be done on the differences in perceived family functioning between adolescents with ADHD and their typically developing peers.

115) Abstract 1442

RESILIENCE, SOCIAL SUPPORT, AND STRESS IN COLLEGE STUDENTS

Cory Newell, Bachelor of Arts, Angela Liegey-Dougall, Ph.D, Psychology, The University of Texas at Arlington, Arlington, TX **Purpose:** College students are a unique population of people who are transitioning into the complicated world of adulthood. It is important to identify risk and resiliency factors among this group because up to 87% of students report moderate to high amounts of stress (Pierceall & Keim, 2007). Recently, Steinhardt and Dolbier (2008) successfully increased resilience among college students using a 4-week intervention. However, it is not clear whether resilience increases naturally among students as they adjust to college life. Additionally, social support has been identified as an important moderator of resilience (Southwick et al., 2016), and we expected that more social support would strengthen the relationship of resilience with academic stress,

general perceived stress, and illness symptoms. Method: This cross-sectional survey included 360 (males = 97, females = 263, undeclared = 3) undergraduate college students from a Southwestern university. Students reported on measures of resiliency, social support, perceived stress, academic stress, illness symptoms, employment, and traumatic events. Results: As expected, resilience increased among class ranks, F(3,300) = 4.01, MSE = 149.65, p = .008 h_p² = .04, after controlling for gender, employment status, and number of potentially traumatic events. While freshmen and sophomores did not differ, seniors reported more resilience than did sophomores and marginally more than did freshmen. Additionally, greater resilience predicted less perceived stress β = -.250, SE = .025, t(290) = -9.93, p < .001, less academic stress $\beta = -9.93, p < .001$.059, SE = .014, t(301) = -4.26, p < .001, and fewer illnesssymptoms $\beta = -.006$, SE = .002, t(301) = -2.69, p = .008, after controlling for the covariates including class rank. Further, social support moderated the effect of resilience on perceived stress as expected, $\beta = -.001$, SE = .0001, t(377) = -2.01, p = .045. At high levels of social support only, more resilience was associated with less stress. Discussion: Results suggest that resilience naturally occurs as students adjust to college life. Furthermore, they suggest that students with less resilience, especially freshmen and sophomores, may benefit from interventions or campus activities that foster social support.

116) Abstract 1354

RESPIRATORY SINUS ARRHYTHMIA AND PROSOCIALITY: A TEST OF THE QUADRATIC VAGAL ACTIVITY-PROSOCIALITY HYPOTHESIS

Kimberly A. Parkhurst, B.A., Timothy W. Smith, Ph.D., Psychology, University of Utah, Salt Lake City, UT

Researchers have long sought to identify biological correlates of prosociality. Previous studies have identified vagus nerve activity, in the parasympathetic nervous system, as a correlate of such social behavior and related affective and cognitive processes. Some findings support this positive association, but others demonstrate contradictory results in which vagal activity was inversely associated with prosociality. Consequently, researchers have proposed a quadratic model (Kogan et al., 2014), in which very low and very high levels of vagal activity are associated with low prosociality, and moderate levels of vagal activity are associated with the highest prosociality. The present study tested the quadratic vagal activity-prosociality hypothesis utilizing multiple samples. Respiratory sinus arrhythmia (RSA), as measured by high-frequency heart rate variability, a common measure of vagal activity, and trait affiliation, a personality trait closely associated with prosociality, were assessed in several samples, including middle-aged and older adults (n = 300)couples), who reported both their own and their partners' trait affiliation, young males and females (n = 120 couples), and two undergraduate samples also providing self-reports (n = 135, 180). Contrary to the quadratic vagal activity-prosociality hypothesis, our analyses revealed no significant quadratic effects in any sample (std. β ranging from -.20 to .10, all $\geq p$.064). A significant linear relationship between RSA and prosociality was found only in younger males within couples (std. $\beta = .25$, p= .008). Across multiple samples providing opportunities for replication, these results fail to support the quadratic vagal activity-prosociality hypothesis, and there was only limited evidence of a linear relationship between vagal activity and trait affiliation. Further research is needed to identify biological systems related to stable individual differences in affiliation and other aspects of prosocial behavior.

117) Abstract 1160

DIVORCE AND BIOLOGICAL RISK FOR POOR HEALTH: A ROLE FOR PARTNER VIOLENCE?

Samantha C. Patton, MS, Jessi Kane, BA, Psychological and Brain Sciences, University of Louisville, Louisville, KY, Yvette Szabo, PhD, VISN 17 Center for Excellence for Research on Returning War Veterans, Doris Miller VA Medical Center, Waco, TX, G. Rafael Fernandez-Botran, PhD, Pathology & Laboratory Medicine, Tamara Newton, PhD, Psychological and Brain Sciences, University of Louisville, Louisville, KY

Divorced persons are at greater risk for morbidity and premature mortality than non-divorced individuals, though risk is not equal for all divorced persons. Explaining this heterogeneity is a top priority. An overlooked, but potentially critical, source of heterogeneity is intimate partner violence (IPV). IPV is more common in divorced than married samples, and extensive research links IPV with poorer health. In a sample of midlife, community women with divorce histories (N = 69), this crosssectional study examined whether IPV explains variation in biological outcomes predictive of morbidity and mortality. Women were screened for good health, and completed two visits 3.5 weeks apart. At the first visit, blood was drawn. Components of the comprehensive metabolic profile and complete blood count were combined to form a validated risk score predictive of 10year mortality. Hemoglobin A1c levels were also quantified. Resting heart rate (HR), systolic (SBP) and diastolic blood pressure (DBP) were assessed at both visits and averaged for analysis. At the second visit, women completed measures of coercive control and physical assault in prior intimate relationships. These measures were used to classify women into three groups: no IPV (n = 12), situational couple violence (n =23), or coercive controlling violence (n = 32). Omnibus tests of group differences in biological measures were not statistically significant (ps > .05). Subsequently, the sample was split into women with one (n = 24) or more than one divorce (n = 45). Using a small-sample approach, contrasts were calculated to assess relationships between the three groups and biological measures. For women with one divorce, a linear relationship with SBP (p < .01, r = .43), and a trend with DBP (p < .10, r = .53) was seen. Further, a dose-response relationship between group and SBP/DBP (mmHg) was observed: no IPV (113/71), situational couple violence (124/76), and coercive controlling violence (134/81). Results suggest that detailed IPV histories identify divorced women at greater health risk. Because this was only observed in women with one divorce, we postulate that risks are obscured if assessment of IPV history is not sensitive to the number of prior intimate relationships. Findings warrant replication in a larger sample.

118) Abstract 1211

SCRUBBING AWAY THE THREAT: RIGHT-WING AUTHORITARIANISM AND PERCEIVED VULNERABILITY TO DISEASE PREDICT USE OF SANITIZERS AND ANTIBACTERIAL PRODUCTS

Lydia E. Eckstein, PhD, Ryan Pickering, PhD, Psychology, Natasha Torrence, BS, Sarah Conklin, PhD, Psychology and Neuroscience, Allegheny College, Meadville, PA

Leading public health agencies have tracked an alarming rise in antibiotic resistance and have called for a global action plan to combat this trend (WHO, 2014). Extant work suggests that the use of antibacterial hygiene products contributes to antibacterial resistance (e.g., Aiello & Larson, 2003). Building on scholarship on the behavioral immune system (BIS) and political conservatism as a disease-avoidance strategy (Murray & Schaller, 2016; Terrizzi et al., 2013) the present research investigated, across two studies, whether Right-Wing Authoritarianism (RWA), a socially conservative ideology driven by threat perceptions, would predict the use of antibacterial hygiene products as a behavioral strategy to neutralize perceived pathogen threat. We predicted that the relationship between RWA and antibacterial product use would be mediated by discomfort about situations that carry the potential for pathogen transmission.

Data were collected online using MTurk in November 2014 (n=218) and again in June 2016 (n=345). Results indicated that those higher in RWA were, in fact, more likely to report antibacterial product use. Moreover, in line with predictions, this relationship was mediated by the Germ Aversion factor of Perceived Vulnerability to Disease (PVD-GA). This was true even after controlling for Social Dominance Orientation (SDO) and Conservatism, two constructs closely related to RWA, in both, Study 1 and Study 2. Limitations, implications, and future directions are discussed.

119) Abstract 1022

MORBIDITY FOLLOWING SPOUSAL BEREAVEMENT IS ASSOCIATED WITH DEPRESSION, NOT PROLONGED GRIEF DISORDER

Lindsey M. Knowles, M.A., Mary-Frances O'Connor, Ph.D., Psychology, University of Arizona, Tucson, AZ

Spousal bereavement is associated with increased morbidity and mortality in the surviving spouse. A minority of widow(er)s develop a mental health disorder of prolonged debilitating grief and/or depression. There is debate regarding the criteria of disordered grief, and recent research suggests the criteria proposed by Prigerson and colleagues (2009) for prolonged grief disorder (PGD) demonstrate high diagnostic specificity and predictive validity for other mental disorders, suicidal ideation, functional impairment and low quality of life (Maciejewski et al., 2016). However, the association between PGD and morbidity following bereavement has not been investigated. The present study used data from the Changing Lives of Older Couples (CLOC) multi-wave database (1987-1993) to conduct a multiple logistic regression analysis of the association between PGD, depression, and morbidity following spousal bereavement. The study sample included 250 widow(er)s (mean age = 70.1, SD = 6.9) and the current investigation controlled for baseline (preloss) health problems and time since baseline, and examined the presence of PGD, depression, and the incidence of health problems in the 6-month period following bereavement. The presence of PGD was measured using relevant items from the CLOC Grief Scales and the presence of depression was measured per DSM II-R criteria for a current major depressive episode. Adjusted for covariates, the likelihood of having one or more health problems within the first six months of widowhood is significantly higher among widow(er)s with depression compared to those without depression (B = 0.91; SE = 0.43; p < .05). Meeting diagnostic criteria of PGD is not a significant predictor of health problems following bereavement (B = 0.61; SE = 0.46; p = .19). The odds of a widow(er) with depression having a health problem following the loss of their spouse is 2.49 times higher than a widow(er) who does not have depression (95% CI = 1.05 to 5.77; p < .05). Though a chi-square test reveals a significant relationship between PGD and depression, variance inflation factor values do not indicate collinearity that would result in a biased model. These findings provide preliminary evidence for the positive relationship between depression and

physical morbidity following bereavement, above and beyond the effects of prolonged severe grief as measured by PGD.

120) Abstract 1222

DO PLACEBO AND NOCEBO EFFECTS WORK WHEN SUBJECTS KNOW THAT THEY RECEIVE A PLACEBO? EFFECTS OF OPEN-LABEL POSITIVE AND NEGATIVE VERBAL SUGGESTIONS ON ITCH

Stefanie Meeuwis, MSc, Henriët van Middendorp, PhD, Judy Veldhuijzen, PhD, Antoinette van Laarhoven, PhD, Faculty of Social and Behavioural Sciences, Institute of Psychology, Health, Medical and Neuropsychology unit, Leiden University, Leiden, Netherlands, Jan De Houwer, PhD, Department of Experimental Clinical and Health Psychology, Ghent University, Ghent, Belgium, Sjan Lavrijsen, MD PhD, Department of Dermatology, Leiden University Medical Center, Leiden, Netherlands, Andrea Evers, PhD, Faculty of Social and Behavioural Sciences, Institute of Psychology, Health, Medical and Neuropsychology unit, Leiden University, Leiden, Netherlands

Negative and positive outcome expectancies, induced by verbal suggestions, have been shown to influence subjective symptoms such as itch. Recent studies indicate that placebo effects may even occur when it is known that a given substance is inert (openlabel placebo). An experimental study was conducted to investigate the effects of open-label positive verbal suggestions on itch. Healthy volunteers (n = 92) were randomized to either an *experimental* or a *control* group. Itch was evoked experimentally during a single laboratory session by histamine iontophoresis. In the experimental group, participants were told that the test would elicit little itch and received information on how expectations could influence itch (i.e. open-label positive verbal suggestions). Open-label verbal suggestions were found to affect itch expectations in this study, but not itch symptoms. Additionally, within the experimental group only, postsuggestion expected itch was significantly associated with selfreported itch. A second study was set up in order to investigate whether effects on itch can be elicited when open-label verbal suggestions are strengthened by application of an inert substance (i.e. tonic). This study investigated whether negative and positive expectations, induced by verbal suggestions under both openlabel and closed-label conditions, can influence itch evoked by histamine iontophoresis. Preliminary analyses indicate that positive suggestions significantly reduce itch expectation, compared to negative suggestions, even when participants know about receiving a placebo. No effects on self-rated skin condition were found however. Data collection for the second study has recently finished and the final results will be presented during the conference.

121) Abstract 1286

PSYCHOSOCIAL PROFILES OF FUNCTIONAL MOVEMENT DISORDER (FMD) PATIENTS COMPARED TO GENERAL NEUROLOGY PATIENTS

Alexandra Jacob, MS, Neurology, University of Louisville, Louisville, KY

Background

Although Functional Movement Disorders (FMD) are commonly seen in neurologic practice, there is a lack of understanding about their pathophysiology and the role of psychological factors, which are no longer mandatory for diagnosis per DSM-V. Prior studies have found high rates of affective disorders and past history of abuse in FMD, but there is a lack of data comparing psychosocial profiles in FMD with patients with other neurologic disorders.

Objective

To characterize psychosocial profiles of FMD patients compared to age and gender-matched general neurology patients.

Design/Methods

Data from 73 FMD patients was obtained by a retrospective chart review from our FMD clinic. Seventy-three age and gendermatched controls were recruited prospectively from a convenience sample in the general neurology clinic. Questionnaires included Beck's Depression Inventory (BDI), State-Trait Anxiety Inventory (STAI), the Sheehan Disability Scale (SHS), Short Health Anxiety Inventory, Primary Care PTSD Screen (PC-PTSD), and the Sexual and Physical Abuse Screen Questionnaire.

Results

The average age was 47.6 ± 14.7 in FMD and 48.7 ± 14.9 in the control group. FMD patients had a mean disease duration of $5.9\pm$ 8.12 years. FMD patients scored higher for depression and anxiety symptoms than general neurology patients (BDI 16.4±10.4 versus 10.4±7.7; STAI-T 43.9 ±12.9 versus 36.7 ±12.1). 58.9% of FMD patients reported a history of physical and/or sexual abuse compared to 27.4% of controls. Disability rates were 45.2% in the FMD and 30.1% in the control group. Mean work impairment per SHS was 8.2 ±2.7 for FMD versus 4.3±3.8 for controls.

Conclusions

Higher rates for depression and anxiety in FMD compared to general neurology patients as well as a higher rate of past abuse should inform the current biopsychosocial illness model and need to be taken into account in treatment planning. Our study confirms the highly disabling nature of FMD, which is especially of concern in light of the often chronic illness course.

122) Abstract 1059

HOARDING BEHAVIOR IN A PATIENT WITH VASCULAR DEMENTIA (CASE REPORT)

Safa Rubaye, MD, MBChB, PSYCHIATRY, UTHSCSA, SAN ANTONIO, TX

Introduction: Hoarding disorder (HD) is a new diagnosis in the Diagnostic and Statistical Manual of Mental Disorders 5th Edition (DSM-5). Other neurological and psychiatric disorders must be ruled out to diagnose a patient with HD (1). The term of "organic hoarding" was used by Mataix-Cols et al. to distinguish hoarding behavior that is related to brain damage from HD (2). Several studies reported hoarding behavior in different types of neurocognitive disorders including Alzheimer's (3, 4, 5), frontotemporal (6) and Lewy body dementias (5). In this case, the patient develops hoarding behavior secondary to cerebrovascular disease.

Case report: A86-year old Caucasian Male with mild neurocognitive disorder who described a gradual onset of paper hoarding behavior. He reported that he keeps all tax documents, bills, receipts, newspapers, magazines and others. He believes that he might need them someday. He keeps boxes of paperwork and other possessions inside the house in a way that clutters the living areas and compromises his safety. However, the patient showed no concerns about moving his possessions to the assisted living facility. A previous brain MRI showed diffuse cortical atrophy and diffuse white matter gliosis secondary to chronic microvascular ischemic disease.

Discussion: This case report describes the development of HD in an elderly patient secondary to cerebrovascular disease. Previous studies and case reports described hoarding behavior to other different types of neurocognitive disorder (3, 4, 5, 6). In conclusion, the hoarding behavior increases with age and associated with different types of neurocognitive disorders and dementia.

123) Abstract 1510 CARDIAC AUTONOMIC BALANCE AND REGULATORY CAPACITY IN PTSD

Kristen Salomon, PhD, Psychology, University of South Florida, Tampa, FL, Paula Castro-Chapman, PhD, Research Service, James A. Haley VA, Tampa, FL

Post-Traumatic Stress Disorder (PTSD) is associated with elevated sympathetic and reduced parasympathetic tone. However, little research has examined sympathetic and parasympathetic activity concurrently and during stress. Further, recent work suggests that among those with PTSD, symptom severity may be differentially related to autonomic profiles. We sought to examine the relationship between PTSD symptom severity and cardiac autonomic profiles among recent military combat veterans with PTSD. We examined cardiac autonomic regulatory capacity (CAR) and cardiac autonomic balance (CAB) during rest and two tasks: a trauma imagery task and a nontrauma speech task. We recruited veterans from a post deployment health clinic at a VA Hospital. Sixty-nine veterans met criteria for probable PTSD diagnosis using the PTSD Checklist - Military. Indices of sympathetic (pre-ejection period: PEP) and parasympathetic (respiratory sinus arrhythmia: RSA) were collected during a resting baseline, script-driven imagery trauma recall, and a non-trauma standardized speech task. PEP and RSA were normalized and CAR was calculated as zRSA + (zPEP * -1), with higher values indicating greater overall autonomic activation. CAB was calculated as zRSA - (zPEP * -1), with higher values indicating greater relative parasympathetic to sympathetic activation. We calculated change scores for CAR and CAB to examine reactivity for three task phases: trauma imagery, speech preparation and speech delivery. Multiple regression was used to examine if PTSD symptoms and symptom clusters of avoidance, vigilance and arousal were related to CAB or CAR, controlling for age, gender, body mass index, and race. Total PTSD symptoms or clusters were not related to resting CAB or CAR. Avoidance symptoms were associated with decreases in CAR during speech preparation (B = -0.1, SE =.02, t = -2.17, p = .03) and delivery (B = -0.1, SE = .03, t = -0.1, SE = .03, SE2.13, p = .04), suggesting a downregulation of overall autonomic activation. Avoidance was not related to task changes in CAR. Arousal and vigilance symptom clusters were not related to task changes in CAB or CAR, although trend-level associations between vigilance and increased CAB during speech preparation and delivery emerged (ps < .09), suggesting an atypical shift toward parasympathetic dominance during the tasks.

124) Abstract 1003

HETEROGENEITY OF SOCIAL ANXIETY DISORDER -IDENTIFICATION AND CLINICAL COMPARISON OF TWO PERSONALITY PROFILES

Julia Weber, M.Sc., Stefanie Rambau, M.Sc., Department of Psychosomatic Medicine and Psychotherapy, Andreas J. Forstner, M.D., Johannes Schumacher, M.D., Institute of Human Genetics, Franziska Geiser, M.D., Rupert Conrad, M.D., Department of Psychosomatic Medicine and Psychotherapy, University of Bonn, Bonn, Germany

Social anxiety disorder (SAD) is typically associated with an inhibited and reserved personality and concomitant behavior.

Recent research has indicated an atypical-impulsive subtype of SAD defined by impulsive behavioral tendencies like substance abuse. The purpose of the present study was to identify potential subgroups based on the temperament dimensions harm avoidance (HA) and novelty seeking (NS) from Cloninger's Temperament and Character Inventory and compare them with regard to clinical variables. For this purpose, a cluster analysis (k-means) was conducted in a hugh sample of persons diagnosed with SAD (N = 497). According to our hypotheses, two different subgroups were replicated: The prototypical-inhibited subgroup (n = 298)was characterized by high HA and low NS. The atypical subgroup (n = 199) showed moderate-high HA and NS. On average, the prototypical subgroup was marked by higher social anxiety (p < .001) and depressive (p < .001) symptoms. Descriptively, comorbid depressions and prior psychotherapeutic treatments were more frequent in the prototypical subgroup. No significant differences regarding the frequency of comorbid anxiety disorders were observed between the subgroups. An association between the atypical personality profile and more frequent drug abuse could not be confirmed for the entire sample. However, an additional analysis only including persons with more severe social anxiety symptoms (prototypical: n = 127; atypical: n = 81), suggested an association between the atypical personality profile and more frequent drug abuse (p = .04). In relation to sample sizes, the frequency of comorbid drug abuse was more than twice as high in the atypical subgroup (12.3%) than in the prototypical subgroup (4.7%). The role of symptom severity in the consideration of the subgroups, a potential compensatory function of NS as well as clinical implications and directions for future research are discussed.

125) Abstract 1370

REAL-TIME PREDICTION OF INTER-BEAT INTERVAL Sazedul Alam, M.Sc., Computer Science and Electrical Engineering, University of Maryland, Baltimore County, Baltimore, MD, Derek P. Spangler, PhD, Pyschophysiology, Cody Feltch, M. Sc. Software Engineer, DCS Corp, U.S. Army Research Laboratory, Aberdeen Proving Ground, MD, Katherine Gamble, PhD, cognitive psychology, Jean Vettel, PhD, Neuroscience, U.S. Army Research Laboratory, Aberdeen Proving Ground, MD, Ryan Robucci, PhD, Nilanjan Banerjee, PhD, Computer Science and Electrical Engineering, University of Maryland, Baltimore County, Baltimore, MD, Justin Brooks, M.D., PhD, RDRL-HRF-A, U.S. Army Research Laboratory, Aberdeen Proving Ground, MD

Predicting future physiological state has implications for both medical and non-medical uses. For example, the ability to predict arrhythmia or changes in heart rate variability could have dramatic implications for prescriptive medical therapeutics or human-computer interaction respectively. Making these predictions with biometric time series data is non-trivial as it requires several signal processing steps to contend for noisy data, requires executing predictive modeling equations, and ultimately provide visualizations in sufficient time to be functional. In this project, we have developed software that meets these criteria and is able to future predict inter-beat intervals (IBIs) with a lag that is less than two seconds. More specifically, our tool predicts IBIs with two models. The first model, is an autoregressive model of order 8 that uses previous IBIs to predict future IBIs. The second model, uses a linear regression approach to predict the mean IBI from respiratory information and provides beat by beat correction of these predictions. Not surprisingly, our preliminary analysis reveals improved prediction accuracy when incorporating respiratory information but the degree of improvement varies

significantly with time. Notably in our tested data set we notice an accuracy in prediction from heart rate data alone is 6.2% to 15.8% and error in prediction from IBI and respiration is 5.9% to 17.4%. In summary, we have developed a software tool that is able to provide prediction of physiological state. Moving forward, we plan to utilize more sophisticated models that incorporate specific parameters that represent coupled oscillator models of cardiorespiratory interaction.

126) Abstract 1455

BETA-ADRENERGIC RECEPTOR BLOCKADE REDUCES ANTICIPATORY THREAT ONLY FOR INDIVIDUALS WITH LOW LEVELS OF DEPRESSIVE SYMPTOMS

Gabriella M. Alvarez, BA, Jennifer K. MacCormack, M.A., Emma Armstrong-Carter, BS, Psychology & Neuroscience, Samantha Meltzer-Brody, MD/MPH, Perinatal Psychiatry Program, Kristen A. Lindquist, PhD, Keely A. Muscatell, PhD, Psychology & Neuroscience, University of North Carolina Chapel Hill, Chapel Hill, NC

Exaggerated sensitivity to threat is a risk factor for multiple mental and physical health concerns. It is hypothesized that in depression specifically, increased anticipatory threat responses propagate neurobiological changes that result in cognitive biases towards threat as well as autonomic nervous system disruptions. Given this relationship, the anticipatory threat response has become a target in moderating the relationship between stress and illness. Thus, in this study we manipulated sympathetic activity to explore the relationship between anticipatory threat and depressive symptoms. 90 young adults participated in a randomized, double-blind, placebo-controlled study in which they received either a placebo or 40 mg dose of propranolol. Propranolol is a beta-adrenergic receptor antagonist that lowers sympathetic nervous system activation. After instruction to prepare a speech for two social evaluators, subjects reported their affective state via self-report. A depressive symptom questionnaire was given at the start of the session (before administration of the drug), and participants were divided into low depressive (n=48) and mild depressive (n=42) symptom groups based on a median split. Results revealed a significant drug by depressive group interaction on self-reported arousal F(1,3)=5.49, p=0.02. Specifically, there was a significant difference between placebo (M= 1.62, SD=0.36) and propranolol (M= 1.36, SD=0.24) in the low depressive symptoms group, t(46)=2.98, p=0.005, such that those on propranolol reported less high arousal emotions compared to those on placebo. Further, participants with low levels of depression who had taken propranolol also reported fewer negative emotions before the stressor (M= 1.17, SD= 0.20) compared to the placebo group (M = 1.35, SD = 0.28), t(46) = 2.49, p = 0.02. However, there were no significant differences between propranolol and placebo in the mild depression group for both arousal t(40) = -0.65, p>0.05 and negative emotions t(40)=0.06, p>0.05. These results suggest that the effectiveness of propranolol for reducing negative and arousing emotions in anticipation of a stressor varies as a function of depressive symptoms. Specifically, blocking the sympathetic nervous system effectively reduces negative and high arousal emotions to anticipatory threat, but only among those with low levels of depression.

127) Abstract 1514 EXAMINING THE ASSOCIATION BETWEEN HEART RATE VARIABILITY AND TEMPORAL DISCOUNTING

Gina M. Gerardo, M.A., DeWayne P. Williams, Ph.D., Julian F. Thayer, Ph.D., Psychology, Ohio State University, Columbus, OH

The present study sought to investigate how temporal discounting might relate to heart rate variability (HRV). Temporal discounting refers to the tendency for an individual's value of a reward to decrease as a function of time or delay. Previous research has associated higher rates of discounting of delayed reinforcers with the development disorders and comorbid health behaviors including substance abuse, gambling, and overeating. Temporal discounting may therefore indicate abilities in inhibitory control or the mental processes that precede behavior. Relatedly, higher levels of resting HRV are associated with better performance on tasks that require behavioral inhibition and HRV is thus suggested as an index of inhibitory control. With this background in mind, it stands to reason that if resting HRV is an index of inhibitory control, then individuals with high resting HRV should be less likely to discount large delayed rewards in favor of small immediate rewards. In the present study, resting state baseline measures of HRV were taken in undergraduate student volunteers (n= 65). Participants also completed a typical computerized temporal discounting task called an amount adjusting procedure. During the task, participants are presented with a series of choices between larger delayed rewards and smaller immediate rewards. Across successive trials, the amount offered for the smaller reward is adjusted until a point is reached where the participant stops waiting for the greater, delayed reward and chooses the lesser, immediate reward instead. This point is referred to as the "indifference point" and was calculated for five different delay time points: no delay, 2 days later, 30 days later, 180 days later, and 365 days later. The association between HRV and value of money chosen at the indifference point was significant at the 30 day (one month) time point (Spearman's Rho = .28, p = .028). These findings suggest that measures of HRV may indicate individual ability or capacity to achieve goals related to delayed rewards.

128) Abstract 1419 DIFFERENTIAL MECHAN

DIFFERENTIAL MECHANISMS ASSOCIATED WITH CAFFEINE-INDUCED BLOOD PRESSURE INCREASES FOR WOMEN AND MEN

Shara S. Grant, M.S., Heather Kissel, B.S., Bruce H. Friedman, Ph.D., Psychology, Virginia Polytechnic Institute and State University, Blacksburg, VA

Caffeine is the world's most widely consumed psychoactive substance, and it exerts substantial effects on cardiovascular reactivity. Despite a wealth of research exploring the myriad acute effects of caffeine, such research involving impedance cardiography indices are relatively sparse. Moreover, among these studies, research has typically included only male subjects. Some research suggests the existence of sex differences in mechanisms underlying acute caffeine-elicited increases in blood pressure. In order to further explore these potential cardiovascular differences, the present study involved 23 regular coffee consumers (mean age= 21.17; SD=1.9; 57% female) who completed a series of tasks (hand cold pressor and a memory task) 30 minutes following ingestion of caffeinated coffee (230 mg caffeine). Cardiovascular measures including systolic (SBP), diastolic blood pressure (DBP), systemic vascular resistance (SVR) and SVR-Index (SVRI) were acquired continuously during pre-task, task, and post-task epochs. Acute caffeinated cardiovascular reactivity to tasks was assessed. No significant sex-related differences in acute caffeinated SBP or DBP reactivity to tasks were found (p=.97; p=.75, respectively).

However, for male subjects only, a significant positive correlation between SBP and SVRI reactivity to the memory task was found (r=.63, p=.048). In contrast, for women, SBP reactivity to the memory task was significantly negatively correlated with SVRI reactivity (r = -.56, p = .036). For acute caffeinated DBP and SVRI memory task reactivity, no significant relationship was found for females (r= -.24, p=.238), whereas for males, a significant positive correlation was shown (r=.76, p=.014). Results suggest that pressor increases in response to acute caffeine intake may operate via differing mechanisms in men and women. For men, pressor increases were significantly associated with vascular responses. However, among women, results did not reveal significant positive associations between blood pressure reactivity to caffeine and SVR, which may suggest an increased contribution of cardiac mechanisms relative to male subjects. These findings may have important implications for cardiovascular research and health, due to the ubiquitous presence of caffeine in daily life.

129) Abstract 1149

EXPLORING PSYCHOPHYSIOLOGICAL RESILIENCE IN YOUNG CARERS: A RESEARCH PROTOCOL

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

Although psychophysiological research into adult and elderly caregivers has made significant advances in recent years, this is not the case for research with young carers, those aged under 18 years with caregiving responsibilities.

A number of negative physiological outcomes have been linked to caregiving in adults, including dysregulation in immune and endocrine functioning. Whilst these physiological outcomes have been identified in adult and elderly caregivers, they have not been investigated in young carers. Research with young carers has focussed primarily on psychosocial outcomes and fails to explore the pathways leading to these outcomes. Furthermore, although negative consequences of caregiving have been noted, positive outcomes have also been identified demonstrating that some carers cope effectively with caring demands. This begs the question of whether there are protective factors at play which may contribute to resilience.

Having previously identified a number of factors which may enable young carers to cope (Hawken, Barnett & Turner-Cobb, in prep), this research seeks to determine whether these factors are linked to psychophysiological resilience, in order to identify pathways to specific outcomes.

Ninety-two participants aged 11 to 18 years will be recruited; 46 young carers and 46 comparison participants (matched by age, gender and geographical location). Participants will complete questionnaire measures including demographics, relative/care questions, the social readjustment scale, youth perceived stress scale, child and youth resilience measure-28, benefit finding scale for children, Will's parental support scale, perceived social support from friends scale, the short attachment to pets scale, time spent outdoors and disability aid questions. Participants will also provide a hair sample for cortisol assessment. To date hair cortisol has not been measured in young carers and provides a retrospective indication of cortisol production and thus is a marker of chronic stress.

Identifying factors that contribute to effective coping and resilience in young carers can allow support services and policy makers to develop targeted interventions that promote and develop resilience, thus enabling more positive health outcomes.

130) Abstract 1509

ETHNIC DIFFERENCES IN CARDIAC AUTONOMIC ACTIVITY: A FOCUS ON IMPEDANCE CARDIOGRAPHY

DeWayne P. Williams, PhD, Psychology, The Ohio State University, Columbus, OH, LaBarron K. Hill, PhD, Center for the Study of Aging and Human Development, Duke University Medical Center, Durham, NC, Julian Koenig, Dr. sc hum, Section for Translational Psychobiology in Child and Adolescent Psychiatry, Heidelberg University, Heidelberg, Germany, Julian F. Thayer, PhD, Psychology, The Ohio State University, Columbus, OH

Evidence suggests that African Americans (AAs) have greater resting sympathetic (SNS) activity (e.g., greater total peripheral resistance) compared to European Americans (EAs). However, a meta-analysis also showed greater resting parasympathetic (PNS) activity (e.g., greater resting high-frequency heart rate variability [HF-HRV) in AAs compared to EAs. This counterintuitive pattern of results has been termed the cardiovascular conundrum. However to our knowledge, research has not yet investigated ethnic differences in impedance derived cardiovascular measures such as left ventricular ejection time (LVET) and pre-ejection period (PEP); the present study sought to further investigate the cardiovascular conundrum using such techniques. In 469 undergraduate students (369 EAs, 100 AAs, mean age = 19 years), a 7-lead electrocardiogram was used during a 5-minute rest period to assess baseline HF-HRV, systolic time intervals (i.e., PEP and LVET as indices of sympathetic cardiac activity), stroke volume (SV), and cardiac output (CO). Cardiac autonomic balance (CAB; relative balance between the PNS and SNS) and cardiac autonomic regulation (CAR; co-activation/inhibition of PNS and SNS) were also calculated. Impedance cardiography data was available for a subset of our sample (113 EAs, 32 AAs). Results showed that in the full sample, AAs had higher resting HF-HRV in comparison to EAs (t(465) = -2.40, p = .017). In our sub-sample. AAs had smaller LVETs (t(143) = 3.75, p < .001) and PEPs (t(143) = 2.67, p = .008), in addition to lower SV (t(143) = 3.13, p = .002) and CO (t(143) = 3.21, p = .002)compared to EAs. AAs also showed greater CAR (t(143) = -2.73, p = .007) compared to EAs, but no difference in CAB (p = .394). These data provide direct support for the cardiovascular conundrum, showing greater PNS activity (i.e., HF-HRV) and greater SNS activity (i.e., quicker LVETs and PEPs) in AAs compared to EAs. Additionally, lower SV and CO found in AAs is in line with previous reports of greater total peripheral resistance in AAs compared to EAs. Finally, greater CAR reflects greater co-activation of the PNS and SNS in AAs compared to EAs. In sum, our results are consistent with previous findings, ultimately suggesting that PNS activity in AAs may not be as effective in inhibiting SNS activity compared to EAs. Implications for health disparities will be discussed.

131) Abstract 1305

SOCIOECONOMIC STATUS AND ACUTE STRESSORS: LINKS TO METABOLIC SYNDROME AND ELEVATED C-REACTIVE PROTEIN LEVELS

Laura A. Bierstedt, Master's, Psychology, Samuele Zilioli, PhD, Psychology; Family Medicine and Public Health Sciences, Wayne State University, Detroit, MI

Previous research has established a link between psychosocial stress and poor health outcomes such as metabolic syndrome and elevated systemic inflammation, as well as a link between

socioeconomic status (SES) and similar outcomes. Inflammation, specifically elevated levels of C-Reactive Protein (CRP), and metabolic syndrome predict cardiovascular disease. These conditions are more prevalent in people from low SES background, which suggests that SES and stress may also be linked together in predicting later disease. However, we still do not fully understand the pathways by which SES leads to metabolic syndrome and increased systemic inflammation through stress. One possible explanation is that the positive gradient between SES and health may be explained by the fact that low SES individuals are exposed to more acute stressors (e.g., losing one's job, death of a child, etc.), which then lead to increased vulnerability to disease. In this study, we examined the role of current SES and acute stressors in predicting one's total number of metabolic syndrome symptoms, whether one met diagnostic criteria for metabolic syndrome, and C-Reactive Protein levels (used as an index of systemic inflammation). Participants (N = 1054) were from the Biomarker Project of the Midlife in the US (MIDUS) study. SES was measured as a composite score of income and education, and acute stress was defined as the number of major stressful life events experienced in the past 5 years. Models controlled for demographic covariates, including age, sex, and race. Results indicated that the number of recent acute stressors mediated the relationship between SES and the number of metabolic syndrome symptoms (indirect effect = -.0059, 95% CI, -.0145, -.0011), whether one met criteria for metabolic syndrome (indirect effect = -.0095, 95% CI, -.0232, -.0016), and CRP levels (indirect effect = -.0060, 95% CI, -.0139, -.0010). These results provide insight into the biological responses to SES-related stress in that those with low SES may be more likely to experience more acute stressors, which in turn increases one's vulnerability and likelihood for metabolic syndrome and systemic inflammation.

132) Abstract 1243

RELATIONS OF SUBJECTIVE SOCIAL STATUS AND PERSEVERATIVE THOUGHT WITH BLOOD PRESSURE

Brooks R. Harbison, M.A., Patrick Pössel, Dr. rer. soc., Sarah J. Roane, M.A., Counseling and Human Development, The University of Louisville, Louisville, KY

Cardiovascular disease (CVD) is responsible for millions of dollars in lost productivity each year. CVD may be related to psychological processes that place stress on the body. The Perseverative Cognition theory posits that perseverative thought, by reactivating the central nervous system after initial exposure to a stressor, may be a diathesis for the development of illness. Research has shown that brooding, a type of perseverative thought leaving an individual dwelling on current suffering, is related to illness pathogenisis but that reflection, another type of perseverave thought related to the passive search for meaning, is not. One stressor to consider when discussing CVD is subjective social status (SSS), an individual's perceived social ranking among peers. The purpose of this study is to examine the role of brooding, reflection, and SSS in the development of CVD as indicated by elevated diastolic blood pressure (DBP) and systolic blood pressure (SBP). We predicted that brooding and SSS are each related to DBP and SBP, the interaction of brooding by SSS is related to DBP and SBP, and reflection does not predict blood pressure either alone or in interaction. The sample was 242 participants (58.6% female with average age of M = 23.95 years) from an urban community college who completed questionnaires and gave blood pressure samples. Linear regression models showed support for the prediction that brooding and SSS are related to DBP but did not show they were related to SBP. As

predicted, reflection was unrelated to DBP and SBP. For individuals with low SSS, higher brooding were associated with higher DBP. Yet, for those with high SSS, higher brooding was associated with lower DBP. Our results suggest that some types of perseverative thought (brooding but not reflection) are related to some symtpoms of CVD (elevated DBP but not SBP) in those with low SSS. We discuss how other factors may contribute to the relation between high SSS, high brooding, and low DBP.

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133) Abstract 1199

SOCIOECONOMIC STATUS AND HEALTH IN A COMMUNITY SAMPLE OF HISPANICS AND NON-HISPANIC WHITES: EXAMINING PERCEIVED COMMUNITY RISK

Shannon V. Moore, M.A., Erin G. Mistretta, M.A., Mary C. Davis, Ph.D., Psychology, Arizona State University, Tempe, AZ

Hispanics make up the second largest ethnic group in the US behind Whites, yet are more than twice as likely to live in poverty (Pew Research Center, 2017). The literature consistently indicates an inverse gradient between socioeconomic status (SES) and health among Non-Hispanic Whites (NHW), but the relation among Hispanics is less clear. One theory is that ethnic disparities in health exist even when controlling for SES due to minorities' disproportionate exposure to psychosocial stressors, including the community environment (Williams, Priest, & Anderson, 2017). This study investigated whether 1) relations between SES and physical and mental health outcomes varied between Hispanics and NHW, and 2) whether community risk factors mediated the SES-health relations differently for Hispanic and NHW, in a community sample of middle-aged adults.

Participants aged 40-65 years old were recruited from communities within in the Phoenix metropolitan area (N= 714; 14.7% Hispanic, 85.3% NHW; 54.9% female; *M* age = 53.9 (*SD*=7.3)). Self-report measures assessed family income, mental and physical health (Mental Health Inventory, Short Form Survey-36), and community factors (Fear of Crime and Perceived Neighborhood Disorder).

Findings showed that income was positively associated with physical health and social functioning and negatively associated with anxiety and depressive symptoms, and these relations were stronger among Hispanics than NHWs (ps < .05). At low income levels, Hispanics reported poorer health than NHW, whereas at high income levels, Hispanics reported better health than NHW. Fear of crime and perceived neighborhood disorder mediated the relations between income and all four indicators of health, with Hispanic ethnicity moderating the income-risk links.

The inverse relation between income level and health is more strongly linked with mental and physical health outcomes among Hispanics compared with NHW, a relation accounted for by community social risk factors. Of note, Hispanics at lower income levels fare more poorly than NHW, but Hispanics at higher income levels fare better than NHW on health outcomes. Future research regarding SES-health relations should examine the role of social contextual factors to elaborate sources of risk and resilience among Hispanic adults.

134) Abstract 1513 THE RELATIONSHIP BETWEEN SUBJECTIVE SOCIO-ECONOMIC STATUS AND DEPRESSION

Hollie Pellosmaa, PhD, Psychology, Tusculum College, Knoxville, TN, Angela Liegey Dougall, PhD, Psychology, The University of Texas at Arlington, Arlington, TX

Background: In 2011, roughly 16% of the American population reported income below the poverty guidelines (Bishaw, 2012). Previous research has shown that low socio-economic status (SES) is associated with a higher prevalence of depression (Lorant et al., 2003). However, less is known regarding the subjective experience of SES and its impact on depression. The purpose of this study was to examine these relationships in an older population. It was hypothesized that individuals with lower subjective SES would be associated with higher depression. Method: A total of 248 individuals were recruited from a free medical clinic or exercise group in the Southwestern United States. The mean age of the sample was 55.96 years (SD = 9.78). Participants identified as female (n = 163) or male (n = 83) as well as Hispanic/Latino (n = 125), white (n = 56), or black (n = 56)60). Participants completed in-person, structured questionnaires regarding depression, social support, and coping. Of these participants, 69 met the conditions for having a probable presence of depression and 179 did not. Results: There was a significant effect of subjective SES on depression, F(1, 214) = 9.849, p =.002, partial $\eta^2 = .044$, when using age, sex, income, education, and work status as covariates. As expected, participants with lower subjective SES had higher levels of depression (M =7.005, SE = 0.448, 95% CI [6.122, 7.888]) compared to individuals with higher subjective SES (M = 4.316, SE = 0.694, 95% CI [2.947, 5.684]). Conclusions: Overall, these findings suggest that lower subjective SES is associated with higher levels of depression, even when accounting for covariates. Future research, is warranted to determine if subjective SES influences both self-rated health as well as physiological health outcomes. Since subjective well-being is understood to be a resilience factor, it is possible that subjective SES could also impact whether or not older adults succumb to the adverse impacts of stress.

135) Abstract 1245

RISKY EARLY FAMILY ENVIRONMENT AND PSYCHOSOCIAL ADJUSTMENT IN ADULTHOOD: DOES SOCIOECONOMIC STATUS MATTER?

Christopher J. Wendel, B.A, Jenny M. Cundiff, Ph.D., Clinical Psychology, Texas Tech University, Lubbock, TX

Intro:Early family environments that increase risk for poor mental and physical health are characterized by conflict, aggression and relationships that are unsupportive and neglectful (Repetti, Taylor, Seeman, 2002). These family characteristics are more common at lower socioeconomic status (SES) (Repetti, Taylor, Seeman, 2002). Most research on risky families has exclusively examined low SES (Hakulinen et al, 2013), a research strategy that does not allow for disentanglement of these two risk factors. It is possible that risky family environments have differential effects across SES.

Methods: A sample of 180 young adults (52% female, mean age = 21) completed self-report measures of parental income and a retrospective report of risky family characteristics. They also completed self-report measures of negative affect (hostility, anger, shame and guilt) and self-compassion. Analyses examined potential independent and joint effects of SES and risky early family environment on psychosocial adjustment in young adulthood.

Results: As expected, lower SES was correlated with a more risky early family environment (r = -.24, p < .001). Regression analyses including both main effects and their interaction revealed only one significant main effect; those who reported their early family environment as higher in risk also reported lower levels of self-compassion in young adulthood ($\beta = -$

.149, p = .055). Examination of moderation by SES revealed a consistent pattern of interactions between SES and early risky family environments. Individuals from high SES and high risk families reported the highest levels of negative affect [hostility ($\beta = .179, p = .01$,); anger ($\beta = .171, p = .02$); shame and guilt ($\beta = .147, p = .051$)] and the lowest levels of self-compassion ($\beta = .188, p = .01$).

Conclusion: Although risky early family environments are more common at lower SES, higher SES individuals appear most sensitive to these risky environments. We interpret these findings in light of evolutionary and developmental models of stress adaptation (e.g., Ellis, Bianchi, Griskevicius, & Frankenhuis, 2017), and suggest that negative affect and lack of self-compassion may be particularly high in this group, as strategies developed early in life secondary to adversity in the proximal social environment (the family) are not well-adapted to the current low adversity, social environment (high SES).

136) Abstract 1427

DOES CUTTING CAFFEINE INTAKE IMPROVE SLEEP? Leah A. Irish, PhD, Michael P. Mead, MS, Psychology, North Dakota State University, Fargo, ND, Li Cao, MS, Biomedical Statistics, Neuropsychiatric Research Institute, Fargo, ND, Allison Engwall, BS, Psychology, North Dakota State University, Fargo, ND, Ross D. Crosby, PhD, Biomedical Statistics, Neuropsychiatric Research Institute, Fargo, ND

Caffeine is the most widely used psychoactive substance in the world, with over 80% of American adults reporting caffeine use. Its stimulating effects are well documented and research has demonstrated that caffeine administration can impair nocturnal sleep. However, it remains unclear whether removing caffeine from habitual caffeine users will result in improved sleep. The few studies conducted to date have yielded inconsistent results. The present study identified poor sleepers who reported using caffeine at least 3 times per week and examined the effect of one week of caffeine abstinence on sleep duration and continuity. Participants included 80 undergraduate students. Baseline sleep was measured with 2 weeks of actigraphy and poor sleepers were defined as those with a total sleep time (TST) of <7 hours, sleep onset latency (SOL) of >30 minutes, or a sleep efficiency (SE) of <80%. Caffeine use was measured by daily online bedtime assessments. Poor sleepers were invited to abstain from caffeine for one week immediately following baseline assessment and continue to wear an Actiwatch to monitor sleep. Mixed models revealed no mean differences in TST, SOL, and SE between baseline and caffeine abstinence. To account for possible temporary sleep problems associated with caffeine withdrawal during abstinence, mixed models compared the trajectory of sleep characteristics during baseline and caffeine abstinence and yielded null results. Taken together, these findings suggest that abstaining from caffeine is not an effective strategy to improve sleep for habitual caffeine users. This contradicts the traditional sleep hygiene recommendation to avoid caffeine to promote healthy sleep, and may instead suggest that the sleep system of habitual caffeine users can develop a tolerance to caffeine's deleterious effects.

137) Abstract 1236 THE LINK BETWEEN SOCIAL CONTEXTS AND SELF-REPORTED SLEEP IN RURAL ADOLESCENTS

Michael P. Mead, MS, Leah A. Irish, PhD, Health Psychology, Brandy A. Randall, PhD, Human Development and Family Science, Molly Secor-Turner, PhD, MS, RN, Nursing, North Dakota State University, Fargo, ND

The interpersonal environment is particularly influential for adolescents' health and well-being and is known to have an impact on sleep health. Perceived threats to immediate physical and psychological safety (i.e., threats in the sleep environment) increase vigilance and impair sleep. Stress caused by anticipation of physical or psychological interpersonal threats (e.g., at school) may also increase physiological arousal and impair sleep. Thus, threats to safety experienced in multiple social contexts (i.e. at both home and school) may have a cumulative, harmful impact on adolescent sleep. To test the individual and combined association between safety in the home and school environments on sleep health, the present analysis utilized data from the Rural Adolescent Health Survey (N=314). In this cross-sectional study, high school students aged 14 to 19 reported the extent to which they felt safe at home and belonging at school. Participants also self-reported health behaviors, including their total sleep time (TST). Multiple regression analyses confirmed that belonging at school was significantly associated with TST (β =.19, p =.02), but the association between safety at home and TST was not significant. There was a significant interaction between belonging at school and feeling safe at home (F(3,309)=6.79,p<.001), such that adolescents with the lowest perceptions of belonging at school and safety at home had the shortest TST. This finding is consistent with the extant literature which supports a compounding effect of social influence on TST. Further, this study extends our understanding of social influences on adolescent sleep in an understudied, highly rural population. Considering that approximately 45% of adolescents do not meet national recommendations for TST, it is important to examine social and environmental factors that may impact sleep health. The present findings support the importance of perceived safety and belonging both at home and school and provide possible targets for sleep health improvement efforts.

138) Abstract 1041

INSOMNIA SYMPTOMS AND STRESS-RELATED VULNERABILITY TO SLEEP DISTURBANCES ARE ASSOCIATED WITH ELEVATED INFLAMMATION

Danica C. Slavish, PhD, Psychology, University of North Texas, Denton, TX, Jennifer E. Graham-Engeland, PhD, Christopher G. Engeland, PhD, Orfeu M. Buxton, PhD, Biobehavioral Health, The Pennsylvania State University, University Park, PA, Daniel J. Taylor, PhD, Psychology, University of North Texas, Denton, TX

Approximately 10% of U.S. adults currently suffer from chronic insomnia. Insomnia symptoms often are comorbid with depression, anxiety, neuroticism, and stress reactivity, each of which is associated with systemic inflammation. However, it is unclear if insomnia symptoms and related psychological risk factors independently predict biomarkers of inflammation when examined simultaneously. The purpose of the current research was to examine severity of insomnia symptoms and associated psychological risk factors (i.e., depressive symptoms, trait anxiety, stress-related vulnerability to sleep disturbances, and neuroticism) as predictors of two plasma markers of inflammation: C-reactive protein (CRP) and interleukin-6 (IL-6). As part of a larger longitudinal study, 57 participants (25.2 ± 3.9 years old, 52% female; 81% White) completed a baseline survey, followed by a plasma blood draw approximately one month later. CRP was quantified using ELISAs, and IL-6 was quantified using multiplex bead arrays. Data were analyzed using multiple linear regression, and controlled for age, gender, and BMI. When

predictors were examined independently, insomnia symptoms $(\beta = 0.04, p < .01)$, trait anxiety $(\beta = 0.02, p < .01)$, stress-related vulnerability to sleep disturbances ($\beta = 0.05, p < .001$), and neuroticism ($\beta = 0.02, p < .01$) each predicted elevated CRP. When predictors were examined simultaneously, only stressrelated vulnerability to sleep disturbances independently predicted elevated CRP ($\beta = 0.04, p < .05$). No predictors were associated with IL-6 when examined separately or simultaneously. Results suggest that insomnia symptoms and related psychological factors, particularly the tendency to report sleep disturbances in the face of stress, may be important predictors of systemic inflammation. The present work highlights the importance of assessing a comprehensive panel of psychological risk factors when examining associations between sleep and inflammation. These constructs may reflect an overlapping phenotype of risk, with stress-related vulnerability to sleep disturbances being the most distinct risk factor for elevated CRP, a broad systemic marker of inflammation associated with risk of cardiovascular disease. Future work should continue to examine stress-related vulnerability to sleep disturbances as a unique vulnerability factor for other biomarkers of health.

139) Abstract 1037

THYROID FUNCTIONING AND FATIGUE IN FUNCTIONAL SOMATIC SYNDROMES - THE ROLE OF EARLY LIFE ADVERSITY

Susanne Fischer, PhD, Clinical Psychology and Psychotherapy, University of Zurich, Zurich, Switzerland, Jana Strahler, PhD, Psychotherapy and Systems Neuroscience, University of Giessen, Giessen, Germany, Charlotte Markert, MSc, Clinical Biopsychology, University of Marburg, Marburg, Germany, Nadine Skoluda, PhD, Clinical Psychology, University of Vienna, Vienna, Austria, Johanna M. Doerr, PhD, Clinical Biopsychology, University of Marburg, Marburg, Germany, Urs M. Nater, PhD, Clinical Psychology, University of Vienna, Vienna, Austria

Background

Fatigue is a prominent symptom in thyroid diseases (e.g., Hashimoto's), which is not surprising given the role of the hypothalamic-pituitary-thyroid (HPT) axis in regulating physiological energy demands. Fatigue is also a core feature of functional somatic syndromes (FSS), which present with various medically unexplained symptoms. Recent research in healthy adults has shown that early life adversity (ELA) is linked with subclinical alterations in the HPT axis. In view of the substantial prevalence of ELA in FSS, it was our aim to investigate whether HPT functioning was related to fatigue in these patients, and how this may be linked with ELA.

Method

N=40 female patients with FSS and n=32 age and BMI matched controls were recruited. Patients fulfilled international research diagnostic criteria for chronic fatigue syndrome, fibromyalgia, or both. They were free of major physical (incl. overt thyroid diseases) and mental illnesses, and did not use any long-term hormonal medication. Early life adversity was measured using the Childhood Trauma Questionnaire (CTQ), which includes questions on sexual, physical, and emotional abuse, and on physical and emotional neglect. General, physical, and mental fatigue were measured via the Multidimensional Fatigue Inventory (MFI). Fasting morning blood samples were taken to determine thyroid-stimulating hormone (TSH), triiodothyronine (T3), and thyroxine (T4). *Results*

Patients with FSS did not differ from healthy controls in any thyroid parameters (all p>.233). However, patients showed negative associations between TSH and general (r=-0.38; p=.044), physical (r=-0.55; p=.002), and mental (r=-0.40; p=.035) fatigue. T4 was marginally related to physical fatigue (r=0.34; p=.081), while none of the other fatigue dimensions were significant (both p>.195). In addition, patients reporting moderate to severe physical neglect had comparably lower TSH (p=.036) and higher T4 (p=.025).

Conclusion

The lower the concentration of TSH and the higher the concentration of T4, the more fatigue was reported by FSS patients. This pattern of HPT functioning was directly linked with childhood physical neglect. Larger (prospective) studies are warranted to determine whether subtle alterations in HPT functioning may mediate the pathway between specific forms of early life adversity and fatigue as present in FSS.

140) Abstract 1360

WHIPLASH PRESENTS AS PSEUDOBULBAR AFFECT: THE CHALLENGES WE FACE THROUGH THE EYES OF PSYCHOSOMATIC MEDICINE

Saeed Ahmed, MD, Psychiatry, Nassau University Medical Center, East Meadow, NY

Case Study:

- This is a 71-year-old male with past medical history of Hypertension, unknown prior Psychiatric history who sustained a traumatic brain injury 6 months prior to his admission.
- The patient reported that his vehicle was struck by another one, and although there was no direct blow to the head, he developed whiplash injury due to acceleration-deceleration, coup and countercoup forces.
- In the ED, a Head CT showed no acute findings, he was medically cleared on same the day and discharged home.
- A few weeks after the accident, he developed episodic angry outbursts and aggression towards his wife. These episodes were not reported by the family to any physician.
- Later he developed generalized body shaking, which prompted a visit to a Neurologist, who prescribed Valproic acid 500mg BID. No EEG was done at that time.
- Five months after the car accident, he developed a severe frontal headache, with left upper and lower extremity weakness, and diagnosed with a massive Cerebrovascular Accident [Exhibit 1]. He was admitted to medicine where his angry outbursts and seizure-like activity worsened.
- Neurology was consulted and diagnosed him with seizure disorder Vs. Post CVA epilepsy. No EEG was reported from the previous hospital. He was started on Levetiracetam 1000mg oral daily, which further worsened the agitation and aggression. Levetiracetam was stopped and changed to Valproic acid 500mg orally BID.
- Clinical Psychology was consulted for Neuropsychiatric Inventory (NPI) to rule out "Sundowning." The diagnosis of PBA was made and they recommended a trial of Nuedexta 1 tab daily. [dextromethorphan hydrobromide/ quinidine sulfate].

- The patient was discharged from another facility and transferred to our hospital for Post-CVA Rehabilitation. During the transfer, he became acutely agitated and jumped out of the ambulance but had no injuries.
- On the 2nd day of his hospitalization, a psychiatry consult was called because the patient was seen laughing inappropriately and later attacked a nurse.
- Psychiatry Consultation and Liaison team evaluated the patient and titrated Valproic acid to a total of 1500mg /daily and Nuedexta to a total of 2 tabs/daily. After this titration, his overall behavior improved and his aggression and agitation subsided in the next 2 days.

Please check the attached PDF file for Challenges we face, and recommendations to handle such cases.

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141) Abstract 1490

GREATER SENSITIVITY TO SOCIAL THREAT IS ASSOCIATED WITH POORER MENTAL HEALTH IN ADOLESCENTS AT VARYING RISK FOR DEPRESSION

Theresa Q. Bui, B.S., Cousins Center for Psychoneuroimmunology and Department of Psychiatry and Biobehavioral Sciences, Meghan Vinograd, M.A., Department of Psychology, Stassja Sichko, B.A., George M. Slavich, Ph.D., Cousins Center for Psychoneuroimmunology and Department of Psychiatry and Biobehavioral Sciences, University of California, Los Angeles, Los Angeles, CA

A growing body of research has suggested that heightened sensitivity to stressors involving social evaluation and rejection predicts poorer mental health in adolescence and adulthood (e.g., Slavich, O'Donovan, Epel, & Kemeny, 2010; Somerville, 2013). However, relatively few studies on this topic have experimentally manipulated experiences of social stress and associated individuals' experiences of such stressors with their mental health profiles.

To address this issue, we collected data on adolescent girls (N=12), who, as part of a larger study exploring responses to social evaluation, participated in an individually filmed interview, in which they described their personality, opinions, and memories. Participants were later introduced to a female confederate, who they believed would be watching their filmed interview and evaluating them every ten seconds. In reality, the subject watched a pre-recorded video of what she believed were the confederate's evaluations on a rating grid, which contained adjectives such as "stupid," "kind," "boring," and "caring." To measure sensitivity to this experimentally induced social stressor, participants completed questionnaires, which asked about their feelings and impression of the confederate, before and after watching the ratings. Participants also completed the Kessler 6, a well-validated instrument for assessing mental health (Kessler et al., 2002).

As hypothesized, greater sensitivity to social stress, as indexed by an increase in feeling threatened by the confederate (F(1, 10) =5.632, B = .600, p = .039) and an increase in feeling disconnected or wanting to disconnect (F(1, 10) = 7.814, B = .662, p = .019) after the stressor, were both associated with a greater number of self-reported mental health complaints.

Though preliminary, these findings suggest that greater sensitivity to social threat is associated with poorer mental health in adolescent females. Although heightened reactivity to social threat may have adaptive benefits in the short term, if sustained, prolonged sensitivity to such stress may lead to the development of mental and physical health problems over time. Future research is needed to examine the neural mechanisms underlying these associations and whether social threat reactivity represents a potentially modifiable process that can be targeted to reduce disease risk and improve adolescent health.

142) Abstract 1035

SUICIDAL IDEATION IN SOCIAL ANXIETY DISORDER - THE SIGNIFICANCE OF PERCEIVED BURDENSOMENESS AND THWARTED BELONGINGNESS

Rupert Conrad, MD, Department of Psychosomatic Medicine and Psychotherapy, Andreas J. Forstner, MD, Johannes Schumacher, MD, Institute of Human Genetics, Franziska Geiser, MD, Stefanie Rambau, M.Sc. Psych., Department of Psychosomatic Medicine and Psychotherapy, University of Bonn, Bonn, Germany

Social anxiety disorder is often associated with considerable suffering for those affected. The avoidance of social contacts may lead to a loss of social support and integration. Psychological distress is often connected to suicidal behavior in affected persons, which can also be a considerable challenge for practitioners. The interpersonal theory of suicidality by Thomas Joiner (2005) postulates a close relationship between the loss of social integration and the emergence of suicidal ideation. Against the background of this theory, we examined the significance of perceived social affiliation for the frequency of suicidal ideation. 226 participants with social anxiety disorder were recruited at the Department of Psychosomatics, Bonn University Hospital. The diagnosis was made using the Structured Clinical Interview for DSM-IV. All participants answered the questionnaires Social Phobia Inventory, State Trait Anger Inventory (STAXI), Parental Bonding Instrument (PBI), Beck Depression Inventory (BDI), and Interpersonal Needs Questionnaire (INQ). By means of linear regression the prediction of suicidal ideation as assessed by the BDI suicidality item was investigated.

46% of participants showed suicidal ideation. 36.1 percent of variance of the dependent variable suicidal ideation could be elucidated by the predictors. Significant predictors were, in addition to the strength of social phobia ($\beta = 0.176$, p = 0.019), the INQ scales "perceived burdensomeness" ($\beta = 0.294$, p <0.001) and "thwarted belongingness" (β =0.205; p=0.009) as well as "State Anger" (β =0.182; p=0.014) "Paternal Care" (β =0.203; p=0.009) und "Paternal Control" (β =-0.239; p=0.004). In addition to age, gender and extent of social phobia (adjusted R² = 0.087), the INQ scales were able to explain 20.1% of the variance.

Our study highlights the significance of the lack of social affiliation for suicidal ideation in social anxiety disorder, which confirms a substantial prediction of the interpersonal theory of suicidality by Thomas Joiner. A lack of paternal care and control as well as anger as a distance-creating emotion also play a role in this context as predictors of suicidal ideation. Clinical implications of the results, especially with regard to diagnosis and prevention of suicidal behavior are discussed.

143) Abstract 1050

RELATIONSHIP BETWEEN STRESS AND FATIGUE IN DEPRESSION AND SOMATIC SYMPTOM DISORDER

Johanna M. Doerr, PhD, Psychology, University of Marburg, Marburg, Germany, Ricarda Mewes, PhD MD, Nadine Skoluda, PhD, Psychology, University of Vienna, Vienna, Austria, Anja C. Feneberg, MSc, Psychology, University of Marburg, Marburg,

Germany, Urs M. Nater, PhD, Psychology, University of Vienna, Vienna, Austria

Background: Fatigue is a symptom occurring in many disorders, and it has been found to be positively associated with stress. Although fatigue is one of the most debilitating complaints in depression (DE, a disorder characterized by affective symptoms) as well as in somatic symptom disorder (SSD, a disorder characterized by somatic symptoms), it has not gained much research interest in these disorders so far. We were interested in differences between DE and SSD concerning a) the subjective sensation of fatigue measured on different dimensions, and b) the relationship between psychobiological stress measures and fatigue.

Methods: 29 women with depression (DE) and 29 women with somatic symptom disorder (SSD) filled out the Multidimensional Fatigue Inventory (MFI), the Trier Inventory for chronic stress subscale chronic stress (SSCS), and reported momentary stress and fatigue during a period of 14 consecutive days with 5 time points each day. They also provided hair samples (measuring long-term HPA axis activity). We report results of questionnaire data using t-tests, and regression analyses, and everyday-life data using hierarchical linear models.

Findings: The DE sample had higher MFI general and mental fatigue (both p<.001). Samples did not differ in MFI physical fatigue (p=.061). SSCS predicted MFI general (p<.001) and mental (p=.005) fatigue in SSD, whereas it was associated with MFI physical (p=.018) and mental (p=.030) fatigue in the DE sample. Hair cortisol was not associated with SSCS or MFI in either sample, nor with momentary fatigue or stress in the DE sample. However, hair cortisol was positively associated with momentary fatigue in the SSD sample (p<.001). In both samples, momentary fatigue was positively associated with same time-point stress (both p<.001), but neither previous time-point stress nor SSCS explained additional variance.

Conclusion: There seem to be differences in the subjective sensation of fatigue and the relationship between psychobiological stress measures and fatigue between DE and SSD patients. The difference in long-term HPA axis activity might be worthwhile of further investigation using longitudinal designs. The data also suggests that it is important to investigate different reference time frames and time-lags between stress and fatigue assessment to gain more information about the (chronological) nature of their association.

144) Abstract 1484

EXERCISE AND RESILIENCE AFTER RETIREMENT

Wendy C. Birmingham, PhD, Psychology, Brigham Young University, 1039 SWKT, UT, Erin Kaseda, N/A, Neuroscience, Tyler Graff, BS, Psychology, Lori Wadsworth, PhD, Public Management, Brigham Young University, Provo, UT

Background: Current projections estimate that the number of older adults will significantly increase in the coming years, and many of those adults will be burdened with major health problems such as heart disease (70%) and diabetes (25.9%). Older adults are also faced with mental and emotional challenges such as depression and suicidal ideation. The social and economic costs of disease burden in the aging population show the importance of understanding factors that increase individuals' resilience against physical and mental health problems that often arise in late adulthood.

Methods: Participants aged 53-90 (58% male) were recruited from those attending the 2016 Huntsman Senior World Games in St. George, Utah. This population was selected to represent successfully aging older adults. We received survey responses from 197 attendees and conducted one-on-one interviews with 175 of those respondents. We focused on specific aspects of spousal relationship quality and depression and the effect of exercise frequency on these psychosocial measures.

Results: Participants were mostly white (91.8%) and educated (88.0%). Most were married (79.4%), and of higher income (70.0% >\$50,000/year). Exercise hours averaged 9.03 per week. Most participants reported an increase in activity level after retirement with 67.86% reporting exercise behavior improving and 21.43% reported maintaining the same amount. Most of these adults (89.6%) reported being either happy in their marriage, and most (84.7%) reported low levels of depression. Regression analysis showed increased hours of exercise to be associated with lower levels of depressive symptoms (p = .01) and better self-reported health (p = .01). The majority of respondents also reported low incidence of diagnosed cardiovascular disease (97.5%) and diagnosed diabetes (90%).

Conclusions: Participants of the Huntsman Senior World Games are prime examples resilience in older adulthood. These senior Olympians demonstrate an increase of physical activity after retirement as well as good physical well-being, and remarkably low levels of common health problems. Participants also happiness in marriage and lower levels of depression. These associations are important in helping us understand how physical activity and social support impacts successful aging and the health and happiness of adults throughout retirement.

145) Abstract 1507

RELIGIOUSNESS AND SPIRITUALITY PREDICT HEALTH BEHAVIORS THROUGHOUT A WEEK

Alyssa C. Cheadle, PhD, Andrew Gall, PhD, Psychology, Hope College, Holland, MI

Religiousness and spirituality are associated beneficially with health. Mechanisms of these associations have not been established, but health behaviors may explain associations. Increasingly, daily diary methods are employed in health research because they decrease retrospective reporting and increase validity. However, these methods have not been used in research on R/S and health. We conducted a 7-day daily diary study on religiousness, spirituality, and health behaviors. Participants (n=150) were recruited from a Christian, liberal arts college. During an initial lab visit, participants completed a survey on baseline and trait religiousness, spirituality and overall health. For the following seven mornings, they completed surveys on their religious, spiritual, and health behaviors and experiences over the past 24 hours. In particular, surveys focused on sleep, diet, and physical activity. Multilevel models suggest that baseline religiousness and spirituality predict unique patterns of sleep and physical activity. These results support health behaviors as a possible mechanism of observed associations of religiousness and spirituality with health outcomes.

146) Abstract 1347

CHRONIC STRESS, PHYSICAL ACTIVITY, AND SLEEP AS PREDICTORS OF THE RESPONSE TO SUSTAINED ACUTE STRESS

Hannah Nordberg, B.A., Juliet Kroll, M.A., Matti Miller,, Yumna Furqan,, Alexis Jones,, Thomas Ritz, Ph.D., Psychology, Southern Methodist University, Dallas, TX

Prior research has indicated that physical inactivity, sleep deprivation, and chronic stress are associated with several health problems. Staying physically active, prioritizing sleep, and reducing chronic stress, however, has been linked to

improvements in both physical and mental health. The extent to which these health-related factors influence individuals' response to stressors has not been thoroughly examined. In this study, an academic final exam period was used as a natural paradigm of sustained acute stress. Undergraduate students (n = 265) were assessed at mid-semester, during a final exam period, and 7 days after the exam period. Participants reported on habitual physical activity levels, sleep habits, and chronic stress exposure. Additionally, participants rated their level of perceived stress, negative affect, and confidence in mastery of the exams. We hypothesized that habitual physical activity levels, chronic stress, and sleep habits during the exam period would predict perceived stress, negative affect, and expectations of mastery. Multiple linear regression models controlling for demographics and BMI indicated that a longer duration of sleep the night prior to the exam assessment predicted lower negative affect and stress responses during the exam period. Additionally, greater levels of reported chronic stress during mid-semester predicted greater negative affect during the exam period. Sex was a significant predictor of performance satisfaction following the exam period, indicating that women are more satisfied with their final exam grades. Contrary to expectations, physical activity levels were not significant predictors of negative affect, perceived stress, or expectations of mastery. However, because physical activity was assessed as habitual at mid-semester, it is possible that it did not reflect physical activity levels more proximal to the exam period. Our findings indicate an important role of prior sleep in predicting the affective response to sustained acute stress.

147) Abstract 1295

EMOTION REGULATION AS A POTENTIAL MECHANISM EXPLAINING THE LINK BETWEEN EVENING CHRONOTYPE AND ALCOHOL USE

Briana J. Taylor, PhD, Psychiatry, Maine Medical Center, Portland, ME, Marissa A. Bowman, BA, Alicia Brindle,, Claire Ozolek,, Kamaria Brown,, Psychology, Martica H. Hall, PhD, Psychiatry, University of Pittsburgh, Pittsburgh, PA

Introduction: Converging evidence suggests that the evening chronotype, or a preference for evening hours, is associated with greater alcohol use. However, mechanisms underlying this relationship have not been well defined. Evening chronotypes may have difficulties with emotion regulation, and this difficulty with emotion regulation may lead to alcohol use. Thus, this study evaluated chronotype differences in emotion regulation and analyzed emotion regulation as a potential mediator between chronotype and alcohol use.

<u>Methods</u>: Eighty-one undergraduates (M_{age} =19.6, SD=1.2; 69.1% female) from the University of Pittsburgh participated in this study. Chronotype was measured using the Composite Scale of Morningness (CSM) and alcohol consumption was assessed using the Alcohol Use Disorder Identification Test (AUDIT). Participants completed a laboratory emotion regulation task that instructed participants to increase positive emotions to positive images and decrease negative emotions to negative images. Self-reported affect and heart rate variability (HF-HRV) were evaluated during the task.

<u>Results:</u> Evening chronotypes reported significantly greater alcohol use on the AUDIT (F = 4.399, p = 0.039). There were no significant differences in emotion regulation as a function of chronotype, as assessed by self-reported affect, HF-HRV or PEP during the laboratory task (p's > 0.05). Emotion regulation did not mediate the association between evening chronotype and alcohol use. Exploratory moderation analyses indicate that there is a positive association between sleep duration and HF-HRV during negative emotion regulation trials, but only for intermediate chronotype.

<u>Conclusion</u>: Consistent with previous findings, we report that evening chronotype among undergraduates is associated with greater alcohol use. Results did not support the mechanism of emotion regulation as a mediator between chronotype and alcohol use. One possible confound to our study may be our emotion regulation method. Future research should assess emotion regulation using different methodologies, such as more intense, real-world examples.

148) Abstract 1407

FOOD-ALCOHOL COMPETITION: DOES EATING SWEETS REDUCE ALCOHOL CRAVING?

Jenna R. Cummings, MA, Peter Nooteboom, BA, Dorothy Nguyen, BA, A. Janet Tomiyama, PhD, Psychology, University of California, Los Angeles, Los Angeles, CA

Alcoholics Anonymous has published testimonies that state that eating sweets allays the urge to drink. However, there is no experimental test of this existing practice and, if it works, it is unknown why. We have proposed a food-alcohol competition hypothesis, which posits that eating sweets attenuates alcohol use because these behaviors share activation of the mesolimbic dopamine reward pathway; if someone eats a large enough amount of sweets, individuals will feel sufficiently rewarded and not crave alcohol. We conducted the first experimental test of the effect of eating sweets on alcohol craving in a sample of 150 heavy drinkers recruited from the Los Angeles community. Each drinker picked the alcohol they considered most rewarding and then smelled it for 3 minutes to induce alcohol craving. Alcohol craving was captured via multiple methods including selfreported alcohol craving, heart rate, heart rate variability, and electrodermal activity. Drinkers were then randomly assigned into one of five conditions: (1) eat 150 calories of bland food, (2) eat 150 calories of sweets, (3) eat 450 calories of bland food, (4) eat 450 calories of sweets, or (5) eat no food/watch a neutral video. Those who ate sweets picked ones they considered most rewarding (e.g., brownies, cookies, ice cream). This manipulation thus tested the food-alcohol competition hypothesis while specifying the amount and type of food needed for any effect, and controlling for alternative explanations such as caloric displacement or distraction. After the manipulation, drinkers again smelled the alcohol they considered most rewarding so that changes in alcohol craving could be observed. Results indicated that there were no significant differences in changes in alcohol craving across conditions, by amount or type of food. These results were consistent across self-report, heart rate, heart rate variability, and electrodermal activity. The lack of experimental support suggests that any anecdote about eating sweets reducing alcohol craving likely does not reflect a causal relationship, and seemingly is due in part to distraction. Critically, these results suggest that Alcoholics Anonymous should not be recommending this strategy to those who are trying to quit drinking.

149) Abstract 1382

DEVELOPMENT AND PRELIMINARY TESTING OF AN INTERNET-BASED COGNITIVE BEHAVIOR GROUP THERAPY PROGRAM WITH SYNCHRONOUS ON-LINE VIDEO CONFERENCE AMONG CORONARY ARTERY HEART DISEASE PATIENTS

Shi-Hong Hsu, M.S., Psychology, National Chung Cheng University, Chiayi, Taiwan, Province Of China, Tin-Kwang Lin, M.D., School of Medicine, Tzu Chi University, Hualien, Taiwan, Province Of China, Pao-Ta Yu, Ph.D., Computer Science and Information Engineering, National Chung Cheng University, Chiayi, Taiwan, Province Of China, Shih-An Pai, M.S., Psychiatry, Cheng Ching Hospital Chung Kang Branch, Taichung, Taiwan, Province Of China, Shu-Shu Wong, Ph.D., Psychology, Wenzhou University, Wenzhou City, China, Chiu-Tien Hsu, Ph.D., Center of Clinical Psychology, Dalin Tzu Chi Hospital, Chiayi, Taiwan, Province Of China, Hui-Ling Shih, Ph.D., Law, Chia-Ying Weng, Ph.D., Psychology, National Chung Cheng University, Chiayi, Taiwan, Province Of China

Objective: To examine the effectiveness of an internet-based cognitive-behavior group therapy (iCBGT) program with synchronous on-line video conference in reducing anxiety and hostility, as well as in improving vasodilation function for patients with coronary artery heart disease (CAD).

Method: Adopting both the asynchronous and synchronous communication forms, the present study developed an iCBGT protocol modified from the traditional FTF one. First, we made an internet digital curriculum to deliver the psycho-education contents one-hour per week through text, picture, clip, and animation. Secondary, we built a synchronous video conference system [Joinet] to conduct the on-line group therapy. The eight weekly sessions consisted with psycho-education, stress management, cognitive flexibility and biofeedback-assistant relaxation training in addition to the standard medical care. Thirty one patients were enrolled in the treatment groups, then chose to participate in the traditional face to face (FTF) (18; mean age = 62.72 ± 7.56 years; male, 50.0%) or iCBGT (13; mean age = 58.23 ± 7.55 years; male, 92.3%) group basing on their preference. Fourteen patients (mean age = 56.79 ± 9.76 years; male, 71.4%) were assigned to the waiting-list control (WLC) group and received standard medical care without any clinical psychological treatments.

Results and Conclusion: The results indicated that the iCBGT program was as efficacious as the traditional FTF one in reducing anxiety ($F_{(2, 41)}$ =4.44, p < .05, $\eta^2 = .18$) and hostility ($F_{(2, 42)}$ = 2.98, p = .06, $\eta^2 = .12$) as well as in reducing respiratory rate ($F_{(2, 42)}$ = 3.34, p < .05, $\eta^2 = .14$) and improving vasodilation function ($F_{(2, 37)}$ = 3.21, p = .052, $\eta^2 = .15$) comparing to the WLC group. **Key words:** cognitive-behavior therapy, group therapy, internet-based intervention, coronary artery heart disease, biofeedback

150) Abstract 1178

GROUP INTERVENTION FOR COUPLES REDUCES LONELINESS: FIRST RESULTS FROM THE SOCIAL INTERACTION IN DEPRESSION (SIDE) STUDY

Marc N. N. Jarczok, Dr., Clinic for Psychosomatic Medicine and Psychotherapy, University Medical Center Ulm, Ulm, Germany, Marco Warth, Dr., Beate Ditzen, Dr., Corina Aguilar-Raab, Dr., Center for Psychosocial Medicine, University Hospital Heidelberg, Heidelberg, Germany

Positive social interactions (e.g. social support, bonding behavior) have a substantial impact on health and survival. Experimental studies prompt that the protective effect of those interactions is mediated by a reduced activity of psychobiological stress. However, people who suffer from chronic mental illnesses such as depression and their partners might benefit less from the positive effects of social interactions. Increasing compassion might increase benefits from those interactions. Circadian variation of vagal activity has been suggested as an integrative marker of overall health. It is hypothesised that a cognitively based compassion training (CBCT ®) increases overall health as indicated by circadian variation of vagal activity.

Women diagnose with a primary recurrent depressive disorder (ICD-10: F33.0 or F33.1) were recruited from the University Hospital Heidelberg (Inpatients) to participate in the Social Interaction and Depression (SIDE) study. Inclusion criteria were: heterosexual relationship at least 2 years, couple willing to participate in a weekly 10-week group CBCT for couples. Eight couples were randomized to training (N=4) or treatment as usual TAU (N=3) group, one couple dropped out after randomization. Multilevel mixed-effects linear regressions were used to estimate the CBCT effect on loneliness in both partners. Models were adjusted for sex and depression severity using becks depression inventory (BDI). Loneliness was assessed pre- & post training using the German translation of the UCLA Loneliness Scale.

Average relationship length was 11years and mean age 50years. Total loneliness score decreased on average by 3 scale points. Both, the CBC-training (vs. TAU; b=-4.7 p=0.004) and post treatment time point (vs. pre; b-3.0 p=0.001) decrease the loneliness score. No sex difference was observed. An interaction of training and time point did not increase model fit. BDI significantly increased loneliness (b=0.3 p=0.049) and time point became insignificant. Adding a BDI sex interaction to the model showed that this effect was specific to women (b=0.23 p<0.001) but not men (b=0.26 p=0.064).

The first training group showed the hypothesized effects: The CBC-Training significantly reduced loneliness independent of sex and depression symptom severity. This couple based group intervention may build up resilience via compassion training.

151) Abstract 1070

DOES OUTCOME IN PATIENTS WITH A PSYCHOSOMATIC DISORDER TREATED IN A STRUCTURED MULTIMODAL PROGRAM DEPEND UPON PSYCHOTHERAPIST'S PSYCHOTHERAPEUTIC APPROACH?

Marzio E. Sabbioni, MD, Patrick Figlioli, PhD, Psychosomatic and Psychotherapeutic Medicine, Lindenhofspital, Bern, Switzerland, Daniel Horat, med. pract., Psychosomatic and Psychotherapeutic Medicine, Linendhofspital, Bern, Switzerland, Anne-Lise Jordi, MD, Marcel Fürer, MD, Psychosomatic and Psychotherapeutic Medicine, Lindenhofspital, Bern, Switzerland 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 treatment outcome was differentially affected by the psychotherapeutic approach in the one to one psychotherapy.

From 2006 until 2016 934 patients (mean age 33.5y, range 14y -78.8y) were treated as in-patients and/or in the day clinic of the Department of Psychosomatic and Psychotherapeutic Medicine. 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. The structured multidisciplinary, multimodal treatment consisted of group therapies (e.g. art therapy, movement therapy, psycho-educative groups on different topics, such as anxiety, depression eating disorder, pain, relaxation), milieu therapy, physical therapy, counselling by social workers and dietitians. One to one psychotherapy was delivered by board-certified physicians in Psychiatry/Psychotherapy or in Psychosomatic Medicine or a psychologist with a completed psychotherapy training. However, they had different psychotherapeutic approaches that can be described as psychodynamic, cognitive-behavioural and/or integrative.

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).

There was a significant improvement of the mental component of QOL (p<.0001), of the physical component of QOL (p<.001), depressive symptoms (p<.001), anxiety (p<.001), distress (p<.001), somatization (p<.001) and eating disorder (p<.001). The improvements were predicted by the amount of psychopathology at the beginning (p.0001) but not by the psychotherapist (p n.s.) in charge of the one to one psychotherapy.

The improvements in QOL, distress, depressive symptoms, anxiety and somatization did not depend upon the psychotherapeutic approach of the psychotherapist delivering the one to one psychotherapy within a structured multimodal treatment program.

152) Abstract 1198

RESILIENCE AND HIV: A REVIEW OF THE CONCEPTUALIZATION AND MEASUREMENT OF RESILIENCE

Akilah Dulin, PhD, Behavioral and Social Sciences, Brown University, Providence, RI, Sannisha K. Dale, PhD; Ed.M, Psychology, University of Miami, Coral Gables, FL, Valerie A. Earnshaw, PhD, Human Development and Family Sciences, University of Delaware, Newark, DE, Joseph L. Fava, PhD, Centers for Behavioral and Preventive Medicine, The Miriam Hospital, Providence, RI, Michael J. Mugavero, MD, Medicine, University of Alabama at Birmingham, Birmingham, AL, Sonia Napravnik, PhD, Medicine, University of North Carolina at Chapel Hill, Chapel Hill, NC, Joseph W. Hogan, ScD, Biostatistics, Brown University, Providence, RI, Michael P. Carey, PhD, Centers for Behavioral and Preventive Medicine, The Miriam Hospital, Providence, RI, Chanelle J. Howe, PhD, Epidemiology, Brown University, Providence, RI

Objective(s): There is a growing interest in measuring resilience among persons affected by HIV to inform future research and intervention efforts. A review of the conceptualization and measurement of resilience within the HIV literature presently does not exist. Therefore, we use a socioecological model to conceptualize resilience and review resilience measures and conceptualizations in studies of persons living with HIV (PLWH).

Design: To contextualize the strengths and limitations of resilience conceptualization and measurement in HIV research, we examine quantitative and qualitative research studies and consider common conceptualizations of resilience and limitations of extant resilience measures in the HIV literature.

Methods: We conducted a review of peer-reviewed literature.

Results: The majority of HIV resilience research conceptualizes and measures resilience only at the individual (i.e., psychological) level. The exclusion of interpersonal and neighborhood resilience contrasts with qualitative and quantitative evidence that describes these factors as resilience resources for PLWH. Furthermore, the preponderance of HIV resilience research uses general measures of psychological resilience; these measures have not been developed with or tailored to the needs of PLWH. Qualitative findings and a recent quantitative paper suggest that resilience measures tailored to the needs of PLWH are important for HIV management.

Conclusions: Qualitative and quantitative evidence suggest that a socioecological approach can more fully represent the construct of resilience. Furthermore, measures specific to PLWH that

capture individual, interpersonal, and neighborhood resilience are needed. Future research should develop and test theory-based resilience measures for PLWH.

153) Abstract 1524

CONSIDERINGTHEROLEOFNATIVITYANDGENDERINTHERELATIONSHIPBETWEENPERCEIVEDDISCRIMINATIONANDOVERWEIGHT/OBESITY:RESULTSFROMTHENATIONALEPIDEMIOLOGICSURVEYONALCOHOLANDRELATEDCONDITIONSSURVEYSURVEY

Adolfo Cuevas, PhD, Community Health, Tufts University, Medford, MA, Yusuf Ransome, PhD, Social and Behavioral Sciences, Yale University, New Haven, CT, Kasim Ortiz, MS, MPH, Sociology & Criminology, University of New Mexico, Albuquerque, NM

Introduction: Overweight/obesity has become a significant public health issue in the United States. While physical activity and nutrition have been shown to have profound impact on weight gain, the role that psychosocial stress play on the risk of overweight and obesity has been understudied. Growing attention has been given to the ways in which perceived discrimination may adversely affect health. Few studies have examined the obesogenic effects of perceived discrimination across a multiracial and multiethnic sample of adults.

Methods: Data for the current study were drawn from Wave 2 of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC; 2003-2004) [N=34,076]. BMI was used to define weight categories as underweight/normal weight, overweight, and obese. We measured perceived racial discrimination using the validated Experiences of Discrimination instrument included in the NESARC, which was developed by Krieger and colleagues1. Multinomial logistic regression was used to model the effects of perceived discrimination, adjusting for sociodemographics, and health-related behaviors (i.e., smoking status, drinking status, physical activity).

Results: Preliminary results suggest that association between perceived discrimination and overweight/obesity differed by race/ethnicity, gender, and nativity. In fully adjusted models, greater discrimination was associated with increased risk of obesity among whites (RRR = 1.28, 95%CI [1.01, 1.62]), whereas greater discrimination was associated with decreased risk of overweight among Blacks (RRR = 0.81, 95%CI[0.66, 0.99]). When considering the role of gender and nativity, in fully adjusted models, discrimination was associated with increased risk of obesity for white women (RRR=1.59, 95%CI [1.16, 2.18]), foreign-born Blacks (RRR = 1.99, 95%CI[1.14, 3.47]), and U.S.-born whites (RRR = 1.29, 95%CI[1.01, 1.66]). Conclusion: Perceived racial discrimination may be an important contributor to obesity for certain groups. Future research is needed to identify the biobehavioral factors that may mediate the relationship between perceived discrimination and overweight/obesity.

154) Abstract 1298

EFFECTS OF PERCEIVED DISCRIMINATION, ETHNICITY, AND GENDER ON CANCER PATIENTS' MENTAL AND PHYSICAL HEALTH OUTCOMES

Angelica Gousse, BS, Patricia Pedreira, BS, Hannah-Rose Mitchell, MPH, Amanda Ting, BS, Marcella May, MA, Youngmee Kim, Ph.D., Psychology, University of Miami, Coral Gables, FL **Background:** Substantial disparities in health outcomes in cancer patients have been noted. The role of psychosocial factors, such as perceived discrimination, gender, and ethnicity, in disparities in patient-reported health outcomes (PROs) as well as objective, neuroendocrine markers, however, remains unknown. The current study aimed to (a) investigate the degrees to which perceived discrimination, gender, and ethnicity relate to these outcome in recently diagnosed colorectal cancer (CRC) patients and (b) explore whether gender and ethnicity (Hispanic, African-American, White-Non Hispanic) moderate the associations between perceived discrimination and health outcomes.

Methods: A total of 73 CRC patients (about 3 months postdiagnosis) provided valid study variables: gender, ethnicity, perceived discrimination in their daily life (Perceived Discrimination Scale), and PRO-mental and -physical health (MOS SF-12). Patients provided saliva samples at waking and bedtime for two consecutive days, from which cortisol was assayed.

Results: Patients reported low to moderate levels of perceived discrimination. PRO mental and physical were at the 25th percentile of US norms. Hierarchical general linear modeling, controlling for income and education, revealed that male CRC patients reported better PRO-mental health than their female counterpart (B = 5.59, p < .01). Also, male patients had higher awakening cortisol than their female counterparts (B = 8.16, p < .05). Greater perceived discrimination was associated with lower awakening cortisol levels (B = -2.12, p < .05) and smaller cortisol difference throughout the day (B = -2.54, p < .01), which were only the case among male patients.

Conclusion: Findings provide support for the adverse effects of perceived discrimination on dysregulated neuroendocrine functioning of male cancer patients, which was evidenced early in the illness trajectory. Further investigations on underlying mechanisms of perceived discrimination linking to health disparities among male patients and its long-term health consequences with a larger sample are warranted. Examining other psychosocial factors, such as access to care and social integration; other health indicators, such as CRC-specific PROs and immune markers; and replicating the findings with family caregivers are encouraged in future studies.

155) Abstract 1192

PHYSIOLOGICAL STRESS RESPONSE VARIES BY STRESSOR TYPE, SEX, AND PARENTHOOD

Christoph Herrmann-Lingen, MD, Clara Dunkel, MD, Psychosomatic Medicine, Univ. of Göttingen Medical Center, Göttingen, Germany, Mira L. Chavanon, PhD, Developmental Psychology, University of Kiel, Kiel, Germany

While physiological stress reactions have been studied extensively, associations between stressor type or intensity of perceived stress and physiological activation are incompletely understood. We recently showed that listening to an audio recording of a crying baby (CB) - although perceived as distressing - led to parasympathetic rather than sympathetic activation healthy in women. Comparing the data from the healthy females (n=35; 38 ± 11 y/o) with an age-matched healthy male sample (n=34) we now tested whether this effect differs by sex and parenthood. Both samples underwent CB and mental arithmetic (MA). At baseline (BL), during both 5 minute stress conditions and final recovery we assessed subjective units of discomfort (SUD) and several and cardiovascular autonomic markers. SUD were significantly higher during CB (3.4±1.5) and MA (5.0 ± 1.7) than at BL (1.7 ± 1.3) and significantly higher during MA than CB. Sex and parenthood were unrelated to changes in SUD. Heart rate significantly increased during MA but decreased

during CB (both p<.001), regardless of sex or parenthood. In contrast, significant effects of sex, but not parenthood, were observed for changes in high frequency heart rate variability, which was significantly higher during CB than during either BL or MA (both p<.01), and this effect was mainly observed in women (sex*time: p<.001). Baroreflex sensitivity decreased from BL to MA regardless of sex or parenthood, while it increased during CB and more strongly so in women than men (p=.012). Parenthood again had no effect. Regardless of sex and parenthood, pre-ejection period decreased during MA but returned to baseline with CB. Change in peripheral resistance was related to both sex and parenthood: While it changed less in women it dropped during MA in men, mainly in fathers, returning to BL values during CB in fathers and increasing significantly above BL during CB (p=.001) in childless men. Physiological changes were mainly unrelated to SUD. Our results indicate that a) SUD during different mental stress tests are only poorly related to the physiological stress response, b) different patterns of change can be observed with different types of stressors, c) patterns differ by sex (eg, more parasympathetic response to CB in women, more overall alphaadrenergic response in men) and d) childless men show the strongest vasoconstrictive response to CB.

156) Abstract 1323 LONGITUDINAL EFFECTS OF PERCEIVED DISCRIMINATION ON NOREPINEPHRINE AND EPINEPHRINE

Lydia Homandberg, B.A., Thomas Fuller-Rowell, Ph.D., David Curtis, Ph.D., Human Development and Family Studies, Auburn University, Auburn, AL

Perceived discrimination (PD) has been associated with self-rated health, mortality, and aggregate indexes of physiologic dysregulation (Barnes et al., 2008; Fuller-Rowell et al., 2012; Schulz et al., 2006). However, few studies have examined associations between PD and catecholamines, and even fewer have considered this association using longitudinal data. This is surprising given that over activation of the sympathetic nervous system has been linked to chronic stress exposure and is thought to be an important mechanism for effects of PD on health (Ahmed et al., 2007; Castro-Diehl, 2013). The current study examined PD as a predictor of changes in urinary epinephrine and norepinephrine concentrations over a three year period in a sample of college students at a large, predominantly white, Midwestern University (N = 149, 45% Black, 55% White; Mean age at baseline = 18.8, SD = .96). Two thirds of participants completed a follow-up assessment three years later (T2). Epinephrine and norepinephrine concentrations were obtained from 12-hour overnight urine samples at both time points. PD (a = .91) was assessed using 13 items from the Racism and Life Experiences Scales (RaLES; Harrell, 2000). Regression analyses examined the effect of PD on catecholamines at T2, adjusting for T1 catecholamine concentrations and other controls. An additional model further adjusted for depression, negative affect, and rejection sensitivity. Full Information Maximum Likelihood estimation was used to deal with missing data. The analytic sample was therefore 149 across all models. Model results for norepinephrine are shown in Table 1. PD was associated with changes in norepinephrine (B = .310; p = .008) across the three year period. These effects remained after further adjusting for depression, negative affect, and rejection sensitivity. Analyses for epinephrine yielded the same pattern of findings. These results are consistent with previous studies showing that PD is associated with physiologic dysregulation, and extends this work

by establishing a longitudinal association with indicators of sympathetic nervous system activation. Additional research is needed to further explicate the mechanisms for the effects of PD on health.

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157) Abstract 1067

STUDENTS OF COLOR HAVE BETTER HEALTH IN SCHOOL ENVIRONMENTS THAT VALUE DIVERSITY

Cynthia S. Levine, Ph.D., Makeda K. Austin, B.S., Edith Chen, Ph.D., Gregory E. Miller, Ph.D., Psychology and Institute for Policy Research, Northwestern University, Evanston, IL

The present research examines what characteristics of school environments might protect the health of students of color. Specifically, it explores whether students of color have better heath when they attend schools that value diversity. Participants were 274 healthy eighth grade students (mean age = 13.91, 36.50% male, 28.04% white) who attended 120 different schools. To assess whether schools valued diversity, we adapted the methodology of previous work showing that schools' mission statements can be coded to reliably capture schools' values (Morley et al., 2015). Specifically, we coded whether the schools' mission statements mentioned diversity-related goals (e.g., teaching students to live in a multicultural world) or not. Outcomes of interest were metabolic syndrome and inflammation. Metabolic syndrome components (waist circumference, blood pressure, HDL cholesterol, triglycerides, and insulin resistance) were combined into two composites: 1) a count of the components on which participants met International Diabetes Federation criteria for elevated risk and 2) a sum of participants' standardized scores on each component. An inflammation composite was computed by summing participants' log transformed standardized levels of circulating interleukin(IL)-6, IL-8, IL-10, C reactive protein, and tumor necrosis factor alpha. Analyses using Hierarchical Linear Modeling software showed that participants' race and whether the school valued diversity interacted to predict the count of metabolic syndrome signs (b = .71, SE = .24, p = .004), the metabolic standardized score sum (b = 2.18, SE = .66, p = .001), and the inflammation composite (b = 2.05, SE = .79, p = .01) composites. Among students of color, attending a school that valued diversity predicted a lower metabolic syndrome component count (b = -.38, SE = .19, p = .045), lower scores on the metabolic standardized score sum (b = -1.29, SE = .46, p = .006), and lower scores on the inflammation composite (b = -1.20, SE = .50, p =.02). These associations were independent of child sex, age, and pubertal stage; family's savings; and the schools' student body demographics and student-teacher ratio. Among white students, the pattern reversed, though not significantly (ps > .12). These findings suggest that inclusive school environments may protect the health of people from underrepresented backgrounds.

158) Abstract 1515

PUT A LITTLE PRAYER IN YOUR JOHN HENRYISM! RELIGIOSITY, EDUCATION AND CARDIOVASCULAR RESPONSES TO ANGER RECALL FOR AFRICAN AMERICAN MEN

Marcellus M. Merritt, Ph.D., Maryam Ayazi, M.S., Kayla Johnson, B.A., Psychology, University of Wisconsin Milwaukee, Milwaukee, WI, Harold G. Koenig, M.D., Psychiatry, Duke University Medical Center, Durham, NC, Michelle R. Di Paolo, Ph.D., Psychology, University of Wisconsin Milwaukee, Milwaukee, WI, Christopher L. Edwards, Ph.D., Psychiatry, Gary G. Bennett, Ph.D., Psychology and Behavioral Sciences, Duke University Medical Center, Durham, NC, Keith E. Whitfield, Ph.D., Psychology, Wayne State University, Detroit, MI

African-American men experience disparate amounts of psychosocial stress (e.g., anger provocation) that increases associated cardiovascular (CV) responses. Our recent research suggests that a mismatch between coping style (e.g., high John Henryism active coping or striving with psychosocial demands) and coping resources (e.g., education level) is linked with elevated blood pressure (BP) reactivity and prolonged BP response to anger recall. As well, religious coping is a recognized CV and psychological stress buffer akin to coping resources for African-Americans. Thus, the present study examined if high levels of religious attendance (ORG), private religious activity (NOR), or subjective religiosity (SUB) buffer CV responses to active speech and anger recall lab stressors alone and linked with John Henryism active coping (JHAC) and educational level.

A sample of 74 healthy African-American males, aged 23 to 47 completed psychosocial surveys and lab reactivity protocol involving active speech and anger recall with a five-minute baseline and ensuing recovery periods. Measures of religious involvement, JHAC and education were related to continuous measures of systolic and diastolic BP and heart rate using Finapres, for each task and rest period with repeated measures ANOVA tests.

The period by education by JHAC interaction effect was significant for diastolic BP responses at low [<u>F</u>(4, 108) = 6.56, <u>p</u> = 0.001] but not higher NOR [<u>F</u>(4, 152) = 1.55, <u>p</u> = 0.203]. At low education and low NOR, diastolic BP levels increased significantly during anger recall [<u>t</u>(14) = -3.12; <u>p</u> = .008] and ensuing recovery [<u>t</u>(14) = -3.07; <u>p</u> = .008] for high but not low JHAC persons.

Private religious activity buffers the role of JHAC in CV reactivity to anger induction for African-American men, especially among those with lower education level. Potential explanations for why the lack of private religious activity would be adverse for poorly educated high JHAC persons include the notion that JHAC has unique meaning at high and low religiosity, and prayer offers a culture-based form of distraction from stress through better cognitive appraisal, affect regulation, and healthy coping in this population.

159) Abstract 1038

SEX AND GENDER-SENSITIVE RISKS OF PSYCHOSOCIAL FACTORS FOR ISCHEMIC HEART DISEASE INCIDENCE AND PROGNOSIS: A SYSTEMATIC REVIEW AND META-ANALYSIS

Veerle R. Smaardijk, MSc, Medical and Clinical Psychology, Paul Lodder, MSc, Methodology and Statistics, Willem-Johan Kop, PhD, Medical and Clinical Psychology, Tilburg University, Tilburg, Netherlands, Angela Maas, MD, PhD, Cardiology, Radboudumc, Nijmegen, Netherlands, Paula Mommersteeg, PhD, Medical and Clinical Psychology, Tilburg University, Tilburg, Netherlands

Background Depression and anxiety are more prevalent in patients with ischemic heart disease (IHD) and among women compared to men. These psychosocial factors predict IHD incidence and progression, but it is unknown whether they are associated with a higher risk in women with IHD compared to men. We aim to assess sex and gender (S&G)-sensitive risks related to psychosocial factors for the incidence and prognosis of IHD outcomes in a meta-analysis.

Methods A literature search was conducted using PubMed, EMBASE and PsycINFO. Studies examining depression, anxiety/panic, social support, hostility (aggression, anger), personality (Type D, neuroticism), posttraumatic stress disorder, and psychological distress on the incidence or prognosis of IHD were included. Screening, data-extraction, risk of bias and quality of evidence assessment was performed by two reviewers. Random-effect analyses will be performed using R. The study has been registered in PROSPERO (registration number CRD42017067087).

Findings The search resulted in 11,711 articles of which 642 were eligible after title-abstract, 408 after full-text, and 292 articles after in-depth screening. Only 40 (14%) reported results S&G-stratified results, 51 (17%) reported for either gender, and 201 studies (69%) did not stratify. In total 46% reported on the incidence of IHD and 58% on prognosis. Depression (71%) was the most examined psychosocial factor, followed by anxiety (26%). Authors of the non-stratified studies are currently being contacted to perform additional gender-stratified analysis. Data-extraction is pending, and S&G-specific association with IHD will be presented.

Discussion Previous meta-analyses suggest that depression is disproportionately predictive of adverse post-myocardial infarction prognosis. Women with IHD have higher levels of depression and other markers of psychosocial distress and they also have a higher risk of IHD incidence and prognosis than men. Our findings concerning S&G-sensitive risks for IHD outcomes will contribute to increase awareness, improve prevention and healthcare, and guide S&G-sensitive interventions for incident IHD and adverse IHD progression.

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160) Abstract 1322

CIRCADIAN MISALIGNMENT IN EVERYDAY LIFE: HOW MISALIGNMENT AFFECTS CARDIOMETABOLIC RISK FACTORS

Kelly G. Baron, PhD, MPH, Behavioral Sciences, Rush University Medical Center, Chicago, IL

There is evidence that individuals with late sleep timing have increased risk for obesity and diabetes but few studies have explored the biological, behavioral and social mechanisms among non-shift workers. This presentation will 1. Discuss the associations between late sleep timing with diet and activity patterns and 2. Present data that demonstrate how variations in the alignment between the circadian rhythm and sleep (circadian misalignment) affect dietary behavior and metabolic processes. This symposium presentation will review a series of observational studies that examined the relationship between sleep and circadian timing with weight, insulin resistance and obesity related behaviors among healthy individuals. As a result of this presentation, attendees will have a greater understanding on how variability in circadian alignment can affect behavioral and biological processes linked to cardiometabolic disorders.

161) Abstract 1365

EXAMINING PREDICTORS OF ENERGY INTAKE AMONGST INDIVIDUALS SELF-MONITORING IN THE REAL WORLD

Sarah C. Beadle, B.A., Jacqueline E. McSorley, B.A., Amelia J. Kinsella, M.S., Eric R. Muth, Ph.D., Department of Psychology, Clemson University, Clemson, SC

The purpose of this study was to examine what factors best predict eating intake of individuals in real-world settings. Other

laboratory-based research has found that eating is predictable and similar; however, these studies usually have similar meals and similar eating context. Studies have shown that the company subjects have during a meal, the location, the type of food, and other individual factors have strong influence over one's eating behavior. We hypothesized that demographic variables would better predict energy intake than eating rate alone. These data were collected by having individuals wear a wrist-worn bite counting device during each meal over a two week period. The device monitored meal duration and number of bites. Caloric information was collected via the Automated Self-Administered 24 hour Dietary Recall (ASA24) or the Remote Food Photography Method (RFPM). Together we had demographic variables for 165 participants as well as eating rate (grams/minute), bite size (kcals/bite), and total meal intake (kilocalories). First, multiple regression was conducted to predict energy intake using eating rate as an independent variable (Model 1). This model was significant, F(1, 163) = 21.92, p < .01. Next, multiple regression was run to predict energy intake using all demographic variables and eating rate as the independent variables (Model 2). This model was significant, F(8, 154) =11.20, p < .01. Only eating rate, age, and waist circumference were significant predictors. Finally, multiple regression was run to predict energy intake using eating rate, age, and waist circumference (Model 3). All of these variables significantly predicted intake, F(3, 159) = 14.75, p < .01. Individual variable coefficients and significance are reported in Table 1. Findings match the hypothesis that demographic factors better predict energy intake in the real world, but this was limited to only age and waist in these data. Surprisingly, eating rate remained significant when demographics were considered as a strong predictor of intake. The next step of this research is to examine what ecological variables such as company and location might alter intake. These findings can better inform clinical interventions and be used for a coaching system for training or weight loss that integrates these variables as predictors of intake.

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162) Abstract 1361

SELF-OBJECTIFICATION IS LINKED TO PHYSICAL ACTIVITY AND PHYSICAL ACTIVITY CHANGE IN SEDENTARY MIDDLE TO OLDER-AGED WOMEN

Claire E. Elling, MA, William K. Goodman, MA, Psychology, Brandeis University, Waltham, MA, Natalie J. Sabik, PhD, Health Studies, University of Rhode Island, Providence, RI, Ashley M. Geiger, PhD, Jutta M. Wolf, PhD, Psychology, Brandeis University, Waltham, MA

Introduction: Self-objectification, or viewing one's body as an object, results from internalizing cultural beauty standards. In active women, greater self-objectification is tied to more frequent moderate and vigorous physical activity. This raises the question whether for sedentary women, changes in mild physical activity correspond with changes in self-objectification. The current study explored the link between Fitbit-assessed changes in step counts as well as self-objectification across a 12-week intervention study in sedentary middle to older-aged women.

Method: Forty-six women (mean age=59.89 +/-6.73 years) taking part in a physical activity intervention study tracked their daily steps for 12 weeks with a Fitbit One. Body surveillance (items 1-8), body shame (items 9-16), and appearance control beliefs (items 17-24) were assessed by the Objectified Body Consciousness Scale (scores range from 1 to 7).

Results: Pre-intervention, participants averaged 5414.28 (+/-2199.51) steps per day and reported low body surveillance and

body shame (2.89 +/-.88; 2.88 +/-.73, respectively) and moderate appearance control beliefs (4.10 + 7.71). While older women walked less (r=-.29, p=.048), self-objectification did not vary by age (ps>.324). Higher step counts, however, were linked to more body surveillance (r=.40, p=.006; shame, control beliefs ps>.452; controlling for age). Across the intervention, steps increased (F=48.73, p<.001), which was predicted by low appearance control beliefs pre-intervention (r=-.38, p=.011; surveillance, shame ps>.104; controlling for age). Facets of selfobjectification, however, remained stable for all ages (ps>.239). Conclusion: The findings suggest that the link between selfobjectification and physical activity remains in sedentary middle to older-aged women. However, this link did not extend to behavior change in the expected direction, but instead the perception of having control over one's appearance limited physical activity change in middle to older-aged women. This may be because perceiving largely uncontrollable normative agerelated changes (weight gain, loss of muscle mass, sagging skin) as controllable is discouraging when the desired appearance consequences are not observed. Our findings thus suggest that certain facets of self-objectification may act as barriers to health behavior changes in middle to older-aged women.

163) Abstract 1034

REDUCED ADRENAL MEDULLARY ACTIVITY MAY BE IMPORTANT FOR THE MAINTENANCE OF NORMAL GLUCOSE REGULATION IN THE OBESE STATE

Anastasia Georgiades, PhD, Richard S. Surwit, PhD, James D. Lane, PhD, Ilene C. Siegler, PhD, Psychiatry and Behavioral Sciences, Cynthia M. Kuhn, PhD, Pharmacology and Cancer Biology, Beverly H. Brummett, PhD, Stephen H. Boyle, PhD, Michael A. Babyak, PhD, Paul Costa Jr., PhD, Redford B. Williams, MD, Psychiatry and Behavioral Sciences, Duke University School of Medicine, Durham, NC

Objective: Obesity is a major risk factor for type 2 diabetes, yet most obese individuals have fasting blood glucose levels within the normal range. We have previously shown that epinephrine (EPI) administration produces an exaggerated glucose response in obese animals and that psychological stress and EPI produces an increased glycemic response in obese individuals at high risk to develop diabetes. We thus hypothesize that reduced adrenal medullary activity both at rest and during mental stress may help maintain optimal glucose regulation in the obese state. To test this hypothesis, we examined the association of plasma EPI, as well as cortisol and norepinephrine (NOREPI) to central adiposity as a function of fasting glucose level at rest and during an anger recall task in a group of non-diabetic individuals.

Methods: We examined 444 healthy individuals (159 white women, 154 white men, 75 African American women and 56 African American men) with the mean age of 27.5 (7.9) years. All had a dual energy X-ray absorptiometry (DEXA) scan to assess central adiposity. Plasma EPI, NOREPI and cortisol levels were measured before and during the anger recall task. We examined the joint effects of glucose and adiposity, modeled as continuous variables on EPI, cortisol and NOREPI levels before and during the stress task. All models included age, sex and race as covariates.

Results: There was a significant trunk fat x fasting glucose level interaction on EPI levels at rest and during stress (p's<.05) and for cortisol levels during stress (p<.03). However, no interaction was observed for resting cortisol or NOREPI levels (p's >.35) or NOREPI levels during stress (p=.42). Centrally obese individuals with trunk fat >30% (Q4) with the lowest fasting glucose (G1)

showed the lowest EPI (**Figure 1a**) and cortisol levels (**Figure 1b**) during stress compared to all other groups.

Conclusions: The present findings suggest that lowered counterregulatory activity may help maintain glucose levels within the low normal range in centrally obese individuals. Further studies are warranted to examine how individual differences in stress-induced counterregulatory hormone activity affects acute and chronic glucose regulation in obese individuals, potentially revealing new treatment strategies for type 2 diabetes.

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164) Abstract 1078

A SYSTEMATIC REVIEW AND META-ANALYSIS OF LIFESTYLE INTERVENTIONS IN OVERWEIGHT AND OBESE WOMEN OF REPRODUCTIVE AGE: THE EFFECTS ON SYMPTOMS OF DEPRESSION AND ANXIETY

Lotte van Dammen, MSc, Obstetrics and gynaecology, University of Groningen, University Medical Center Groningen, Groningen, Netherlands, Vincent Wekker, MSc, Obstetrics and gynaecology, Susanne R. de Rooij, PhD, Biostatistics and Bioinformatics, Academic Medical Centre, University of Amsterdam, Amsterdam, Netherlands, Henk Groen, PhD, Epidemiology, Annemieke Hoek, PhD, Obstetrics and gynaecology, University of Groningen, University Medical Center Groningen, Groningen, Netherlands, Tessa J. Roseboom, PhD, Obstetrics and gynaecology, Academic Medical Centre, University of Amsterdam, Amsterdam, Netherlands

Background: Obesity is a rising problem, especially among women of reproductive age. Overweight and obesity affect both physical and mental health, which could be counteracted by lifestyle interventions. This has been shown for physical health, but an overview of the effects on mental health, especially in women of reproductive age is currently lacking.

Methods: The databases MEDLINE, EMBASE and PsycINFO were searched from inception to September 2017 for published randomized controlled trials (RCT). We used search terms for the patients (female, overweight or obese), the intervention (lifestyle intervention, behavioral therapy, diet, exercise, weight loss), the outcome (depression, anxiety, mental health) and the type of study (randomized controlled trial). Reproductive age was assessed during the abstract and full-text screening. The difference between baseline and post-intervention scores on symptoms of depression and/or anxiety for the intervention and control group was analyzed. Meta-analysis was performed with a random effects model.*

Results: The search resulted in 4963 citations. After exclusion based on study design, population and outcomes, 5 RCT's were selected for meta-analysis. The interventions differed in length (12 weeks to 1 year) and type (diet and exercise, behavioral, only exercise). The effect of a lifestyle intervention on depression scores was investigated among 242 women from five different RCT's. The pooled estimate for the mean difference was -2.05 (95% CI, -3.30 to -0.81, p = 0.001) with significant heterogeneity. Two studies that did not report or did not find weight loss in the intervention group, and that were both of longer duration, compared to the other studies, were excluded in a sensitivity analysis. The pooled estimate was -3.02 (-4.06 to -1.98, p < 0.001), and there was no longer significant heterogeneity. The effect of a lifestyle intervention on anxiety levels was studied among 148 women from four different RCT's, resulting in a pooled estimate of -3.39 (-4.26 to -2.52, p < 0.001), without significant heterogeneity.

Conclusion: Based on 5 RCT's with limited numbers of participants, meta-analyses show that lifestyle interventions in obese women of reproductive age reduce symptoms of depression and anxiety, especially if women lost weight.

* The protocol was registered in PROSPERO (CRD42015020902).

165) Abstract 1420

TWO-WEEK SMARTPHONE-BASED MINDFULNESS TRAINING DOES NOT IMPACT MARKERS OF INFLAMMATION: A RANDOMIZED CONTROLLED TRIAL

Emily K. Lindsay, PhD, Anna L. Marsland, PhD, Psychology, University of Pittsburgh, Pittsburgh, PA, Shinzen Young, PhD, Clinical Neuroscience Research Unit, University of Vermont, Burlington, VT, Joshua M. Smyth, PhD, Biobehavioral Health and Medicine, Penn State University, University Park, PA, Kirk W. Brown, PhD, Psychology, Virginia Commonwealth University, Richmond, VA, Katarina Gray, BS, Catherine P. Walsh, MS, Psychology, University of Pittsburgh, Pittsburgh, PA, J. David Creswell, PhD, Psychology, Carnegie Mellon University, Pittsburgh, PA

Objective: Mindfulness interventions, which train people to *monitor* present-moment experience with a lens of *acceptance*, have been associated with improved physical health outcomes. It is possible that these improvements in health are conferred via inflammatory pathways. Although not all findings are consistent, initial evidence supports this possibility. Here, we examine the impact of brief mindfulness training on systemic levels of CRP and IL-6, and explore whether acceptance training is critical for these effects.

Method: In a three-arm parallel trial, mindfulness components were dismantled into three structurally equivalent 14-lesson smartphone-based interventions: (1) training in both monitoring and acceptance (Monitor+Accept; MA), (2) training in monitoring only (Monitor Only; MO), or (3) active control training. 153 stressed adults (M_{age} =32 years; 67% female; 53% white) were randomly assigned to one of the interventions. Dried blood spots were collected at pre- and post-intervention for the assessment of CRP and IL-6. Follow-up analyses explored subgroups at risk for heightened systemic inflammation: midlife and older adults (40-65 years; N=38) and overweight adults (BMI>=25; N=60).

Results: Contrary to predictions, there were no significant pre- to post-intervention changes in CRP or IL-6 across or between groups. Subgroup analyses provide preliminary evidence that MA training may reduce CRP among both older and overweight participants. Specifically, among older participants, MA reduced CRP compared to control (p=.01, d=1.18) but not MO (p=.57, d=0.24). Among overweight participants, MA reduced CRP compared to both MO (p=.05, d=0.73) and control (p=.01, d=0.82). There were no condition differences in these subgroups on changes in IL-6.

Conclusions: Although we previously showed that 2-week MA training lowered biological stress reactivity, MA did not reduce markers of systemic inflammation in the same sample. Subgroup analyses suggest that this brief mindfulness intervention may reduce CRP among older and overweight stressed adults, and that acceptance is key for these effects. It is possible that a longer intervention or follow-up period would show more reliable changes in inflammatory markers. Further research is needed to test the dosing and mechanisms of mindfulness interventions that contribute to improvements in biomarkers of health.

166) Abstract 1140

PARTICIPATION IN A 6-WEEK MINDFULNESS BASED STRESS REDUCTION INTERVENTION UNIQUELY PREDICTS BLOOD PRESSURE RECOVERY FROM REPEATED ACUTE STRESS

Andrew W. Manigault, MS., Matt Scanlin, MS., Katrina Hamilton, BA., Cari Hollenbeck, BA., Max Slepian, MS., Catherine Strauss, MS., Ellen Haynes, MS., Andrew Bryant, MA., Christie Thiessen, MS., Psychology, Ohio University, Athens, OH, Alex Woody, PhD., Institute for Behavioral Medicine Research, The Ohio State University, Columbus, OH, Ryan Shorey, PhD., Peggy Zoccola, PhD., Psychology, Ohio University, Athens, OH

The allostatic load model posits that poor habituation to repeated stressors is an important pathway via which the cumulative effects of stress lead to disease. Mindfulness (i.e., the practice of monitoring present moment experiences with acceptance) is thought to improve a wide variety of health outcomes by buffering against stress. Yet the relationship between mindfulness and stress habituation remains unexamined. As such, the present project examined the effect of a 6-week mindfulness-based intervention on cardiovascular habituation to repeated acute laboratory stressors.

Seventy-two adults with moderate to high perceived stress were recruited from a Midwestern community (aged 18-50, 79% female) and were randomly assigned to either a 6-week Mindfulness Based Stress Reduction intervention (MBSR; n = 27), a 6-week Cognitive Behavioral Therapy intervention (CBT; n = 21), or a waitlist control condition (n = 24). Post-intervention, participants attended two laboratory visits (48-h apart), where they completed the Trier Social Stress Test (N_{MBSR} = 10; N_{CBT} = 11; N_{Waitlist} = 17; 47% attrition). Blood pressure was measured (-16, +0, +16, +22, +30, +46, +71 minutes post-stressor onset) during both visits to capture cardiovascular stress reactivity and recovery.

Mixed linear models revealed that Mean Arterial Pressure (MAP) was best modeled as a quadratic function of time, F(1,381)=21.20, p<.001, or peaked trajectory. Overall, the degree of habituation from visit 1 to visit 2 did not vary by condition (i.e., non-significant condition visit х х time² interaction), F(1,371)=1.05, p=.35. However, when specifically examining recovery, a condition x visit interaction MAP levels 71 minutes postpredicted stressor, F(2,371)=3.65 p=.026. Follow up analyses revealed that the decrease in MAP levels (+71 minutes post-stressor onset) from visit 1 to visit 2 was significantly greater for participants in the MBSR condition relative to the CBT, t(371)=2.22, p=.026, and the waitlist conditions, t(371)=2.59, p=.010.

In sum, participation in a 6-week MBSR intervention uniquely predicted blood pressure recovery from repeated acute stress. The present findings may suggest a new mechanism by which mindfulness influences health. More specifically, mindfulness may buffer against the effects of stress on health by improving cardiovascular recovery from repeated acute stress.

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167) Abstract 1501

A BRIEF IPOD-BASED MINDFULNESS INTERVENTION FOR UNDERGRADUATES: EFFECTS ON PSYCHOLOGICAL AND PHYSIOLOGICAL OUTCOMES Sandra E. Sephton, Ph.D., Allie Hicks, B.A., Kala Phillips, M.S., Chelsea Siwik, B.A., Christy Albert, B.A., Lauren Zimmaro, M.S., Kathleen A. van der Gryp, B.A., Paul Salmon, Ph.D.,

Psychological and Brain Sciences, University of Louisville, Louisville, KY

Undergraduates report social, academic, and financial stress. Many seek services for anxiety and depression. Evidence for the benefits of mindfulness training among undergraduates has grown dramatically. However, new strategies are needed for wider dissemination of mindfulness practices. To test the feasibility of a mobile format, we piloted a one-week iPod-based mindfulness intervention; positing that time spent listening to didactic and meditation practice tracks would reduce stress, increase positive and reduce negative affect, reduce anxiety and depression, improve self-rated health, and enhance diurnal cortisol rhythmicity.

University students (N=52) were recruited using classroom visits and an online research portal. Subjects completed self-reports of distress, affect, anxiety and depressive symptoms at baseline. They were oriented to mindfulness, given iPods with 40 prerecorded MBSR-based tracks ranging 5-45 min, and asked to listen daily for 30 min. Over the next 4 days they collected waking and bedtime saliva for cortisol assessment. One week later, students repeated baseline assessments and listening data was downloaded from iPods. Paired t-tests described pre-post intervention outcomes. Associations of total listening time with changes in self-report data were explored in separate hierarchal regressions adjusting for sex and minority status. Oral contraceptives were adjusted in cortisol analyses. Regression analyses were run both before and after exclusion of 16 cases who reported smoking or overnight shift work (n=36).

T-tests suggested improvements in stress (t=3.55, p<001), anxiety (t=6.98, p<001), depressive symptoms (t=14.13, p<001), negative affect (t=3.03, p<01) and overall mental health (t=-3.36 p<000). Regression analyses on the subsample showed total listening time was linked with increased self-reported physical health ($\beta=.350$, p<.01), a more rhythmic diurnal cortisol profile ($\beta=.385$, p<.05), and lower mean cortisol values at waking ($\beta=.540$, p<.01).

Conclusions are limited by the self-selected sample and the lack of a control group. However, findings suggest feasibility and promise for a brief, cost-effective way of exposing college undergraduates to mindfulness. Associations of listening time with cortisol slope point to a need for research examining doseresponse effects of mindfulness practice on biomarkers of stress and health.

168) Abstract 1012

CHANGES IN INDICES OF AUTONOMIC NERVOUS SYSTEM FUNCTION FOLLOWING PARTICIPATION IN MINDFULNESS AND TAI CHI INTERVENTIONS

Kirsti I. Toivonen, M.Sc., Psychology, Linda E. Carlson, Ph.D., Psychosocial Oncology, Tavis S. Campbell, Ph.D., Psychology, University of Calgary, Calgary, AB, Canada

Cancer and its treatment may be associated with altered autonomic nervous system (ANS) function. Such impairments are associated with symptoms including fatigue and may also contribute to other chronic health issues. Participation in various mind-body interventions has previously been associated with improvements in measures of ANS function. However, there is little evidence comparing the relative autonomic specificity of different interventions commonly offered in complementary cancer care. Evaluating the impact of various mind-body interventions on ANS function may help inform the appropriate selection of complementary therapies and a better understanding of mechanisms associated with behavioral outcomes. As part of the MATCH study, 23 cancer survivors (any diagnosis, stage I- III) experiencing significant distress on the Dist ress Thermometer) completed psychophysiological testing before and after participation in Mindfulness-Based Cancer Recovery (MBCR), Tai Chi/Qigong (TCQ), or waitlist. ANS function was assessed indirectly via high frequency heart rate variability, baroreflex sensitivity (BRS), and systolic/diastolic blood pressure (SBP/DBP). Exploratory linear mixed model analyses examined (1) whether outcomes changed from baseline to post-intervention and (2) whether there were group differences at post. Group and time were included as fixed factors. BRS increased from baseline post-intervention in the MBCR to group $(M_{diff}=5.89, SE=2.67, p=.04, d=.74)$, and at post-intervention it was greater in the MBCR group than TCO $(M_{diff}=9.34, SE=3.26, p=.02, d=1.17)$. At post-intervention, SBP $(M_{diff}=23.72, SE=7.37, p=.01, d=2.05)$ and DBP $(M_{diff}=8.79, SE=3.39, p=.04, d=1.47)$ were lower in the MBCR group than the TCQ group. However, SBP and DBP did not change from baseline to post-assessment in the MBCR group. In this preliminary study with a small group of cancer survivors, participation in MBCR, but not TCQ, was associated with change in BRS. SBP and DBP were also lower in the MBCR group than TCQ at post-assessment. These findings lend support for a more thorough investigation of the autonomic specificity associated with participation in MBCR vs. TCO in a larger sample. Further, preliminary evidence of a differential impact on ANS function suggests there may be a rationale to select complementary therapies based on specific symptom presentation.

169) Abstract 1439

ENHANCED SYMPATHETIC RESPONSE TO AN ATTACHMENT-RELATED STRESSOR IN PATIENTS WITH PRIMARY HYPERTENSION AND ATTACHMENT AVOIDANCE

Elisabeth M. Balint, MD, Susanne Campbell, none, Alexandra Funk, none, Julia Klinghammer, none, Simon von Renouard, none, Marc N. Jarczok, PhD, Psychosomatic Medicine and Psychotherapy, University Hospital of Ulm, Ulm, Germany, Johannes С. Ehrenthal, PhD, Clinical Psychology, Psychotherapy and Psychoanalysis, Alpen-Adria-University of Klagenfurt, Klagenfurt am Wörthersee, Austria, Anna Buchheim, PhD, Psychology, University of Innsbruck, Innsbruck, Austria, Christiane Waller, MD, Psychosomatic Medicine and Psychotherapy, University Hospital of Ulm, Ulm, Germany

Background: Attachment insecurity has been linked to primary hypertension as well as to altered stress responsiveness. The interaction between attachment insecurity and the stress response system in hypertension has not been analyzed yet. Therefore, we investigated the stress response in patients with primary hypertension compared to healthy controls with regard to attachment related stress and attachment styles.

Material and Methods: We performed an attachment related interview (Adult Attachment Projective picture system, AAP) and an attachment-related stressor (Separation Recall, SR) with 25 patients suffering from primary hypertension and 18 healthy individuals. ECG and skin conductance (SC) were recorded continuously and HRV parameters (HF-HRV, LF-HRV) were calculated for the last five minutes of each time period (rest, AAP, SR, recovery). Attachment style was assessed using the Experiences in Close Relationships-Revised (ECR-R). Parameters were compared using ANCOVA (covariates: age, BMI, education) and (related samples) t-test where appropriate after logarithmic transformation.

Results: HF-HRV decreased (p<.001) with a corresponding increase in LF-HRV (p=.004) and SC (p<.001) during the AAP

and the SR. HF-HRV of hypertensive patients did not differ to healthy controls whereas LF-HRV revealed differences by showing a delayed increase during recovery (p=0.021) compared to controls. Comparing low versus high attachment avoidance, patients with hypertension and high attachment avoidance showed significantly higher SC during the SR (p=.009) and during recovery (p=.008) than hypertensives with low attachment avoidance, while SC response of healthy individuals did not differ as a function of attachment avoidance.

Conclusion: Parasympathetic response reflected by HF-HRV to an attachment-related interview and stressor did not differ between healthy and hypertensive individuals, while the sympathetic response reflected by LF-HRV was enhanced and prolonged in hypertensives, especially in those high in attachment avoidance. Our data suggest that attachment style interacts with an attachment related stress response especially in those prone to a heightened stress response such as patients with hypertension and might therefore contribute to disease manifestation and progression.

170) Abstract 1086

IS LIFE SATISFACTION AN ASSET AGAINST INCIDENT HYPERTENSION IN MIDDLE-AGED ADULTS? EVIDENCE FROM THE WHITEHALL II COHORT.

Anne-Josee Guimond, M.A., School of Psychology, Laval University, Quebec, QC, Canada, Claudia Trudel-Fitzgerald, Ph.D., Department of Social and Behavioral Sciences, Harvard T.H. Chan School of Public Health, Boston, MA, Julia K. Boehm, Ph.D., Department of Psychology, Chapman University, Orange, CA, Laura D. Kubzansky, Ph.D., Department of Social and Behavioral Sciences, Harvard T.H. Chan School of Public Health, Boston, MA

Methods: Participants were 3,813 normotensive British civil servants aged 34-49 from the Whitehall II cohort. Life satisfaction and cardiovascular risk factors (demographic characteristics, health status, health behaviors, psychological distress) were assessed at the 1985-1988 baseline. Incident hypertension was defined by clinical measures of systolic or diastolic blood pressure at least 140/90 mmHg, self-reported physician-diagnosed hypertension, or hypertensive medication use. Follow-up assessments of hypertension took place every 3 years through 2002-2004. Cox proportional hazards regression models estimated hazard ratios (HR) and 95% confidence intervals (CI). Results: There were 1,198 cases of incident hypertension during the follow-up period. "High" vs. "Very low" levels (4th vs. 1stquintile) of life satisfaction were associated with a significantly reduced risk of hypertension in an age-adjusted model (HR=0.76, CI=0.60-0.90). This association remained significant, although slightly attenuated, after controlling for demographics, health status, health behaviors, and ill-being (HR=0.82, CI=0.68-0.99). In the overall sample, no significant relationships were observed between other quintiles of life satisfaction and hypertension risk. Associations were stronger when life satisfaction was assessed at least 4 years before the onset of hypertension (4th vs. 1st quintile: HR=0.77, CI=0.63-0.95 in fully-adjusted model), mitigating concerns about reverse causality. Moreover, in these lagged analyses, sex appeared to moderate the relationship. For instance, in the fully-adjusted model (overall interaction test: p=.005), "Moderate," "High," and "Very High" (vs. "Very low") life satisfaction levels were associated with significantly reduced hypertension risk in women (HR=0.54, CI=0.35-0.82, HR=0.52, CI=0.34-0.78, HR=0.65, CI=0.43-0.98, respectively) but not in men (HR=1.08, CI=0.851.40, HR=0.88, CI=0.69-1.13, HR=1.25, CI=0.97-1.60, respectively). **Conclusions:** Compared to very low life satisfaction levels, higher levels were associated with a reduced risk of incident hypertension in middle-aged adults, particularly in women. There was no evidence of a dose response relation. Future research should aim to better understand the possible interaction between life satisfaction and sex in relation to lower hypertension risk in this middle-aged population.

171) Abstract 1445

REDUCED VAGALLY MEDIATED HEART RATE VARIABILITY PREDICTS HYPERTENSION

Guang Hao, PhD, Population Health Sciences, Augusta University, Augusta, GA, LaBarron Hill, PhD, Aging and Human Development, Duke University, Durham, NC, Julian Thayer, PhD, Emotions and Quantitative Psychophysiology, Ohio State University, Columbus, OH, James D. Halbert, PhD, Shaoyong Su, PhD, Population Health Sciences, Vincent Robinson, PhD, Cardiology, Gregory Harshfield, PhD, Gaston Kapuku, MD, PhD, Department of Population Health Sciences, Augusta University, Augusta, GA

Objectives: Autonomic dysregulation has been linked to hypertension. However, previous research has been cross-sectional and overlooks the effect of stress on vagal activity. We hypothesize that vagally mediated heart rate variability is decreased in individuals at high risk of developing hypertension.

Method: There were 388 healthy participants aged 20 to 26 years who were examined during two visits 6.5 years (median: 5.7-7.1) apart. Each visit consisted of resting and exposure to a videogame challenge. Resting and reactive blood pressure (BP) were recorded at 2 visits while the root of mean squared differences of successive RR intervals (RMSSD) was determined at rest and stress during baseline visit. **Results**: At follow-up, the means of systolic and diastolic BP were 116.4 \pm 14.2 and 68.9 \pm 9.1 mmHg, respectively. Participants under stress had lower RMSSD and shorter R-R interval when compared with resting condition.

Multiple linear regression adjusting for age, race, gender, body mass index, baseline systolic BP, heart rate and total peripheral resistance, revealed that RMSSD at rest (β =-0.0442, P=0.023) and under stress (β =-0.0815, P=0.001) were significant predictor of systolic BP, and RMSSD under stress (β =-0.0488, P=0.004) was significant predictor to diastolic BP. Namely, 12.3 units increase of RMSSD predicted 1 mmHg decrease of systolic BP, and 20.5 units increase of RMSSD predicted 1 mmHg decrease of diastolic BP. A total of 31 (8%) participants developed hypertension during the follow-up period. The participants with lower RMSSD had significant higher incidence of hypertension than those with higher RMSSD (15/113, 11.7% for Tertile 1; 10/118, 7.8% for Tertile 2; and 6/121, 4.7% for Tertile 3). After adjustment of other covariates, Logistic regression model showed that RMSSD at rest in tertile 1 (OR: 3.47, 95%CI: 1.00-12.09, P=0.050) had a significantly higher risk of incident of hypertension compared with tertile 3. Similar result was found for RMSSD under stress (OR: 4.84, 95%CI: 1.23-19.07, *P*=0.024).

Conclusion: We demonstrate that lower vagally-mediated heart rate variability at rest and under stress predicts BP elevation overtime suggesting that interventions that enhance vagal activity may prevent hypertension.

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172) Abstract 1171

THE RELATIONSHIP BETWEEN TYPE D PERSONALITY AND AUTONOMIC **NERVOUS** RESPONSES IN THE PERIPHERAL VASOCONSTRICTION OR VASODILATION GROUP DURING THE ANGER RECALL TASK AMONG HYPERTENSIVE PATIENTS

Hu-Jing Ji, Master, Psychology, The Buddhist Hualien Tzu Chi General Hospital, Taiwan, Taiwan, Province Of China, Tin-Kwang Lin, Bachelor, Cardiology, Ming-Nan Lin, Master, Family Medicine, Chih-Wei Chen, Bachelor, Cardiology, The Buddhist Dalin Tzu Chi General Hospital, Taiwan, Taiwan, Province Of China, Chin-Lon Lin, Bachelor, Cardiology, The Buddhist Hualien Tzu Chi General Hospital, Taiwan, Taiwan, Province Of China, Chia-Ying Weng, Ph D, Psychology, National Cheng Chung University, Taiwan, Taiwan, Province Of China

Methods:Seventy-two adults with elevated blood pressure were recruited (age:55.37±8.69,male:45.80%).The excluded criteria were coronary artery disease, stroke, neurologic diseases, liver diseases, kidney diseases and mental disorders. Type D personality was assessed by Type D Scale-14-Taiwanese version which includes two subscales, negative affectivity(NA) and social inhibition(SI). Blood volume amplitude (BVA) and HRV indices were collected during the following five stages of the anger recall task: adaptation, baseline, anger recall, anger description, and recovery. The participants were then divided into the following two groups by anger description reactivity in BVA (%):(1)typical vasoconstriction group(n=48,age:54.15 \pm 12.24, male: 43.75%) with BVA (%) less than zero;(2)atypical vasodilation group $(n=24, age:55.45\pm7.45, male:50.00\%)$ with BVA (%) greater than zero. There were no significant differences in age and gender between the two groups.

Results: During baseline and anger recall task, the BVA of atypical vasodilation group were significantly lower than that of the typical vasoconstriction group. In non-type D personality, the total HRV reactivity indexed by SDNN and parasympathetic activity indexed by HF of vasodilation group were significantly lower than that of the typical vasoconstriction group. In atypical vasodilation group, the total HRV reactivity indexed by SDNN and parasympathetic activity indexed by SDNN and parasympathetic activity indexed by SDNN and parasympathetic activity indexed by HF of type D personality were significantly greater than that of the non-type D personality.

Conclusion: 67% of the participants demonstrated a typical vasoconstriction reaction during the anger description stage. Also, the level of vasoconstriction was associated with sympathetic reactivation. The remaining 33% of the participants showed higher sympathetic nerve activity than the vasoconstriction group during the baseline resting stage, and demonstrated an atypical vasodilation reaction during the anger description stage while the sympathetic nerve failed to increase as the counterpart of the typical vasoconstriction group did. In atypical vasodilation participants with type D personality demonstrated autonomic nervous system hyperactivity (especially parasympathetic hyperactivity). The autonomic nervous system hyperactivity might occur among atypical vasodilation participants with a vigilant response when feeling threatened in an unfamiliar situation.

173) Abstract 1526

THE RELATIONSHIP BETWEEN RESTING HEART RATE VARIABILITY AND THE NEED FOR AFFECT: THE MEDIATING ROLE OF DIFFICULTIES IN EMOTION REGULATION

Nicholas Joseph, B.S, DeWayne P. Williams, Ph.D, Psychology, The Ohio State University, Columbus, OH, Julian Koenig, Ph.D, Section for Translational Psychobiology in Child and Adolescent Psychiatry, University of Heidelberg, Heidelberg, Germany, Julian Thayer, Ph.D, Psychology, The Ohio State University, Columbus, OH

The motivation to approach, and not avoid, emotion inducing situations is defined as the need for affect. Previous research suggests that avoiding emotions is associated with maladaptive outcomes such as psychopathology, while approaching emotions is associated with adaptive outcomes and better health. Resting high frequency heart rate variability (HF-HRV) is an index of emotion regulation (ER) and better health. In a preliminary study, we showed lower HF-HRV was associated with the greater avoiding and approaching of emotion inducing situations. The relationship between resting HF-HRV and the motivation to approach and avoid emotion inducing situations is likely mediated by ER difficulties, yet, this has not been tested directly. Thus, the current study re-evaluates the link between resting HF-HRV and the need for affect in a larger sample of participants, including the possible mediating role of difficulties in ER, including varying facets of ER difficulties. In this study, 143 undergraduate participants (80 female, Mean Age = 20 years old) completed a 5-minute baseline-resting period, followed by the 26-item NA questionnaire, including NA-approach (13 items) and NA-avoid (13 items) subscales. Difficulties in ER was assessed via the 36 item Difficulties in ER Scale, which includes six subscales designed to assess different facets of ER difficulties. Controlling for important covariate such as age and sex, results indicated a significant relationship between lower resting HF-HRV and NA-Avoid (r partial = -.175, p = .041). Difficulties in ER was indeed a significant mediator between resting HF-HRV and NA-avoid (B = -1.73 (standard error = 0.56), [Bootstrapping CI: -3.03, -0.80]). This was especially true for non-acceptance (B = -0.77 (standard error = 0.41), [Bootstrapping CI: -1.83, -0.17]) and awareness (B = -.74(standard error = 0.44), [Bootstrapping CI:-2.00, -0.13]) of negative emotions. These data contrast with our previous preliminary findings, such that lower HF-HRV was associated only with NA-avoid. Novel results suggest poorer regulation of emotions fully mediate this relationship. Future directions and implications for ER will be discussed.

174) Abstract 1261

VALENCE WEIGHTING BIAS PREDICTS CHANGE IN CRP VIA INCREASED PERCEIVED STRESS

Alexis Keaveney, M.A., Russell H. Fazio, Ph.D., Baldwin M. Way, Ph.D., Psychology, The Ohio State University, Columbus, OH

People regularly encounter ambiguous situations in their daily lives and differ in the extent to which they give weight to negatives and positives when encountering and trying to resolve this ambiguity. This differential weighting of negatives and positives leads to differences in the way individuals interpret and react to ambiguous situations: the valence weighting bias. A more extreme negative valence weighting bias predicts less friend making, more negative mood reactivity to a stressor, and greater depression, all of which may predict greater inflammation over time. Additionally, a more extreme positive bias predicts greater self-control failure, which may lead to more unhealthy eating and greater inflammation over time. Thus, we hypothesized a curvilinear relationship such that more extreme biases, both positive and negative, would lead to greater inflammation, through potentially different mechanisms. In a study of OSU undergraduates (N=83), we tested the relationship between valence weighting bias and change in C-Reactive Protein (CRP)

over the course of seven weeks. Valence weighting curvilinearlly predicted increased CRP such that individuals with more extreme biases, both negative and positive, had greater increases in CRP relative to individuals with less extreme biases, $\beta = 0.22$, p = .01. This effect was mediated by perceived stress such that individuals with more extreme biases had greater perceived stress, and greater perceived stress predicted larger increases in CRP (bootstrapped 95% confidence interval for negative bias: [-.19, -.01]; positive bias [.003, .16]). We did not find evidence of a mechanism through frequency of unhealthy eating. This suggests individuals with more extreme weighting biases, both negative and positive, are more stressed and inflamed. We will also discuss an ongoing intervention aimed at reducing weighting bias extremity and improving resiliency and health.

175) Abstract 1473

THE ROLE OF REGULATORY FLEXIBILITY IN RESILIENCE: A GROUNDED THEORY APPROACH TO ADVERSITY OUTCOMES

Megan Lipsett, MA, Integrative Health S, Health Psychology, David Creswell, PhD, Social Psychology, Mary Marchetti, B.S. in Brain and Cognit, Psychology, Carnegie Mellon University, Pittsburgh, PA

Background: Research has begun to uncover the mechanisms by which social and environmental stressors result in a cascade of psychophysiological consequences. Identifying negative protective factors and adaptive coping strategies that influence these mechanisms is crucial in utilizing scientific insights across interpersonal, social, behavioral, and psychospiritual factors and capturing the nuanced nature of resilience processes. Through outlining major themes emerging from a qualitative data set, we delineate key categories of adaptive responses to stressful life events which support maintained or improved mental and physical health. We examine the role of regulatory flexibility in the application of coping strategies that promote resilience, exploring the importance of both emotional regulation strategies and behavior modification strategies. We explore stress-buffering factors including life history, mindset, meaning, coping flexibility, trait characteristics, and social connection across a variety of adverse experiences. Methods: The mixed methods grounded theory approach includes qualitative data from an interview schedule assessing details of adverse event, attentional focus strategies, emotional regulation techniques, life history, and protective factors. Quantitative data include self-report questionnaires (BRS, PCL-C, DERS, PSS, TLEQ, FQES, SCS, SMM, CFS, and ERQ) for 75 adult participants with history of significant life adversity. Analysis: Data analysis includes constant comparative method, theoretical sampling, and coding (open, axial, and selective) guided by grounded theory method to assess category, property, and dimension across data. Results and Discussion: Completion of interview schedule and recruitment of participants began October 2017. First participant self-report data, coding groups, and theory delineation will be available by March 2018. The grounded theory method will provide generalizable and dynamic theory outlining the interrelated factors that facilitate resilience across individuals and experiences. Findings will provide insights into key internal factors related to regulatory flexibility in the utilization of skills in stress management, emotional regulation, and cognitive reappraisal that may empower people during adverse experiences, in turn improving psychosocial outcomes.

176) Abstract 1169

DOES TIMEFRAME ADJUSTMENT OF THE LIFE ORIENTATION TEST-REVISED ASSESS OPTIMISM AS A STATE?

Elizabeth Madva, MD, Psychiatry, Massachusetts General Hospital, Boston, MA, Brian Healy, PhD, Neurology, Brigham and Womens Hospital, Boston, MA, Rachel Millstein, PhD, Sean Legler, slegler@partners.org, Christopher Celano, MD, Jeff Huffman, jhuffman@partners.org, Psychiatry, Massachusetts General Hospital, Boston, MA

Background: Optimism is prospectively associated with superior health outcomes in cardiac patients, making it an attractive target for well-being interventions in this population. However, most studies have utilized the Life Orientation Test-Revised (LOT-R), which measures optimism as a static, dispositional construct, to assess connections between optimism and health. A measure of more state, dynamic optimism would be welcome to assess whether 'state' optimism is also linked to health.

Methods: Among 125 patients with a recent acute coronary syndrome who received a positive psychology intervention, we assessed the properties of a modified LOT-R that changed the timeframe of items from general dispositional statements to queries about 'right now.' We aimed to learn whether this modified LOT-R was more dynamic over 16 weeks than the original LOT-R, via administration of both instruments at three timepoints over the 16-week study period. We compared mean change in scores at 8 and 16 weeks across the entire sample, and additionally compared intra-individual variability on both scales.

Results: Contrary to our hypothesis, this modified LOT-R showed no greater change in mean score or intra-individual variance than the original LOT-R. Both scales showed less change over time than other psychological measures (e.g., depression, positive affect) at the same time points (effect size of change in LOT-R scales= .03-.27; effect size in change on other measures= .46-.60).

Conclusions: Modification of the LOT-R by simple change in wording of the items may not facilitate assessment of more statelike optimism in medical patients. Additional study is needed to determine whether other approaches can detect state-like optimism or whether optimism simply is a dispositonal construct.

177) Abstract 1258

EMOTION DYNAMICS AND HEALTH: THEORETICAL AND METHODOLOGICAL CONSIDERATIONS

Rebecca G. Reed, PhD, Psychology, Pathology and Laboratory Medicine, University of Kentucky, Lexington, KY

Helen Flanders Dunbar, the founder of the American Psychosomatic Society 75 years ago, wrote of the significant linkage between emotions and physiological processes in her seminal 1935 book, Emotions and Bodily Changes: A Survey of the Literature on Psychosomatic Interrelationships 1910-1933. Furthermore, in her chapter devoted to the issue of measurement, she stressed that "fundamental to all instruments for research in the field of emotion...is the inclusion of the time factor". Today, an emerging area of emotion research is emotion dynamics, capturing emotions as they are - not static entities but dynamic phenomena characterized by frequent fluctuations over time. Scientific inquiry is beginning to focus on the relevance of emotion dynamic patterns in physical health and well-being. The purpose of this presentation is threefold: to discuss the why, how to, and what next of emotion dynamics and health research. Specifically, I will present a dynamic systems perspective to explain why within-person emotion fluctuations may play a role

in dysregulation that threatens resilience for physical health. Next, current methodological and statistical modeling approaches investigate emotion dynamics will be discussed. to Recommendations will be presented on study design, how and how often to assess emotions, and the utility of several timedependent analytic measures (controlling for and interacting with mean levels of emotion) that characterize emotional variability, instability, and inertia. To conclude, for future research I'll propose a socio-ecological model that incorporates the situational (e.g., stress) and interpersonal contexts of emotion dynamics and implications for health. Throughout the talk, I will use my own and others' findings to illustrate these ideas. Attendees will become familiar with why emotion dynamics matter for health, how to collect and analyze emotion dynamic data, and what exciting avenues lie ahead for future inquiry.

178) Abstract 1482

OPTIMISM IS ASSOCIATED WITH DIURNAL CORTISOL TRAJECTORIES

Minhxuan T. Tran, B.S., Jennifer R. Piazza, Ph.D., Health Science, California State University, Fullerton, Fullerton, CA, Natalia O. Dmitrieva, Ph.D., Psychological Science, Northern Arizona University, Flagstaff, AZ

Objective: Optimism, which plays an integral role in enhancing resilience in the context of stressors, has been linked to improved physical and psychological health outcomes. The current study aims to more clearly understand the physiological mechanisms underlying this association. Methods: Participants consisted of 964 adults (ages 34-84 years old) who participated in the second wave of the National Study of Daily Experiences. During four of eight interview days, participants provided saliva samples, from which cortisol was assayed. Diurnal cortisol regulation was operationalized using previously-validated diurnal cortisol trajectories (i.e., a normative profile vs. two dysregulated profiles, characterized either by a flattened or an elevated profile). Optimism was measured using the Life Orientation Test. Results: Binomial logistic regression indicated that higher optimism was associated with a greater likelihood of belonging to a normative class (β = .092, p= .002). **Discussion:** Diurnal cortisol regulation may be one factor that contributes to the relationship between personality characteristics, resilience and physical health outcomes.

179) Abstract 1364

COPING MODERATES THE RELATIONSHIP BETWEEN STRESS AND NEGATIVE AFFECT: A 12-DAY DIARY STUDY

Joshua F. Wiley, PhD, Rebecca C. Rice-Lacy, Honours, Yi Yang Yap, Honours, David Tuck, Honours, Institute of Cognitive and Clinical Neurosciences, Monash University, Melbourne, Australia, Annette L. Stanton, PhD, Psychology, University of California Los Angeles, Los Angeles, CA, Bei Bei, PhD, Institute of Cognitive and Clinical Neurosciences, Monash University, Melbourne, Australia

Objective: In response to stress, individuals engage a variety of coping strategies to address the source of stress or manage its emotional sequelae. Extensive research has studied coping at single time points, but *daily* coping remains poorly understood. This study aimed to test whether daily coping moderated the relations between previous or concurrent stress and affect.

Methods: Participants were 162 young adults who completed a 12-day study. Perceived stress (1 item) and positive and negative affect (PA, NA; 4 items each) were measured daily (morning,

afternoon, evening). Problem-focused, emotional expression, emotional processing, and mental disengagement coping (4 items each) were measured daily in the evening. Covariates were assessed daily (study day, day of the week) and at baseline (age, sex, race, education, body mass index, alcohol use, smoking). Stress and coping were decomposed into within-person, fluctuations around individuals' own mean, and average, an individuals' average across the study. To test if stress predicts later affect, *previous* stress and affect variables were included in analyses (eg, for afternoon NA, previous NA and stress would be morning scores). Data were analyzed using multilevel models.

Results: The detrimental effects of stress on concurrent NA were exacerbated by within-person problem-focused, emotional processing, and mental disengagement coping (all p<.05). However, the relationship between previous within stress and NA was weakened by within-person emotional processing (p=.018) and expression (p=.041) coping (see Figure). Average emotional processing and expression coping ameliorated the effects of previous within-person and average stress on NA (all p<.05). Mental disengagement coping worsened the concurrent relations between within-person stress and NA (p=.029). Fewer interactions emerged for PA.

Conclusions: Whilst all coping strategies examined in this study exacerbated the effects of stress on *concurrent* NA, emotional expression and processing coping were protective against the effect of previous stress on later NA. These findings support using emotional approach coping on high stress days to potentially decrease the duration of the impact of stress. Psychological interventions that promote emotional approach coping also may benefit from acknowledging and addressing immediate distress related to coping.

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180) Abstract 1303

REDUCED FUNCTIONAL CONNECTIVITY BETWEEN THE RIGHT VENTRAL ACC AND MFG PREDICTS PTSD SYMPTOMS AFTER A DISASTER

Atsushi Sekiguchi, Dr. Psychosomatic Research, NIMH, NCNP, Kodaira, Japan, Yuka Kotozaki, Dr, Iwate Tohoku Medhical Megabank, Iwate Medical University, Morioka, Japan, Motoaki Sugiura, Dr, Human Brain Science, IDAC, Tohoku University, Sendai, Japan, Seishu Nakagawa, Dr, Psychiatry, Tohoku Medical and Pharmaceutical University, Sendai, Japan, Rui Nouchi, Dr, Cognitive Brain Function Research, SARC, Tohoku University, Sendai, Japan, Carlos M. Miyauchi, Dr, Language Sciences, Graduate School of Humanities, Tokyo Metropolitan University, Hachioji, Japan, Hikaru Takeuchi. Dr. Developmental Cognitive Neuroscience, IDAC. Tohoku University, Sendai, Japan, Yasuvuki Taki, Dr, Cognitive Brain Function Research, SARC, Tohoku University, Sendai, Japan, Ryuta Kawashima, Dr, Advanced Brain Science, IDAC, Tohoku University, Sendai, Japan

A number of survivors soon after the Great East Japan Earthquake, even those without posttraumatic stress disorder (PTSD), sought psychological support. To understand the pathologies of PTSD symptoms and prevent the development of PTSD, the critical issue is to distinguish neurological abnormalities as vulnerability factors from acquired signs of PTSD symptoms in the early stage of adaptation to the traumatic event in the normal population. The neurological underpinnings of PTSD have been well characterized, but the causal relationships with the traumatic event are still unclear, because of difficulties with prospective studies. In fact, we had obtained magnetic resonance images from a group of healthy young adults

before the earthquake in multiple studies performed in our laboratory at that time. Then, we assessed their PTSD symptoms by using the Japanese version of the clinician-administered PTSD scale (CAPS) structured interview 3 to 4 months after the earthquake. In our previous report, we demonstrated the smaller right ventral anterior cingulate cortex (ACC) volume contributed to PTSD symptoms soon after the earthquake (Sekiguchi 2013). Here, we examined twenty six non-PTSD subjects using resting state functional MRI data before the earthquake by setting the right ventral ACC as a seed ROI. We found that the PTSD symptoms soon after the earthquake were negatively associated with functional connectivity between the right ventral ACC and right middle frontal gyrus (MFG) at rest. These brain regions are ones of key nodes of salience network and cognitive control network, respectively. Therefore, our results suggested that the reduced functional connectivity predicts PTSD symptoms soon after the earthquake. These networks are involved in cognitive control of emotion by synchronizing each other. The findings provide a new evidence of functional network level vulnerability for a traumatic event, and may contribute to the development of effective methods to prevent PTSD.

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181) Abstract 1450

ABSENCE OF VISCERAL SENSITIVITY AND VAGAL TONE INTERACTION IN THE ANTERIOR CINGULATE CORTEX AND BRAINSTEM OF PATIENTS WITH IRRITABLE BOWEL SYNDROME

Michiko Kano, MD,PhD, Frontier Research Institute for Interdisciplinary Sciences (FRIS), Makoto Yoshizawa, PhD, Research Division on Advanced Information Technology, Cyberscience Center, Tomohiko Muratsubaki, PhD, Joe Morishiata, MD,PhD, Behavioral Medicine, Tohoku University, Sendai, Japan, Lukas Van Oudenhove4, MD,PhD, Translational Research Center for Gastrointestinal Disorders (TARGID), Patrick Dupont, PhD, Laboratory for Cognitive Neurology, University of Leuven, Leuvne, Belgium, Shin Fukudo, MD,PhD, Behavioral Medicine, Tohoku University, Sendai, Japan

Background: Disintegration of autonomic function and pain regulation in the central network may be a responsible mechanism for functional pain conditions including irritable bowel syndrome (IBS). This study investigated autonomic nervous system (ANS) activity during rectal distention and its influence on visceral perception and brain activity during rectal distention.

Methods: The study included 27 patients with IBS and 33 agematched healthy control subjects. Heart rate variability was analyzed from electrocardiography before the barostat bag was inserted into the colorectum, during pre-distention rest period, and during colorectal distention. Visceral sensitivity was assessed using the ascending method of limits. Brain responses to rectal distention were measured using functional magnetic resonance imaging, and associations with individual ANS function parameters were investigated.

Results: Patients with IBS exhibited blunted sympathovagal balance in response to colorectal distention compared to the control findings (p = 0.003). There was no difference in parasympathetic response between the control and IBS groups. Control subjects with higher basal parasympathetic tone displayed a significantly lower visceral sensitivity, but such association was not found in IBS patients (group comparison p = 0.04). Furthermore, a positive association between basal parasympathetic tone and activity in the pregenual anterior cingulate cortex (pACC) and periaqueductal grey matter (PAG)

response during colorectal distention was identified in control subjects but not in patients with IBS.

Conclusion: Basal vagal tone is associated with perceptual and brain responses to visceral pain in key pain modulatory regions (pACC and PAG) in healthy subjects but not in patients with IBS. Our results suggest dysregulation of ANS mediated brain-gut interactions in patients with IBS.

182) Abstract 1300

DURATION OF HYPERTENSION BLUNTS CEREBROVASCULAR REACTIVITY IN TREATMENT-RESISTANT HYPERTENSIVES

Patrick J. Smith, PhD, MPH, Andrew Sherwood, PhD, Psychiatry and Behavioral Sciences, Duke University Medical Center, Durham, NC, Alan Hinderliter, MD, Medicine, University of North Carolina at Chapel Hill, Chapel Hill, NC, Stephanie Mabe, MS, Jeanne Schwartz, PA, James Blumenthal, PhD, Psychiatry and Behavioral Sciences, Duke University Medical Center, Durham, NC

Background: Chronically elevated hypertension (HTN) is one of the primary risk factors for cerebrovascular damage, including stroke. However, few studies have examined the association between duration of HTN and cerebrovascular reactivity (CVR), a biomarker of cerebrovascular health. Individuals with blunted CVR have been shown to have increased risk of stroke and dementia. We therefore examined the association between HTN duration and CVR among individuals with treatment-resistant hypertension participating in the TRIUMPH randomized trial.

Methods: CVR was assessed by examining changes in tissue oxygenation using functional near-infrared spectroscopy during a breath holding test (BHI), a standardized CVR assessment in which a hypercapnic response is elicited by asking participants to hold their breath up to 30 seconds following exhalation. Duration of HTN was assessed during baseline medical screening. We also covaried for stroke risk using the Framingham Stroke Risk Scale and medication burden using the daily defined dose. Linear regression was used to examine the association between CVR and duration of HTN, controlling for age, gender, ethnicity, stroke risk, daily defined dose of cardiovascular medications, and resting tissue oxygenation.

Results: Participants included 72 middle-aged and older adults (39 males, 33 females; mean age = 63.2 [SD = 9]) who were primarily African-American (56%). CVR response during the BHI varied widely (mean change = 1.4% [-0.7, 4.4]), as did duration of HTN (mean = 21.8 years [1, 50]). Greater duration of HTN was associated with a blunted CVR, independent of background characteristics, medication burden, and stroke risk (β = -0.27, P = .046) (**Figure 1**).

Discussion: Greater duration of HTN is associated with blunted CVR, suggesting greater cerebrovascular disease burden, among individuals with treatment-resistant hypertension.

VIEW PDF

183) Abstract 1408

FUNCTIONAL BRAIN CORRELATES OF CARDIAC AUTONOMIC CONTROL: FOCUS ON ROOT MEAN SQUARE OF SUCCESSIVE DIFFERENCES (RMSSD) AND PRE-EJECTION PERIOD (PEP)

Derek P. Spangler, PhD, Jean M. Vettel, PhD, Human Research & Engineering Directorate, U.S. Army Research Laboratory, Aberdeen Proving Ground, MD, Matthew Cieslak, PhD, Barry Giesbrecht, PhD, Scott T. Grafton, PhD, Gold Okafor, B.S., Viktoriya Babenko, B.S., Psychology, University of California, Santa Barbara, Santa Barbara, CA, Javier O. Garcia, PhD, Justin R. Brooks, PhD, Human Research & Engineering Directorate, U.S. Army Research Laboratory, Aberdeen Proving Ground, MD

Identifying the functional brain correlates of cardiac autonomic control is essential for understanding the neurocognitive pathways to stress and disease. Past research has not precisely identified such relationships for cardiac sympathetic control. To address this gap, we monitored blood oxygen level dependent (BOLD) responses in 41 subjects (Mean age= 22.06, SD= 3.07; 53% male) using functional magnetic resonance imaging (fMRI) while collecting impedance cardiography and electrocardiography during a 5-minute resting state. The electrocardiography and impedance signals were used to compute the root mean square of successive differences in interbeat intervals (RMSSD) and pre-ejection period (PEP) as metrics of cardiac parasympathetic and sympathetic control, respectively. Brain regions of interest were identified based on their inclusion in the central autonomic network. Brain and autonomic metrics were computed: (i) as averages across resting state to investigate between-subject relationships, and (ii) as consecutive 30-s epochs to examine within-subject relationships between brain and autonomic responses. Preliminary results reveal a betweensubjects association between RMSSD and insula activity. Here, individuals with higher parasympathetic control had stronger activations in the right insula. Within-subject fluctuations in PEP were related to concurrent modulations in bilateral activity of the insula, dorsal anterior cingulate cortex, and dorsolateral prefrontal cortex. These results suggest that changes in sympathetic control may be sensitive to the brain systems involved in detecting novel information and maintaining salient information. Implications of findings are discussed with reference to cardiovascular and mental health, as well as to theories of brain-body relationships.

184) Abstract 1492

AN INVESTIGATION ON THE RELATIONSHIP BETWEEN HEART RATE VARIABILITY AND IMPULSIVE BEHAVIOR

Ahmad A. Kittaneh, Bachelors in Psychology, Gina Gerardo, Masters, Nicholas Joseph, Masters, DeWayne Williams, PhD, Julian Thayer, PhD, Psychology, The Ohio State University, Columbus, OH

Resting heart rate variability (HRV) is widely recognized as a biomarker of overall health and inhibitory control such that lower HRV is associated with poorer inhibitory control. Inhibition is a process that plays a role in decision-making and impulse control - such that it can enable an individual to preclude an impulse in favor of a deliberate action. As such, it is hypothesized that individuals with lower resting HRV show more difficulty controlling impulses when compared to their higher HRV counterparts. Previously, our lab has found that individuals with greater HRV found themselves to be less impulsive, while their low HRV counterparts considered themselves to be more impulsive. We aimed to continue this investigation in impulsive behavior with a larger sample of 165 undergraduate students (105 female, Mean Age = 19.4). Continuous heart rate was measured for a 5 - minute baseline period using electrocardiogram (ECG). HRV was assessed using root mean square of successive differences (RMSSD). Participants then completed two selfreport scales: the Barratt Impulsive Scale (BIS) and the Consumer Impulse Scale (CIS), with higher scores reflecting

more impulsivity. The CIS is made of two subscales: 7 items which measure one's self-reported prudent behaviors (related to cautious behavior); and 5 items which measure one's self-reported related to hedonic behaviors (related to impulsive behaviors). Correlational results showed that individuals with higher HRV scored lower on the BIS ($\mathbf{r} = -.178, p < .05$). This relationship was stronger in women ($\mathbf{r} = -.196, p < .05$) than in men ($\mathbf{r} = -.107, p = .423$). There was no relationship found between HRV and the total score of the CIS ($\mathbf{r} = .066, p = .400$). Also in women, higher HRV was associated with lower hedonic subscale scores ($\mathbf{r} = -.212, p < .05$). These results support our previous work, and suggests that resting HVR may serve as an individual difference variable in consumer impulsivity. Future directions and implications will be discussed.

185) Abstract 1277

COPING FLEXIBILITY AND CARDIOVASCULAR REACTIVITY TO MULTITASKING STRESS

Eimear M. Lee, PhD, Psychology, Anglia Ruskin University, Cambridge, United Kingdom, Mark A. Wetherell, PhD, Psychology, Northumbria University, Newcastle, United Kingdom

Previous research has explored the value of considering trait personality variables in an attempt to understand differential patterns of physiological responding to stress and has broadly found that certain traits related to negative affectivity appear to be related to poorer physiological health outcomes. Further, individual differences in physiological stress responding have been identified, with exaggerated, blunted and diminished responses to stress found to be indicative of poorer long-term health statues. Recently, attention has turned to factors which may moderate physiological responding, including trait coping flexibility which has been defined as the ability to recognise that a coping effort is ineffectual, to stop it and to replace it with something else. To date only one study has examined the relationship between coping flexibility and cardiovascular reactivity (CVR) to stress.

Participants (N = 31) completed a 20 minute multitasking stressor involving auditory processing, visual processing, mental arithmetic and a Stroop task presented at medium workload intensity while blood pressure was continuously measured. Psychometric instruments to assess individual differences in trait coping flexibility, perceived stress and workload demands were also administered.

Results revealed significant differences in CVR to multitasking stress, whereby participants with moderate levels of coping flexibility had significantly higher diastolic blood pressure (DBP) reactivity to multitasking stress than those with lower or higher levels of coping flexibility. No significant differences in the perception of task demands between the groups were observed. While participants with varying levels of coping flexibility performed similarly on the multitasking framework task, participants with low coping flexibility performed significantly worse on the visual processing element of the task specifically than either moderate or high coping flexibility participants.

The results confirmed differences in CVR were associated with levels of coping flexibility but the relationship was more complex than originally hypothesised. The results may reflect increased psychological effort to cope with the stressor for those with moderate coping flexibility, successful coping for those with higher coping flexibility and potentially less task engagement for those with lower coping flexibility.

186) Abstract 1518 AGE, DAILY STRESS PROCESSES AND ALLOSTATIC LOAD: A LONGITUDINAL STUDY

Jennifer R. Piazza, Ph.D., Health Science, California State University, Fullerton, Fullerton, CA, Robert S. Stawski, Ph.D., Human Development and Family Studies, Oregon State University, Corvallis, OR

Objective: The theory of Strength and Vulnerability Integration (SAVI) posits that stressors become costlier with increasing age, due to age-related decreases in physiological resilience (Charles, 2010; Charles & Piazza, 2009). The current study tests SAVI by examining whether the association between daily stress processes and allostatic load increases in magnitude with age. Method: Participants consisted of 317 adults (ages 34-84 years old) who participated in Waves 1 and 2 of the Midlife Development in the United States (MIDUS) survey. During Wave 1, participants completed the daily diary portion of MIDUS, where they reported the stressors they encountered across eight consecutive days. Within-person reactivity slopes indexing change in negative affect from a non-stressor day to a stressor day were calculated for each participant. Stressor exposure and reactivity scores at Wave 1 were then used in models predicting allostatic load (a multi-system index of physiological function) at Wave 2. Results: Results revealed a main effect of age, whereby increasing age was associated with greater allostatic load. This effect, however, was qualified by a three-way Stressor Exposure X Stressor Reactivity X Age interaction. Older adults who reported higher than average stressor reactivity and higher than average stressor exposure showed the highest level of allostatic load (β = .255, p= .042), even after statistically adjusting for several variables related to allostatic load. Discussion: All people face physical health declines as they age; yet, there is variability in the rate at which these declines occur. Daily stress processes, in conjunction with increasing age, may be one pathway through which this variability emerges.

187) Abstract 1189

MODELING AUTONOMIC NERVOUS SYSTEM ACTIVITY TO PREDICT RESPONSE TO FATIGUE

Theresa Sheets, BS Mathematics, Mathematics, University of Maryland Baltimore County, Baltimore, MD, Joshua Crone, MS, Computational & Information Sciences Directorate, Derek Spangler, PhD, Human Research and Engineering Directorate, U.S. Army Research Laboratory, Aberdeen, MD, DeWayne Williams, PhD, Psychology, The Ohio State University, Columbus, OH, Ryan Robucci, PhD, Computer Science and Electrical Engineering, Nilanjan Banarjee, PhD, Computer Science, University of Maryland Baltimore County, Baltimore, MD, Julian Thayer, PhD, Psychology, The Ohio State University, Columbus, OH, Kathleen Hoffman, PhD, Mathematics, University of Maryland Baltimore County, Baltimore, MD, Justin Brooks, MD/PhD, Human Research and Engineering Directorate, U.S. Army Research Laboratory, Aberdeen, MD Accurately characterizing individual resiliency to fatigue has numerous applications ranging from adaptive training systems to fatigue monitoring technologies in a variety of clinical patient populations. In order to accomplish this goal, several studies have examined heart rate variability (HRV) as it relates to fatigue, however, success with this approach has been limited. This limitation is primarily because HRV measures are distant correlates of autonomic nervous system (ANS) activity and are subject to number of cardiovascular influences and therefore relatively non-specific. To address this knowledge gap, we

model the direct interaction between the ANS and the cardiovascular system using a set of coupled delay differential equations initially developed for use in medical intensive care patients and compare its predictions of ANS activity to traditional HRV measures. We use these equations to develop a time series estimate of sympathetic effect on heart rate, parasympathetic effect on heart rate, and sympathetic effect on arterial resistance. In this work, we examined data from sixteen participants who performed a cognitive depletion task for 16-20 minutes followed by a Stroop task during which heart rate and blood pressure where continuously monitored. Fatigue resiliency was determined by accuracy in the performance of the Stroop task and was subsequently related to traditional HRV measures and the ANS parameters determined in the delay differential equation model. Preliminary results indicate modeling accuracy greater than chance and improves upon traditional HRV measures. Further analysis reveals that the sympathetic effect on arterial resistance may be more significant for distinguishing resiliency than previously predicted. These equations may serve as valid ways to estimate parameters of significance to autonomic regulation of the cardiovascular system and psychological function.

188) Abstract 1358

CARDIOVASCULAR REACTIVITY AND TASK DIFFICULTY:LOOKING BEYOND HEART RATE AND BLOOD PRESSURE

Alaina Tiani, B.S., Daniel Stephenson, M.S., Shannon Underwood, B.S., Leah Brown, M.A., Kevin Larkin, Ph.D., Psychology, West Virginia University, Morgantown, WV

Although task engagement and task difficulty have been reported to influence the magnitude of cardiovascular reactivity to mental stress (Gendolla & Richter, 2006; Maier, Waldstein, & Synowski, 2003), other studies have found heart rate response to stress to be independent of task difficulty (Callister, Suwarno, & Seals, 1992). To explore reasons for these discrepant findings, this study aimed to compare cardiovascular reactions, performance, and self-reported affect and appraisal responses between easy and difficult versions of the same cognitive task.

This study utilized a between-subjects design in which 152 undergraduates were randomly assigned to a difficult or easy stress task using stimuli from Raven's Progressive Matrices. After task completion, participants completed the Multiple Affect Adjective Checklist- Revised (MAACL-R), and a post-task questionnaire containing items regarding appraisals of task stressfulness, difficulty, effortfulness, perceived performance, persistence, and frustration.

ANCOVAs were conducted on several measures of cardiovascular reactivity (systolic and diastolic blood pressure, heart rate, high frequency (HF) heart rate variability (HRV), low frequency (LF) HRV, and standard deviation of the normal sinus interbeat interval-to-normal sinus interbeat interval (SDNN). Although results showed significant differences between easy and difficult tasks on all measures of mood, performance, and task appraisal, results revealed no significant differences for heart rate and blood pressure reactivity. However, significant task differences were observed for measures of LF HRV, F = 6.83, p = .01, and SDNN, F = 4.85, p = .029, suggesting that task difficulty affected both parasympathetic and sympathetic nervous system responses during task completion, even if measures of heart rate and/or blood pressure did not reflect this activity. This finding indicates that measures of HRV can be useful for evaluating the influence of various task parameters on cardiovascular reactivity to stress.
PAPERS

<u>Psychological Wellbeing</u> Thursday, March 8 from 9:30 to 10:30 am

Abstract 1400

MEANING IN LIFE PREDICTS SURVIVAL OVER 17 YEARS IN HIV

Gail Ironson, MD, PhD, Psychology, University of Miami, Coral Gables, FL

Having meaning in one's life is central to creating an authentically happy fulfilled life beyond a life focused on transient pleasures. Major theorists (Viktor Frankl, Abraham Maslow, Gordon Allport, Martin Seligman) have all spoken of the importance of leading a meaningful life. The question of whether this construct is related to survival has only rarely been scientifically studied.

Method: We recruited a diverse sample of 182 people with HIV (30% women; 39% African American) who were in the midrange of illness (CD4 predominantly between 150 and 500, never had an AIDS defining symptom) at entry to our study, and followed them for up to 17 years. At baseline and every 6 months, questionnaires, a face to face interview on stress and coping with HIV, and blood draws were conducted. Meaning was rated by the interviewer using 4 items each rated from 0 to 3. In order to obtain a reliable measure of meaning ratings were averaged over the first 4 interviews. Our dependent variable was survival over up to 17 years.

Results and Conclusion: The average rating of meaning was 1.66 (sd=.59). During this 17 year period, 35% died. After controlling for medical variables related to survival (baseline CD4, viral load, age and antiretroviral medication) meaning predicted significantly lower mortality [Wald = 7.36. p = .007; exp (*B*) = .552]. This finding was maintained even after further sociodemographic controls [gender, race, and education; Wald =4.41, p =.037; exp (B) = .630]. Dichotomizing meaning at the median revealed that those in the top half were roughly twice as likely to be alive at the 17 year mark (1.95-2.25 depending on covariates) compared to those in the bottom half. Implications and potential mediators including immune measures (CD4), and psychological measures (such as coping) will be discussed.

Abstract 1340

EUDAIMONIC WELL-BEING AT ONE YEAR POST-DIAGNOSIS IS RELATED TO LONGER SURVIVAL IN EPITHELIAL OVARIAN CANCER PATIENTS

Susan K. Lutgendorf, Ph.D., Psychological and Brain Sciences, Obstetrics and Gynecology, Ellen M. Kinner, MA, Psychological and Brain Sciences, University of Iowa, Iowa City, IA, Premal H. Thaker, MD, Obstetrics and Gynecology, Washington University, St. Louis, MO, Michael J. Goodheart, MD, David P. Bender, MD, Obstetrics and Gynecology, Michaela Cuneo, MA, Psychological and Brain Sciences, University of Iowa, Iowa City, IA, George M. Slavich, Ph.D., Psychiatry and Behavioral Sciences, UCLA, Los Angeles, CA, Andrew Schrepf, PhD, Anesthesiology, University of Michigan, Ann Arbor, MI, Anil K. Sood, MD, Gynecologic Oncology and Reproductive Medicine and Cancer Biology, UT MD Anderson Cancer Center, Houston, TX, Steve W. Cole, Ph.D., Psychiatry and Behavioral Sciences, Hematology Oncology, UCLA, Los Angeles, CA

<u>Objective</u>: Because of poor prognosis, ovarian cancer patients commonly report high distress during initial treatment. Nevertheless some patients maintain high levels of well-being despite the uncertainties of their condition. Little is known about specific psychosocial characteristics following treatment that are related to ovarian cancer survival. We have previously reported that ovarian cancer patients with higher levels of eudaimonic well-being (a form of resilience including meaning in life, fulfilling one's potential, etc.) have lower levels of tumor norepinephrine, which has been associated with multiple pathways of tumor progression. Here we examined how eudaimonic well-being in women who had survived 1 year postdiagnosis was related to survival over an 8-year period.

<u>Method</u>: 159 patients with histologically confirmed epithelial ovarian cancer completed psychosocial assessments at 1 year post-diagnosis (approximately 6 mo. post-treatment) and were followed until death or last contact before December 2016. Clinical information was obtained from medical records. Eudaimonic well-being was assessed by a z-scored composite of 4 domains of the Ryff Well-being scales thought to be particularly relevant for cancer: Environmental Mastery, Personal Growth, Purpose in Life, and Self-Acceptance. Distress was assessed by a z-scored composite of the CESD and POMS depression subscales and the Impact of Events scale.

<u>Results</u>: In a Cox proportional hazards model, adjusting for disease stage and grade, histology, cytoreduction, age, current chemotherapy, and distress, greater eudaimonic well-being at 1 year was associated with a lower likelihood of death (HR: 0.745; 95% CI, 0.59 to 0.94; p=.012). Compared to a patient at the mean of the well-being composite, a patient 1 SD above the mean would have an approximately 25% lower hazard of death during the observation period; a patient 1 SD below the mean would have a 34% greater risk of death. Distress at 1 year was not significantly related to survival (HR: 0.97; 95% CI, 0.81 to 1.16; p=0.73).

<u>Conclusions</u>: Eudaimonic well-being at 1 year following diagnosis was associated with a survival advantage for ovarian cancer patients, whereas distress at 1 year was not. Clinical implications include the importance of screening for deficits in well-being and consideration of supportive interventions following primary treatment.

Abstract 1235

THE ROLE OF SELF-COMPASSION IN A STRESS-HEALTH PATHWAY

Allison Hicks, B.A., Paul Salmon, Ph.D, Whitney Rebholz, Ph.D, Kala Phillips, M.S., Chelsea Siwik, B.A., Lauren Zimmaro, M.A., Psychological and Brain Sciences, Elizabeth Cash, Ph.D, Department of Otolaryngology Head and Neck Surgery and Communicative Disorders, Kathleen van der Gryp, B.A., Sandra E. Sephton, Ph.D, Psychological and Brain Sciences, University of Louisville, Louisville, KY

Undergraduates frequently experience multiple novel stressors over the course of their education, with the frequency of mental health-related use of campus services steadily increasing. Selfcompassion has been shown to ameliorate stress-related problems including anxiety and depression. To more clearly understand the scope of self-compassion, it was explored in the context of a stress-health pathway (Figure 1). It was hypothesized that greater levels of self-compassion would be associated with (1a) less perceived stress, (1b) greater positive affect and less negative affect, (1c) fewer symptoms of anxiety and depression, (1d) more rhythmic hypothalamic-pituitary-adrenal (HPA)-axis activity, and (1e) greater overall mental and physical health.

Participants (N=52) were predominately non-Hispanic white (71.2%) and female (86.4%), with a mean (SD) age of 21.5 (3.9). Baseline questionnaire data were collected during a laboratory visit. Participants provided 4-day salivary cortisol collection at

home, yielding diurnal slope and mean morning and evening levels. Hypotheses were assessed using hierarchical regressions with psychosocial variables adjusted for sex and minority status, and psychophysiological variables adjusted for tobacco and oral contraceptive use.

Undergraduates reporting greater self-compassion had significantly lower perceived stress (p < .001), greater positive affect (p < .01), lower negative affect (p < .01), fewer symptoms of anxiety (p < .01) and depression (p < .001), steeper (more rhythmic) diurnal cortisol slopes (p < .05) and greater day-to-day cortisol stability (p < .01).

These intriguing findings suggest a possible role for selfcompassion as a protective factor in stress-health pathways. Of interest, self-compassion was not significantly associated with overall health, which may be explained by a relatively healthy sample and incongruous health measure. The results of this study indicate interventions aimed at enhancing self-compassion could be beneficial among undergraduates to help ameliorate a negative psychological and physiological stress response.

Figure 1. Hypothesized model associations



Abstract 1045 CHANGES IN SPIRITUALITY. DISTRESS. AND OUALITY OF LIFE AMONG LUNG CANCER **SURVIVORS**

Lisa Gudenkauf, Ph.D., Matthew Clark, Ph.D., Psychology, Paul Novotny, M.S., Biostatistics, Shawna Ehlers, Ph.D., Christi Patten, Ph.D., Psychology, Mayo Clinic, Rochester, MN, Lise Solberg Nes, Ph.D., Center for Shared Decision Making and Collaborative Care Research, Oslo University Hospital, Oslo, Norway, Katherine Piderman, Ph.D., Psychiatry, Kathryn Ruddy, M.D., Oncology, Jeff Sloan, Ph.D., Biostatistics, Ping Yang, M.D., Ph.D., Epidemiology, Mayo Clinic, Rochester, MN Background.

The American College of Surgeons' mandate for distress screening among cancer survivors highlights the need to understand factors associated with distress. Recent work from our team has shown that higher reported spirituality is associated with lower emotional distress and better quality of life (QOL) after lung cancer diagnosis. Longitudinal analyses are needed to

better understand the relationships among spirituality, distress, and QOL over time and to determine whether or not spirituality is related to changes in distress or QOL. Method.

Adult lung cancer survivors (N = 849) at a large academic medical center completed surveys within the first year following diagnosis and again one year later. Measures of spirituality, emotional distress, and QOL included the Functional Assessment of Chronic Illness Therapy - Spiritual Well-Being (FACIT-Sp), the Short-Form-8, and validated 10-point linear analog scales, respectively. Survivors were categorized into high/low spirituality and high/low distress groups at baseline using predetermined cut-off scores, and change scores were calculated from baseline survey to the survey one year later. Wilcoxon and chi-square tests examined longitudinal associations among spirituality, emotional distress, and QOL.

Results.

Baseline demographic results have been previously submitted for presentation. In examining change over time, among survivors with low emotional distress at baseline, survivors with low spirituality were more likely to develop emotional distress within the next year (p = .0182). Among survivors with high emotional distress at baseline, survivors reporting high levels of spirituality were more likely to experience reduced distress within the next year (p = .0177). Spirituality and emotional distress were not related to changes in QOL from baseline to one year later. Conclusions.

In a large sample of lung cancer survivors, high spirituality after diagnosis related to lower distress one year later while low spirituality related to greater distress one year later. These longitudinal findings provide additional support for a possible buffering effect of spirituality on distress level. Findings also provide a potential direction for clinical interventions, suggesting that addressing spirituality could impact distress and promote resiliency in the early years after lung cancer diagnosis.

Immunology Thursday, March 8 from 9:30 to 10:30 am

Abstract 1066

THE DYNAMICS OF STRESS, CYTOMEGALOVIRUS, AND IMMUNOSENESCENCE IN A LONGITUDINAL STUDY OF OLDER ADULTS

Rebecca G. Reed, PhD, Psychology, Pathology and Laboratory Medicine, Steven R. Presnell, PhD, Charles T. Lutz, MD, PhD, Pathology and Laboratory Medicine, Suzanne C. Segerstrom, PhD, MPH, Psychology, University of Kentucky, Lexington, KY

Background: Aging of the immune system (immunosenescence) is a major factor responsible for increased morbidity and mortality in older adults. Psychological stress can promote subclinical reactivation of cytomegalovirus (CMV), a herpesvirus implicated in immunosenescence. It is unknown, however, whether relationships between stress, CMV control, and immune aging are more stable or dynamic over time. Thus, the present study examined both between-person (stable individual differences) and within-person (dynamic fluctuations) associations among these variables in a longitudinal study of older adults.

Method: Participants (N=149; 43% male; baseline age 60-93 years; 72% CMV+) reported their perceived stress and provided blood every 6 months for 2.5 years (up to 5 waves per person). Blood was assayed for anti-CMV IgG antibody titers. Reliable composites of adaptive and innate immune aging were characterized via flow cytometry as percentages of late differentiated cytotoxic T cells (CD8+ expressing CD28- and CD57+) and mature natural killer (NK) cells (CD56dim expressing CD57+, NKG2C+, and FC ϵ R1 γ -). Multilevel models with waves at Level 1 and people at Level 2 included number of waves, sex, baseline age, education, and income as covariates.

Results: Higher CMV titers was associated with a) higher T and NK cell senescence between people (T cell: t(127)=4.58, p<.001; NK cell: t(123)=2.63, p=.01) and b) lower NK cell senescence within people (t(273)=-2.54, p=.011). There were no main effects of stress on T or NK cell senescence between or within people. However, among CMV+ older adults, there was a significant interaction between stress and CMV titers on T cell senescence between people (t(90)=-2.69, p=.009). Older adults with low stress levels and low CMV titers (better viral control) had the lowest T cell senescence at both low and high CMV titer levels.

Conclusion: Stable, between-person differences but not dynamic within-person fluctuations tend to govern associations between stress and CMV on immunosenescence. Among CMV+ older adults, those with high, enduring stress had more "aged" T cell profiles, regardless of their level of CMV control. Targeting factors that promote low, stable perceived stress in older adults may retard T cell senescence and ultimately support healthy aging.

Abstract 1242

CHURCH ATTENDANCE AND CELLULAR IMMUNE FUNCTION AMONG BEREAVED AND NON-BEREAVED ADULTS

Luz M. Garcini, PhD., MPH, Psychology, Rice University, Houston, TX, Raymond Stowe, PhD., Microgen Laboratories, Microgen Laboratories, Galveston, TX, Diana A. Chirinos, PhD., Psychology, Northwestern University, Chicago, IL, Kyle W. Murdock, PhD., Psychology, Pennsylvania State University, State College, PA, Angie S. Leroy, MA, Psychology, University of Houston, Houston, TX, Michelle Chen, BA, Christopher P. Fagundes, PhD., Psychology, Rice University, Houston, TX

Objective: There is an emerging literature linking church attendance to physical health. However, little is known about the association of church attendance and the immune system, particularly during difficult life transitions. This study investigated the association between church attendance and cellular immune function by assessing Cytomegalovirus (CMV) IgG antibody titers among bereaved and non-bereaved individuals.

Methods: Participants included 44 bereaved individuals and 44 controls with a mean age of 68 (SD=12.84). Cellular immune function was measured using CMV IgG antibody titers. Church attendance was measured using three items from the Community Healthy Activities Model Program for Seniors (CHAMPS) Questionnaire.

Results: After adjusting for participant's age, gender, education, minority status, weekly alcohol consumption, smoking, depression, body mass index (BMI) and comorbidities, church attendance was associated with lower CMV IgG antibody titers among bereaved and control participants. Further, there was a significant moderating effect of church attendance in the association between bereavement status and CMV IgG antibody titers, so that bereaved individuals attending church were found to have better cellular immune functioning (lower CMV IgG antibody titers) when compared to their bereaved counterparts that do not attend church.

Conclusion: This study demonstrated that church attendance is associated with better cellular immune function as indexed by lower levels of CMV IgG antibody titers, particularly among the bereaved. Future studies should focus on further understanding the pathways by which church attendance impacts cellular immune function during stressful life events, such as bereavement.

Abstract 1063

SOCIOECONOMIC DISADVANTAGE IN EARLY CHILDHOOD, BUT NOT ADULTHOOD, PREDICTS ACCELERATED EPIGENETIC AGING OF MONOCYTES Makeda K. Austin, BS, Psychology, Northwestern University, Chicago, IL, Edith Chen, Ph.D., Psychology, Northwestern University, Evanston, IL, Kharah M. Ross, Ph.D., Psychology, University of California, Los Angeles, Los Angeles, CA, Kobor S. Michael, Ph.D., Medical Genetics, University of British Columbia, Vancouver, BC, Canada, Gregory E. Miller, Ph.D., Psychology, Northwestern University, Evanston, IL

Low socioeconomic status (SES) in both childhood and adulthood independently contribute to increased risk for agingrelated chronic disease. One mechanistic hypothesis for these associations involves faster cellular aging of immune cells, which could plausibly contribute to chronic disease pathogenesis by compromising host resistance and/or upregulating inflammation. However, little is known about the association between life course SES and cellular aging. Accordingly, the present study examines the association of childhood and adulthood SES with a novel biomarker of cellular aging termed the "epigenetic clock," in monocytes. Additionally, we examine health behaviors and depressive symptoms as potential explanatory pathways. The study involved 335 participants between the ages of 15 and 55 from Vancouver, Canada and surrounding areas. Enrolled participants had to fit into four life-course SES trajectories, corresponding to low-low, low-high, high-low and high-high combinations of childhood (ages 0 to 5) and current SES respectively. Cellular aging of monocytes was measured using Horvath's DNA-methylation derived measure of epigenetic age acceleration. Results indicated that socioeconomic disadvantage during early childhood, but not adulthood, was associated with accelerated epigenetic aging of monocytes. Subsequent path analyses were inconsistent with scenarios in which health behaviors or depression played an explanatory role in the main effect. These findings suggest socioeconomic disadvantage in early childhood is independently predictive of cellular aging of immune cells, and that this association is not modified by upward SES mobility later in life.

Abstract 1226

LONELINESS, HERPESVIRUS REACTIVATION, AND LEUKOCYTE TELOMERE LENGTH: HEART RATE VARIABILITY PROMOTES RESILIENCE IN A NOVEL PATHWAY TO ACCELERATED AGING

Stephanie J. Wilson, PhD, Institute for Behavioral Medicine Research, The Ohio State University College of Medicine, Columbus, OH, Avelina C. Padin, MA, Psychology, The Ohio State University, Columbus, OH, Alex Woody, PhD, Institute for Behavioral Medicine Research, The Ohio State University College of Medicine, Columbus, OH, William B. Malarkey, MD, Internal Medicine, The Ohio State College of Medicine, Columbus, OH, Janice K. Kiecolt-Glaser, PhD, Institute for Behavioral Medicine Research, The Ohio State University College of Medicine, Columbus, OH

Lonely people face heightened risks for age-related chronic conditions and mortality. Loneliness is also related to higher rates of depression, smoking, drinking, unhealthy diet, and sedentary lifestyles, but the link between loneliness and mortality persists after adjusting for these factors. Thus, the downstream biological mediators remain poorly understood. Loneliness may increase health risks and accelerate aging in part through stress-mediated effects on the immune system, with herpesvirus reactivation and telomere shortening as prime candidates. Further, lonelier people have a heightened awareness of social stressors and more severe responses to stress. Therefore, their general ability to discriminate safety from potential threat and to regulate emotion and attention accordingly-indexed by heart rate variability (HRV)-should offset their risks for herpesvirus reactivation and shortened telomeres. To examine the links among loneliness, HRV, cytomegalovirus (CMV) and Epstein Barr virus (EBV) antibody titers, and leukocyte telomere length, 113 healthy men and women ages 40-85 provided blood samples, completed a baseline resting task for HRV assessment, and reported their levels of loneliness. Models revealed significant moderation by HRV (ps = 0.01): lonelier people with low HRV had shorter telomeres (p =0.02) and higher CMV antibody titers (i.e., poorer control over latent CMV, p = 0.03) compared to their less lonely counterparts after adjusting for age, sex, race, education, BMI, and depression. However, loneliness was not associated with CMV reactivation or telomere shortening among those with high HRV (ps > .05). The results were robust to additional confounds-social isolation, stressful life events, sleep problems, and alcohol use. In turn, higher CMV and EBV antibody titers were associated with shorter telomeres (CMV: p = 0.03, EBV: p = 0.01). These data provide evidence for a novel route by which loneliness poses mortality risks. Indeed, loneliness-related CMV reactivation appears to promote telomere shortening through increased viral replication, speeding cellular immunosenescence. Results also emphasize the central role of threat-based neural circuitry shared by loneliness and low vagal tone in the pathway to poorer health and aging. High HRV represents a key source of resilience that may facilitate healthy aging in the face of loneliness.

<u>Cardiovascular Reactivity</u> Thursday, March 8 from 9:30 to 10:30 am

Abstract 1085

RECURRENT DAILY LIFE SOCIAL CONFLICT IS ASSOCIATED WITH SUBCLINICAL ATHEROSCLEROSIS, BUT ONLY FOR STRESS-REACTIVE INDIVIDUALS: AN INTERNAL REPLICATION USING AMBULATORY MONITORING METHODS

Thomas W. Kamarck, Ph.D., Psychology, Psychiatry, Xingyuan Li, M.S., Biostatistics, Aidan Wright, Ph.D., Psychology, Matthew F. Muldoon, M.D., Medicine, Psychology, Stephen B. Manuck, Ph.D., Psychology, Univ.of Pittsburgh, Pittsburgh, PA

We have previously reported that ambulatory blood pressure (ABP) reactivity moderates the effects of daily life task strain on subclinical atherosclerosis. Here we use similar methods to assess exposure and reactivity to daily life social conflict in the same sample. 429 healthy employed adults, ages 30-54 (54 % female, 16 % Black) monitored their daily experiences, using electronic diary and ABP methods during each waking hour for 4 days, and carotid artery intima-medial thickness (IMT) was assessed using ultrasonography to yield a surrogate marker of subclinical

atherosclerosis. As part of each hourly interview, ratings of recent (past 10 minutes) Social Conflict (e.g., "Someone treated you badly?") were collected, using a 2-item 6-point Likert scale. Momentary ambulatory systolic BP (A-SBP) was significantly greater during periods when momentary Social Conflict ratings were higher ($\underline{b} = .47, \underline{F} = 8.83, \underline{p} = .003$ after covariate adjustment), but there were individual differences in the extent of these effects, i.e. differences in A-SBP conflict reactivity. These differences in Conflict reactivity moderated the effects of Social Conflict exposure (mean Social Conflict rating across the monitoring period; planned comparison $\underline{p} = .0079$). Among high Conflict reactive individuals, higher Social Conflict exposure was associated with larger IMT (1 sd above the mean on reactivity, b=0.05, t=3.71, p=0.0002 after adjusting for demographic and risk factor covariates), whereas Social Conflict was not linked with IMT among less reactive subjects (1 sd below the mean, b=0.02, t=1.35, p=0.18, see Figure). These findings highlight a) the importance of daily life social stressors as predictors of cardiovascular disease risk, b) the existence of individual differences in susceptibility to daily life demands based on an individual's biological sensitivity to acute stressor exposures, and c) the value of ambulatory measures for characterizing these factors and for examining how they may unfold, over time, in the natural environment.

Supported by HL40962



Abstract 1544

EARLY LIFE ADVERSITY AND CARDIOVASCULAR REACTIVITY AND RECOVERY: CONSIDERING THE CONTRIBUTIONS OF TEMPERAMENT

Stacey N. Doan, PhD, Stacey N. Doan, PhD, Psychology, Claremont Mckenna College, Claremont, CA, Nadya Dich, PhD, School of Public Health, University of Copenhagen, Copenhagen, Denmark, Thomas E. Fuller-Rowell, PhD, Psychology, Auburn University, Madison, WI, Gary W. Evans, PhD, Human Development, Cornell University, Ithaca, NY

Exaggerated cardiovascular reactions to acute psychological stress is thought the be a risk factor for cardiovascular health problems (Lovallo & Gerin, 2003). Along these lines, researchers have been interested int he role of early life adversity and how early life stressors may influence individual variability to stressors. Despite dozens of studies attempting to address these questions, the literature is rather mixed. Some studies report a potentiating effect of chronic stressors on cardiovascular response, while others show a null finding, or even attenuated reactivity to acute stress (Gump & Matthews, 1991). These conflicting data suggest the importance of identifying factors that may influence the relations between early life adversity and cardiovascular response. In the current study, we argue that

individual variability in temperament, or biological based differences in reactivity and regulation would moderate the relation between early life adversity and later reactivity and recovery. In particular, we look specifically at "difficult" temperament. Children who are classified as difficult are more emotional, reactive, and tend to respond more negatively to events. We hypothesized, based on the allostatic load frame work, demonstrating that life time adversity leads to a blunted stress response (Lovallo, farag, Sorocco, Cohoon & Vincent, 2012), this effect would be exaggerated for children characterized as difficult. Children and their families participated (N = 346) at age 9 and 13. Parents reported on children's temperament, and the Trier Social Stress test was used to evaluate cardiovascular reactivity and recovery. Linear mixed modelling was use to analyze our data. Results suggests that for children with low levels of early life adversity, reactivity is moderate and recovery to the stressor is quicker than for children from higher levels of adversity. Importantly, there was also an effect of temperament, such that for difficult children in the high risk context, there is blunted reactivity and prolonged recovery. We also found that for children with easy going temperament, earlier life adversity was associated with increases in reactivity and prolonged recovery. Thus considering individual variability in emotionality is important for understanding the effects of early life adversity.

Figure 1: <u>Relations between Cumulative Rick and Cardiovascelar Reactivity and Recovery is Moderated</u> by Temperament



Abstract 1072

THE EFFECTS OF MUTUAL SUPPORT WITH HEALTH CONCERNS ON CARDIOVASCULAR REACTIVITY IN MID AND LATE LIFE MARRIAGE

Joan Monin, PhD, Social and Behavioral Sciences, Yale School of Public Health, New Haven, CT

Little is known about how older spouses support one another with their health concerns. Drawing from communal relationships theory, we hypothesized that mutual support, in which both partners give and receive support, compared to one-sided support or no support, would decrease cardiovascular reactivity and distress and increase closeness. We also hypothesized that wives would benefit from mutual support more than husbands and that greater marital satisfaction would maximize the benefits of giving and receiving support more generally. Ninety-eight heterosexual couples, age 50 and over, were assigned randomly to four experimental conditions in which they took turns talking about their health concerns: neither partner received support (n=26), only the wife received support (n=22), only the husband received support (n=23), or both partners received support (n=27). Blood pressure, heart rate, distress, and closeness were measured. Contrary to the mutual support hypothesis, there were separate effects for giving and receiving support, and wives did not

benefit more than husbands from mutual support. Specifically, husbands' blood pressure decreased when receiving support (F(9)=3.38, p<.05) and their closeness decreased when neither spouse received support (F(6)=12.53, p<.001). Wives' heart rate decreased when they gave support (F(9)=2.83, p<.05) and their closeness increased when they gave or received support (F(6)=2.10, p=.05). Supporting the marital satisfaction hypothesis, receiving support decrease wives' systolic (F(3)=3.47, p<.05) and diastolic (F(3)=3.98, p<.05) blood pressure and husbands' distress (F(3)=3.16, p<.05) only when marital satisfaction was high. In conclusion, mutual support did not have benefits beyond receiving support; however, there were gender differences in the effects of giving and receiving support that differed by relationship satisfaction. Couples health interventions could benefit from considering these differences.

Abstract 1279

INDIVIDUAL DIFFERENCES IN CROSS-SYSTEM PHYSIOLOGICAL AROUSAL AND STRESS REACTIVITY, A LATENT CLASS ANALYSIS - THE PHEMORE STUDY

Nina Kupper, PhD, Marija Jankovic, MSc, Willem J. Kop, PhD, Medical & Clinical Psychology, Tilburg University, Tilburg, Netherlands

Background: The interrelations of the physiological processes involved in stress reactivity are complex, and not entirely understood. The current goal was therefore to investigate individual differences in the patterns of physiological arousal and stress reactivity, combining parasympathetic, sympathetic, and hemodynamic measures.

Methods: Participants were 558 undergraduate students (72% women, mean age= 21.0, SD=2.3) from Tilburg University, the Netherlands, who underwent the Trier Social Stress Test, while blood pressure (SBP, DBP), an electrocardiogram (IBI) and an impedance cardiogram (RSA, PEP, LVET) were recorded. 3-step latent class analysis (LatentGOLD) was performed on resting and reactivity values. We explored demographic and psychological (personality and mood) determinants of the observed latent profiles, reporting main effects and odds contrasted with the most prevalent reactivity profile.

Results: the analysis revealed 5 patterns: a profile characterized by general low to moderate responding (28%), a vigilant profile with high resting sympathetic activity and high general responsivity (21%), a buffered profile, with high parasympathetic resting tone and low to moderate general responding (20%), a sympathetic reactivity profile characterized by average resting and response sizes, but a high sympathetic reactivity (17%), and a sensitive profile, combining increased parasympathetic resting tone and high responsivity with moderate/high responsivity of sympathetic and hemodynamic measures (14%). None of the personality constructs (Big-5, Type D) were predictive of any of the profiles. Men were more likely to belong to the Vigilant (odds=2.63) and Sensitive profile (odds=2.23), as compared to the Moderate profile (Wald=15.25, p=.004). Depression was a significant predictor of class membership (Wald=43.67, p=.001). Severe levels of depression were most characteristic of the Sympathetic reactivity profile (odds=7.45) and the Sensitive profile (odds=3.44), while moderate depressive symptoms were most prevalent in the Buffered type (odds=1.67).

Conclusion: The current study revealed latent profiles in resting arousal and stress reactivity that in part concur with previously reported profiles of the Adaptive Calibration Model, but also reveal some unique profiles. Sex and depressive symptoms were significant predictors of the latent profiles. Behavioral & Psychological Randomized Controlled Trials in Disease

Thursday, March 8 from 9:30 to 10:30 am

Abstract 1469

ACTIB (ASSESSING COGNITIVE BEHAVIOURAL THERAPY IN IRRITABLE BOWEL): A RANDOMIZED CONTROLLED TRIAL OF CLINICAL AND COST EFFECTIVENESS OF THERAPIST DELIVERED COGNITIVE BEHAVIOURAL THERAPY AND WEB-BASED SELF-MANAGEMENT IN IRRITABLE BOWEL SYNDROME

Rona Moss-Morris, PhD, Psychology, King's College London, London, United Kingdom, Hazel Everitt, PhD, Primary Care and Population Sciences, University of Southampton, Southampton, United Kingdom, Sabine Landau, PhD, Department of Biostatistics and Health Informatics, Paul McCrone, PhD, Kings Health Economics, King's College London, London, United Kingdom, Gilly O'Reilly, PhD, Primary Care and Population Sciences, University of Southampton, Southampton, United Kingdom, Alice Sibelli, PhD, Sula Windgassen, MSc, Psychology, Kimberley Goldsmith, PhD, Rachel Holland, MSc, Department of Biostatistics and Health Informatics, Trudie Chalder, PhD, Psychological Medicine, King's College London, London, UK

Irritable bowel syndrome (IBS) affects 10–22% of the population. Current treatment relies on a positive diagnosis, lifestyle advice and drug therapies, but many people suffer ongoing symptoms. **Objectives:** To determine the clinical and cost-effectiveness of therapist telephone delivered CBT (TCBT) and web based CBT self-management (WCBT) compared to treatment as usual (TAU) in IBS. **Design:** 3-arm randomised controlled trial. Ethical approval awarded on 11th June 2013 (13/SC/0206) **Setting:** UK Primary and secondary care

Participants: Adults with refractory IBS recruited from 74 general practices and 3 gastroenterology centres in England over 23 months (May 2014 to March 2016).

Randomisation: Conducted by an independent clinical trials unit using random block sizes stratified by treatment centre.

Blinding: Randomization by concealed allocation, blinding of outcome assessors and the trial statistician. Interventions: Therapist delivered CBT: IBS specific self-help manual with six 60-minute telephone therpay sessions over nine weeks plus two 60-minute booster sessions (8 hours therapist time). Web-based CBT: An eight session IBS specific tailored self-management website (Regul8) plus three 30-minute telephone therapy sessions therapist over 9 weeks and two 30 minute boosters (2.5 hours therapist time). Therapists and treatment fidelity: 10 CBT therapists, 1 day training in trial interventions, monthly supervision, post-trial ratings of fidelity.

Primary outcome measures: Irritable bowel syndrome symptom severity score (IBS SSS) and Work and Social Adjustment Scale (WSAS) at 12 months. **Data sources:** Participants completed measures online at baseline (pre-randomization), three, six and 12 months after randomization. **Data analysis:** Data were analysed under intention-to-treat assumptions using longitudinal linear mixed modelling, including outcome measures at all time points and adjusting for the stratification variable (treatment centre) and baseline measures. **Results:** 558 (36.6%) of 1525 patients screened for eligibility were recruited. 186 randomised to TCBT, 185 to WCBT and 186 to TAU alone. Data have been analysed but because of the embargo on releasing trial results prepublication from high impact journals, the trial team has asked these to be withheld until published or presented at conference.

Study registration ISRCTN44427879 **Funding details** NIHR HTA (11/69/02)

Abstract 1227

A RANDOMIZED CONTROLLED TRIAL OF INTERNET-DELIVERED COGNITIVE-BEHAVIORAL THERAPY FOR INSOMNIA (ICBT-I) IN WOMEN TREATED FOR BREAST CANCER EFFECTS ON SLEEP -CHARACTERISTICS, SLEEP QUALITY, AND FATIGUE Robert Zachariae, DMSc, Ali Amidi, PhD, Oncology, Aarhus University Hospital, Aarhus, Denmark, Malene Damholdt, PhD, Clinical Medicine, Cecilie Clausen, MSc, Psychology, Aarhus University, Aarhus, Denmark, Jesper Dahlgaard, PhD, Health Sciences, VIA University College, Aarhus, Denmark, Holly Lord, PhD, Frances Thorndike, PhD, Lee Ritterband, PhD, Psychiatry and Neurobehavioral Sciences, University of Virginia, Charlottesville, VA

Background: Insomnia is 2-3 times more prevalent in cancer survivors than in the general population, where it is estimated to be approx. 10-20%. Cognitive behavioral therapy for insomnia (CBT-I) is an efficacious non-pharmacological alternative, and is the recommended first-choice treatment for chronic insomnia. Due to limited availability of trained therapists and the relatively high costs of face-to-face delivered CBT-I, meeting the needs of cancer survivors remains a challenge. Internet-delivered CBT-I (iCBT-I) is a possible solution and has been shown efficacious in otherwise healthy adults. We tested the efficacy of iCBT-I in breast cancer survivors with significant sleep disturbance.

<u>Methods</u>: Women from a national sample of Danish breast cancer survivors who experienced significant sleep disturbance were randomly allocated to iCBT-I or waitlist control (55:45). The fully automated iCBT-I program consisted of 6 cores. Online measures of insomnia severity, sleep quality, and fatigue were collected at baseline, post-intervention (9 weeks), and follow-up (15 weeks). Online sleep diaries were completed over 2-week periods pre- and post-intervention. Treatment adherence was measured as the number (out of six) treatment cores completed. Intention to treat analyses (time \times group interactions) were conducted with mixed linear models (MLMs) and corrected for multiple outcomes.

<u>Results</u>: A total of 255 women were randomly allocated to iCBT-I (n=133) or waitlist control (n=122). Statistically significant (p: 0.019 to <0.0001) time × group interactions were found for all sleep-related outcomes, including fatigue, from pre- to postintervention. Effect sizes (Cohen's *d*) ranged from 1.17 [95%CI: 0.87, 1.47] (insomnia severity) to 0.33 [0.06, 0.61] (wake after sleep onset). The improvements were maintained for outcomes measured at a 6 week follow-up (*d*: 0.66-1.10). Additional analyses showed that higher treatment adherence was associated with larger improvements from baseline to post-intervention.

<u>Conclusion</u>: The results indicate that iCBT-I is effective in breast cancer survivors with additional benefit in terms of reduced fatigue. The low-cost treatment could be incorporated in cancer rehabilitation programs.

Abstract 1496

DYADIC YOGA PROGRAM FOR PATIENTS WITH BRAIN TUMORS UNDERGOING RADIOTHERAPY AND THEIR FAMILY CAREGIVERS: RESULTS OF A RANDOMIZED CONTROLLED TRIAL

Kathrin Milbury, PHD, Smitha Malliah, MA, Palliative, Rehabilitation and Integrative Medicine, The University of Texas MD Anderson Cancer Center, Houston, TX, Anita Mahajan, MD, Radiation Oncology, Mayo Clinic, Rochester, MN, Terri Armstrong, RN PHD, Center for Cancer Research, National Cancer Institute, Bethesda, MD, Jing Li, MD, Radiation Oncology, Lorenzo Cohen, PHD, Palliative, Rehabilitation and Integrative Medicine, The University of Texas MD Anderson Cancer Center, Houston, TX

The role of mind-body medicine in the symptom and quality of life (QOL) management of glioma patients is largely unknown. Moreover, despite the high physical and psychological burden among family caregivers, the needs of caregivers generally remain unaddressed. Thus, we aimed to establish the feasibility and preliminary efficacy of a Dyadic Yoga (DY) intervention. Adults with high grade glioma undergoing at least 5 weeks of radiotherapy (RT) and their family caregivers were included. Dyads were randomized to a 12-session DY program focusing on breathing exercises, gentle movements and guided meditations or a waitlist control (WLC) group. Patients and caregivers in both groups completed measures of depressive symptoms (CESD), cancer-related symptoms (MDASI) and overall QOL (SF-36) at baseline and post-DY, which was at the end of RT. Dyads in the yoga group also completed written program evaluations. We approached 36 dyads of which 21 (58%) consented with one dyad withdrawing prior to randomization. Patients (mean age: 46 yrs., 58% male, 68% KPS=90) and caregivers (mean age: 51 yrs., 68% female, 50% spouses) and completed a mean of 11.67 sessions (range: 10-12), and all of them completed baseline and follow-up assessments. We examined differences scores separately for patients and caregivers for each outcome using ANCOVA controlling for participants' age, sex, and patient KPS. The voga group revealed marginally significant reductions in depressive symptoms in patients (p<.09; means, DY=-7.73 vs WLC= -1.17; Cohen's d=.64) and caregivers (p<.09; means, DY=-5.06 vs WLC=2.56, d=.86) and patients' cancer-related symptoms (p<.09, means, DY=-1.60 vs WLC=-.26, d=.69) relative to the WLC group. We also found clinically significant improvements in the mental component summary of the SF-36 for patients (means, DY=-6.54 vs WLC= 1.62; d=.35) and caregivers (means, DY=2.87 vs. WLC= -2.36; d=.35) in the DY group relative to the WLC group. Lastly, all participants in the DY group indicated that they perceived benefit from the program and found it useful. As the DY program appears to be feasible and beneficial to patients and their caregivers regarding self-reported QOL outcomes with medium and large effects, a larger trial with a more stringent control group is warranted.

Abstract 1437

THE EFFECTS OF EXPRESSIVE WRITING ON SALIVARY ALPHA-AMYLASE AND C-REACTIVE PROTEIN IN CANCER SURVIVORS POST-RADIATION: RESULTS FROM THE SECONDARY PHYSIOLOGICAL OUTCOMES OF A TWO ARM RANDOMIZED CONTROLLED TRIAL.

Utkarsh Subnis, PhD, Oncology, University of Calgary Cumming School of Medicine, Calgary, AB, Canada, Angela Starkweather, PhD, Center for Advancement in Managing Pain, University of Connecticut School of Nursing, Storrs, CT, Richard Brown, PhD, Health Policy and Behavior, Virginia Commonwealth University School of Medicine, Richmond, VA

Background. Cancer survivors (CS) must deal with significant stressors during survivorship such as the fear of cancer recurrence as well as attempt to resume their roles in their family and work lives. Stress is known to have negative psychobiological impacts on the nervous and endocrine systems, which in turn influences immune function, a critical system for CS. The Institute of Medicine has identified a lack of theorydriven interventions for managing psychosocial stress in CS. This study reports the results of a psychosocial intervention for CS and its effects on physiological outcomes. Methods. We conducted a two-arm randomized controlled trial to determine the efficacy of an online expressive writing (EW) intervention. The intervention group wrote about their deepest thoughts and feelings about their cancer in an online survey for 20 minutes over 4 consecutive days. The control group wrote about mundane matters e.g. time usage, for the same duration as the EW group. We measured physiological stress in CS through salivary cortisol (primary outcome) and salivary alpha-amylase and C-Reactive Protein (secondary outcomes). We also measured self-reported perceived stress, coping with cancer and fear of cancer recurrence (FCR). The outcomes were measured at baseline, 24 hours' post-intervention (immediate) and 6 weeks' post-intervention (delayed). Multiple analysis of covariance (MANCOVA) tests were conducted to determine the group and time differences in the secondary physiological and psychosocial outcomes.

Results. Participants (N=40) were predominantly white women with an early stage breast cancer diagnosis and who were in the phase of 2-12 months' post-radiation treatment completion. The results of this study revealed that EW was effective in lowering salivary cortisol levels (p<0.05) and lowered self-reported fear of cancer recurrence (F (1, 38) =9.65; p<.05). Although the analysis of the secondary physiological outcomes showed no significant difference between the groups, however the data describes a change within the individual groups and a correlation with the psychosocial outcomes of FCR, and coping with cancer.

Conclusions. Online expressive writing is a low-cost and convenient approach for delivering psychosocial care to CS for managing stress during survivorship. Also, comments on using salivary measures of stress in the CS population are presented.

Cancer

Thursday, March 8 from 10:35 to 11:50 am

Abstract 1294

ONE YEAR AFTER CANCER SCREENING, CANCER-RELATED DISTRESS PREDICTS GREATER INFLAMMATION, PAIN, AND SLEEP PROBLEMS

Alex Woody, PhD, Stephanie J. Wilson, PhD, Avelina C. Padin, M.S., William Malarkey, MD, Janice K. Kiecolt-Glaser, PhD, Institute for Behavioral Medicine Research, The Ohio State University Medical Center, Columbus, OH

Many people who are screened for cancer each year will experience a cancer scare, in which they exhibit potential warning signs for cancer, but follow-up testing leads to a benign diagnosis. Despite receiving positive news, some of these individuals may have lingering intrusive thoughts or images related to cancer and avoidance of these thoughts over the following months, collectively known as cancer-related distress. More broadly, focusing on past stressors in this manner has been associated with increased inflammation and somatic symptoms in acute laboratory settings. The current study tested the relationship of cancer-related distress with heightened inflammation, poor sleep, and increased pain after the benign diagnosis. A larger study screened for colorectal (n = 92) or breast (n = 106) cancer in at-risk patients (80.8% female). Plasma inflammatory markers were measured at initial cancer screening and one year following benign diagnosis, when self-reported cancer-related distress (Impact of Events Scale - Revised, with specific instructions related to cancer), sleep quality (Pittsburgh Sleep Quality Index) and pain (Brief Pain Inventory) were also measured. Higher levels of cancer-related distress predicted greater interleukin-6, tumor necrosis factor alpha, and C-reactive protein (ps < .04, R^2s

= .01-.02) along with poorer sleep and pain (ps < .001, $R^2s = .10$ - .22) when controlling for age, race, sex, cancer screen type, comorbidities, BMI, exercise, family history of cancer, alcohol use, and inflammation at the time of cancer screening. Cancer-related distress remained a significant predictor of all outcomes when also controlling for non-cancer distress (global stress, anxiety, depressed mood) and anti-inflammatory medications. Thus, cancer concerns following screenings can have lingering psychological *and* physiological effects. These findings expand the current literature linking focus on past stressors with elevated inflammation by measuring stressor-related distress further from stressor occurrence as well as inclusion of distress associated with perceptions of a "near-miss" of a negative health event.

Abstract 1167

PROGNOSTIC SIGNIFICANCE OF BEHAVIORAL SYMPTOMS FOR MULTIPLE MYELOMA PATIENTS UNDERGOING AUTOLOGOUS PERIPHERAL BLOOD STEM CELL TRANSPLANTATION

Erin S. Costanzo, PhD, Psychiatry; Carbone Cancer Center, Meredith E. Rumble, PhD, Psychiatry; Center for Sleep Medicine and Research, Mark B. Juckett, MD, Hematology/BMT; Carbone Cancer Center, Christopher L. Coe, PhD, Psychology; Harlow Center for Biological Psychology, Peiman Hematti, MD, Natalie S. Callander, MD, Hematology/BMT; Carbone Cancer Center, University of Wisconsin-Madison, Madison, WI

Fatigue, sleep disturbance, depression, and pain are common behavioral comorbidities for patients undergoing hematopoietic stem cell transplantation (HSCT). We evaluated the extent to which these symptoms predicted progression-free survival (PFS) and overall survival (OS) for multiple myeloma patients treated with autologous HSCT. Participants (N=119) completed measures of depression (IDAS), sleep (PSQI sleep disturbance, duration, global score), fatigue (FSI intensity, interference), and pain (BPI intensity, interference) prior to HSCT and 3 months post-HSCT and were followed prospectively for up to 6 years. The majority of participants reported clinically significant fatigue (79.8%) and sleep disturbance (67.2%) pre-HSCT. Fatigue and sleep indices improved significantly by 3 months post-HSCT (all ps<.05). Fewer participants had elevated depression symptoms (31.1%) or moderate-to-severe pain (16.0%); these symptoms were relatively stable pre- to post-HSCT. Cox proportional hazard regression models were used to examine relationships between behavioral indices and time from HSCT to disease progression and death. All models adjusted for ISS stage and cytogenetic risk, and hazard ratios (HR) were standardized to correspond to a 2 SD difference on the measures. During the follow-up period, 71 participants (61.3%) progressed or relapsed, and 42 (35.3%) died. Patients with poorer global sleep scores or shorter sleep duration pre-HSCT had marginally reduced OS (*HR*=1.72, *p*=.056, *HR*=1.70, *p*=.060) but not PFS. Shorter sleep or greater sleep disturbance at 3 months post-HSCT predicted shorter PFS (*HR*=1.65, *p*=.027; *HR*=1.68, *p*=.032) but not OS. The combination of short sleep and disturbed sleep at 3 months was the most sensitive predictor of PFS (HR=1.85, p=.006). Pain interference 3 months post-HSCT was associated with both shorter PFS (HR=1.66, p=.029) and OS (HR=1.81, p=.048). Depression and fatigue were not associated with these outcomes. In sum, pain interference with daily activities and sleep problems persisting beyond the acute HSCT recovery appear to have prognostic significance above and beyond the standard clinical risk factors. Inadequate sleep and limited activity due to pain may alter physiological mediators to hasten disease progression,

and/or these behavioral symptoms may reflect underlying disease activity not captured by established clinical indices.

Abstract 1441

ASSOCIATIONS BETWEEN DAILY AFFECT, INTRUSIVE THOUGHTS, AND CORTISOL LEVELS AMONG LUNG CANCER PATIENTS

Kala Phillips, M.S., Chelsea Siwik, B.A., Psychological and Brain Sciences, University of Louisville, Louisville, KY, Suzanne Segerstrom, Ph.D., Psychology, University of Kentucky, Lexington, KY, Lauren Zimmaro, M.A., Psychological and Brain Sciences, University of Louisville, Louisville, KY, Whitney Rebholz, Ph.D., Elizabeth Cash, Ph.D., Otolaryngology-HNS and Communicative Disorders, University of Louisville School of Medicine, Louisville, KY, Allison Hicks, B.A., Kathleen van der Gryp, B.A., Sandra E. Sephton, Ph.D., Psychological and Brain Sciences, University of Louisville, Louisville, KY

A diagnosis of cancer is often perceived as stressful, resulting in a combination of emotional, cognitive, and physiological responses. Robust relationships between cancer-related distress, mood, and cortisol have been observed across different cancers. However, within-subject analyses are needed to inform how daily fluctuations in affect and distress may covary with cortisol secretion patterns in this context.

Non-small cell lung cancer patients (N=65) provided 10 days of home-based data, including self-reports of affect (PANAS) and cancer-related distress (intrusive thoughts, IES-R). Saliva was collected at first waking and bedtime for examination of salivary cortisol. Multiple imputation (m=25) was performed on cortisol collection times and values for days with one cortisol value measured. Daily fluctuations in affect and intrusions were evaluated for associations with waking and bedtime cortisol using multilevel modeling, with people at Level 2 and days at Level 1. For waking cortisol, the predictor was affect or intrusions on the previous day. For evening cortisol, the predictor was affect or intrusions on the same day. Three models were run for each predictor: an unadjusted model, a model adjusting for medical and demographic factors (and time since waking for waking cortisol models), and a model testing disease stage as a moderator of the examined associations, adjusted for medical and demographic factors. Each model was run without, and then with imputation of missing cortisol values.

Older patients had significantly higher bedtime cortisol (p=.026). On days when patients reported higher positive affect, they had higher bedtime cortisol (p=.032). This effect persisted after adjustment (p=.028) and imputation (p=.038, adjusted model), and was not moderated by disease stage.

Contrary to expectation, daily experiences of positive affect were associated with higher bedtime cortisol. Items in the positive affect subscale of the PANAS convey high arousal (e.g., excited) and do not capture positive, low arousal affective states (e.g., content). Therefore, findings may reflect effects of arousal, as opposed to the valence of affect, on endocrine responses. Findings suggests a need for more precise measures that can distinguish affect and arousal in the cancer context, and biobehavioral intervention strategies with everyday applicability.

Abstract 1033

LIFE STRESS AS A RISK FACTOR FOR SUSTAINED ANXIETY AND CORTISOL DYSREGULATION DURING THE FIRST YEAR OF SURVIVORSHIP IN OVARIAN CANCER

Jessica S. Armer, B.S., Psychological and Brain Sciences, University of Iowa, Iowa City, IA, Anil K. Sood, M.D.,

Gynecologic Oncology and Cancer Biology, UT MD Anderson Comprehensive Cancer Center, Houston, TX, Premal H. Thaker, M.D., Obstetrics and Gynecology, Washington University School of Medicine, St. Louis, MO, Michael J. Goodheart, M.D., **Obstetrics** and Gynecology, Michaela Cuneo, M.S., Psychological and Brain Sciences, David Bender, M.D., Obstetrics and Gynecology, Lauren Clevenger, Ph.D., Psychiatry, University of Iowa, Iowa City, IA, Lauren Z. Davis, Ph.D., VA Ann Arbor Healthcare System, University of Michigan, Ann Arbor, MI, George M. Slavich, Ph.D., Psychiatry and Biobehavioral Sciences, University of California, Los Angeles, Los Angeles, CA, Susan K. Lutgendorf, Ph.D., Psychological and Brain Sciences, University of Iowa, Iowa City, IA

Among ovarian cancer patients, who generally have a poor prognosis, 29%-38% have significant anxiety at diagnosis. Anxiety tends to decrease during the first year post-diagnosis, but a minority of patients experience sustained anxiety, impacting well-being and recovery. Despite these effects, few studies have examined predisposing risk factors for persistent anxiety in this population or downstream physiological effects of anxiety in ovarian cancer. To address this, we examined associations between prior life stressors, anxiety trajectories, and diurnal cortisol secretion in ovarian cancer patients over the first year post-diagnosis. Participants (n=144) completed questionnaires assessing anxiety (POMS-SF anxiety) and collected salivary cortisol pre-surgery, following chemotherapy (6 months), and 12 months post-diagnosis. Early life adversity (CTES) was assessed pre-surgery and recent stress (LEDS) was assessed on a subset of patients (n=127) within a month post-surgery. Linear regression models using bootstrapping assessed whether anxiety trajectories mediated associations between (a) early life adversity (ELA) and changes in diurnal cortisol slope, and (b) recent stress and changes in diurnal cortisol slope during the first year of treatment. Age, chemotherapy use at 1 year, and cancer stage were included as covariates. ELA was related to flatter cortisol slopes over time (β =-0.763, p=0.002) and this relationship was partially mediated by the anxiety trajectory (p=0.046). A greater number of danger-related stress events in the year before surgery was associated with sustained elevations in anxiety over time $(\beta=0.537, p=0.019)$ and flatter cortisol slopes over time $(\beta=-$ 0.243, p=0.047); anxiety partially mediated the relationship between danger and cortisol slope (p=0.037). Although these findings do not address causality between anxiety and cortisol dysregulation, as dysregulated cortisol has been related to fatigue, poorer quality of life, and shorter survival in ovarian cancer, patients with chronic anxiety during the first year following diagnosis may be at risk for more rapid disease progression. Additionally, ELA and prior danger stressors emerged as risk factors of persistent anxiety. Clinical implications of these findings include consideration of ELA and prior stress as factors to identify women with potentially increased risk for negative outcomes.

Abstract 1404

BEHAVIORAL AND BIOLOGICAL PREDICTORS OF CHRONIC GRAFT-VERSUS-HOST DISEASE AND MORTALITY FOLLOWING HEMATOPOIETIC STEM CELL TRANSPLANTATION

Kellv Cousins Rentscher, PhD, Center for Psychoneuroimmunology, UCLA, Los Angeles, CA, Aimee Broman, MA, Biostatistics and Medical Informatics, Christopher L. Coe, PhD, Psychology, Mark B. Juckett, MD. Hematology/Oncology, Paul J. Rathouz, PhD, Biostatistics and Medical Informatics, Peiman Hematti, MD,

Hematology/Oncology, University of Wisconsin-Madison, Madison, WI, Judith E. Carroll, PhD, Cousins Center for Psychoneuroimmunology, UCLA, Los Angeles, CA, Erin S. Costanzo, PhD, Psychiatry, Carbone Cancer Center, University of Wisconsin-Madison, Madison, WI

Chronic graft-versus-host-disease (cGVHD) is a common complication of allogeneic hematopoietic stem cell transplantation (HSCT) and a significant cause of morbidity, nonrelapse mortality and health-related quality of life. Although inflammatory processes are known to be important in the pathophysiology of cGVHD no clear behavioral predictors and few prognostic mediators have been identified. The present study investigated behavioral (dysphoria, fatigue, sleep) and biological (cytokines, chemokines) predictors of cGVHD incidence and later mortality in 60 adults receiving allogeneic HSCT for a hematologic malignancy. Participants completed self-report measures (IDAS, FSI, PSQI) and provided blood samples pre-HSCT and 100 days post-HSCT. HSCT outcomes (cGVHD, mortality) were monitored for up to six years, during which time 35 participants (58%) developed cGVHD and 24 (40%) died. Biomarkers relevant to disease course and recovery were determined via electrochemiluminescence assay (MSD) and exploratory factor analysis (EFA) identified the underlying covariance structure of quantified analytes. Cox proportional hazards models covarying for age, sex, treatment regimen, and donor age and sex examined behavioral measures and EFAderived biomarker factors as predictors of outcomes. Participants reporting more fatigue pre-HSCT (HR=1.29, 95% CI, 0.99-1.67; p=.05) and post-HSCT (HR=1.39, 95% CI, 1.00-1.93; p=.05) had increased risk of mortality. Participants with short sleep duration (<6 hours) pre-HSCT (HR=3.28, 95% CI, 1.17-9.19; p=.02) and post-HSCT (HR=4.85, 95% CI, 1.62-14.53; p<.01) had increased risk of cGVHD and those with short sleep pre-HSCT had increased risk of mortality (HR=4.76, 95% CI, 1.05-21.65; p=04). A factor comprised of cytokines and chemokines involved in lymphocyte proliferation and chemotaxis (e.g., IL-12/IL-23p40, MDC) pre-HSCT was associated with decreased risk of cGVHD (HR=.65, 95% CI, 0.45-0.94; p=.02) and marginally decreased risk of mortality (HR=.69, 95% CI, 0.49-1.01; p=.06). This analysis suggests that fatigue and short sleep duration preand post-HSCT are important risk factors for the development of cGVHD and a concern for long-term survival and successful therapeutic intervention. Exploratory analyses also identified biomarkers that can be acquired prior to transplant that may be indicative of patient variation in HSCT outcomes.

<u>Social Relationships</u> Thursday, March 8 from 10:35 to 11:50 am

Abstract 1077

SPOUSES' DISCORDANCE ON REPORTED ANGER-COPING RESPONSE STYLES PREDICT INCREASED RISK OF EARLY MORTALITY 32 YEARS LATER

Kyle J. Bourassa, M.A., David A. Sbarra, PhD., Psychology, University of Arizona, Tucson, AZ, Niko Kaciroti, PhD., School of Public Health, University of Michigan, Ann Arbor, MI, Ernest Harburg, PhD., School of Public Health, University of Michigan, New York, NY

Research in psychosomatic medicine includes a long history of understanding how responses to anger-provoking situations are associated with health. In the context of a marriage, spouses may differ in their anger-coping response style. Where one person

may express anger in response to unfair, aggressive interpersonal interactions, others may instead suppress their anger. Discordant response styles within couples may lead to increased relational conflict, which, in turn, may undermine long-term health. To examine the association between spouses' response styles and mortality, the present study used data from a subsample of married couples (N = 163) drawn from the Life Change Event Study (LCES). In the LCES (Julius et al., 1986), each spouse reported how they would respond to unfair and aggressive imagined interactions with their spouse and an authority figure. These responses were then used to quantify each partner as having a more expressive or suppressive response style. Mortality status was then tracked from this assessment (1971/1972) until 2003. We hypothesized that spouses who were more discordant on their reported response styles would have higher risk of later mortality and tested this hypothesis using an actorinterdependence model (APIM). We first examined the model's actor and partner effects. Neither husbands' nor wives' response styles predicted their own or their partners' mortality. Although neither of these main effects was reliably different from zero, we found that wives' anger-coping response style significantly moderated the association of husbands' response style and their later mortality, $\beta = -0.18$ [-0.35, -0.01], p = 0.028. Similarly, husbands' response style significantly moderated the association of wives' response style and their later mortality, $\beta = -0.20$, [-(0.39, -0.01) p = 0.035. This interaction was such that husbands and wives were at lower risk of later mortality if their angercoping response styles were more similar, whereas their risk increased as their response styles were less similar. This interaction effect explained an additional 3.4% and 4.0% of the variance in husbands' and wives' risk of mortality 32 years later. These results suggest that spouses' anger-coping response styles, and more specifically the *mismatch* between spouses' response styles, predicts both husbands' and wives' later risk for early death.



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Abstract 1018

LONELINESS IN CHILDREN WITH ASTHMA: LINKS WITH SYMPTOMS, FAMILY ASTHMA MANAGEMENT, AND CYTOKINE REGULATION

Katherine B. Ehrlich, PhD, Psychology, University of Georgia, Athens, GA, Gregory E. Miller, PhD, Psychology, Northwestern University, Evanston, IL, Madeleine Shalowitz, MD, MBA, Pediatrics, NorthShore University Health System, Evanston, IL, Rachel Story, MD, Pediatrics, NorthShore Health System, Evanston, IL, Cynthia Levine, PhD, Makeda Austin, BS, Phoebe H. Lam, BA, Psychology, Northwestern University, Evanston, IL, Kelsey Corallo, BS, Sarah Lyle, MS, Psychology, University of Georgia, Athens, GA, Edith Chen, PhD, Psychology, Northwestern University, Evanston, IL

Loneliness and social isolation have been associated with increased risk for early mortality and physical health problems, such as obesity and deficiencies in cell-mediated immunity (e.g., Cacioppo et al., 2009; Holt-Lunstad et al., 2015; Kiecolt-Glaser et al., 1984). We extended this research by examining whether children's reports of loneliness were associated with asthma symptoms, family asthma management strategies, and inflammatory processes in youth with asthma.

Participants included 308 children ($M_{age} = 13.0$; 54.7% male) who were physician-diagnosed with asthma and one parent. Children completed the Life Stress Interview, which documents the experience of stress across different domains, including interpersonal relationships. During the interview, interviewers asked participants whether they ever feel lonely or left out from things with other kids. Children self-reported their asthma symptoms and limitations. Dyads completed the Family Asthma Management System Scale (McQuaid et al., 2005)-a semistructured interview about asthma management. Finally, children had a blood draw to measure asthma-relevant inflammatory responses. Specifically, we examined how aggressively children's cells respond with Th2 (IL-4, IL-5, IL-10, and IL-13) and Th1 (IFN-y, IL-2) cytokines when exposed to mitogens in vitro; similarly, we examined how sensitively children's cells responded to anti-inflammatory signals from cortisol. We incubated 0.5×10^6 PBMCs with 25 ng/mL of phorbol 12myristate 13-acetate + 1µg/mL of ionomycin for 24 hours at 37°C in 5% CO₂ In a separate well, we incubated cells with the same mitogen cocktail and 1.38×10^6 mol/L hydrocortisone.

Approximately 12% of the sample reported feeling lonely and left out of things with peers. Analyses revealed that these lonely children reported worse asthma symptoms, worse balance in their family asthma management, and higher Th1 cytokine production after mitogen presentation; similarly, their cells were less sensitive to anti-inflammatory signals from cortisol (as indicated by higher Th1 cytokine responses after incubation with PMA/INO + hydrocortisone). These findings remained significant when controlling for depressive symptoms, interviewer ratings of social stress, and demographic and biomedical covariates. These findings suggest that loneliness may represent a unique source of risk for children with asthma.

Abstract 1369

ACTIVATING PERCEPTIONS OF SUPPORT GIVING IMPROVES AFFECT AND ATTENUATES PHYSIOLOGICAL STRESS RESPONSE IN LATER LIFE

Diana Wang, B.S., Gerontology, University of Southern California, Los Angeles, CA, Tara Gruenewald, PhD, Psychology, Chapman University, Orange, CA

Mounting epidemiological research shows that support-giving behavior is associated with greater longevity and health in later life. However, the psychological and physiological pathways through which support-giving influences health remains unclear in middle-aged and older adults. In this study, we examined whether activating a schema of support-giving improved affective well-being and reduced responses to acute laboratory stress.

48 healthy adults age 40+ and over were recruited from the greater Los Angeles area. Subjects were randomly assigned to a 10-minute written manipulation of giving, in which they discussed how they support others, or a control condition in which they discussed activities from the previous day. They were asked to report levels of affect, social well-being and ego achievement. Then, they were exposed to a socially-evaluative stressor consisting of a Stroop task and paced auditory serial addition task, and recovery period. Throughout the tasks, blood pressure was collected periodically. Repeated measures ANOVA

models were used to compare the reactivity and recovery in blood pressure, and t-tests compared cognitive-affective states between groups.

Those in the support-giving group reported higher levels of positive affect (p=.018) and marginally higher levels of mastery (p=.064) compared to the control group. The givers also demonstrated a greater recovery in pulse pressure from the stressor compared to the control group. Givers demonstrated a significant difference between the pulse pressure during the stressor and recovery periods (p=.005), whereas the control condition did not (p=.057).

Our findings indicate that support-giving may confer immediate affective well-being benefits as well as buffer sympathetic responses to stress in later life. These data show potential mechanisms through which giving in later life may confer health benefits. We will also share neuroendocrine and autonomic nervous system findings examined in the same experiment.

Abstract 1431

CAN SES MODERATE THE ASSOCIATION OF DAILY SOCIAL SUPPORT WITH DAILY STRESS APPRAISALS AND DIURNAL CORTISOL?

Emily D. Hooker, Ph.D., Psychology, Pace University, Overland Park, KS, Belinda Campos, Ph.D., Chicano and Latino Studies, Psychology, University of California, Irvine, Irvine, CA, Lesa Hoffman, Ph.D., Child Language Doctoral Program, University of Kansas, Lawrence, KS, Peggy Zoccola, Ph.D., Psychology, Ohio University, Athens, OH, Sally S. Dickerson, Ph.D., Psychology, Pace University, New York, NY

Because those higher in socioeconomic status (SES) tend to be more independent, social support may threaten the self, thereby undermining potential benefits of receiving social support. However, among those who are lower in SES, the self may be more interdependent and, therefore, less threatened when receiving social support. This study examined SES as a moderator of how daily, received support predicted both daily, psychological stress appraisals and diurnal cortisol. For those lower in SES, we hypothesized that higher support would be associated with lower stress appraisals and a more favorable pattern of diurnal cortisol. For those higher in SES, we hypothesized that higher support would be associated with higher appraisals and less favorable diurnal cortisol. Healthy undergraduate students (N=148) participated in a three-day study. Participants completed one or more evening diaries the first day of the study and additional questionnaires upon awakening, throughout the day, and at bedtime the following two days. Support was measured each evening and stress appraisals and cortisol were measured throughout the day. Subjective SES moderated how daily received support predicted diurnal cortisol such that for those who reported higher subjective SES, receiving less support than usual was associated with a more favorable pattern of diurnal cortisol the next day. Neither subjective nor objective SES moderated how daily support predicted stress appraisals, but the receipt of more support on average was associated with lower, next-day stress appraisals. The findings demonstrate that subjective SES can moderate the relationship between daily, received social support and next-day, physiological outcomes.

Abstract 1401

THE EFFECT OF SOCIAL SUPPORT BEHAVIOURS ON CORTISOL REACTIVITY TO AN ACUTE STRESS TASK *Kimberly A. Dienes, PhD, School of Health Sciences, Audrey Poh, BA, Psychology, Alison Wearden, PhD, School of Health*

Poh, BA, Psychology, Alison Wearden, PhD, School of Hea Sciences, University of Manchester, Manchester, UK

Social support, especially when provided by a romantic partner, has consistently been associated with improved psychological and physiological responses to stress (Cosley et al., 2010; Kirschbaum et al., 1995; Ditzen et al., 2008). Literature has mainly focused on effects of presence vs. absence of social support on stress reactivity, yet it may be useful to examine the influence of distinct social support behaviours (positive emotional (PE), positive informational (PI), and negative (N)) on our physiological responses to stress determine which would be most effective in reducing stress reactivity (Uchino et al., 1996; Nurullah, 2012; Cutrona & Suhr, 1992). The aim of the current study was to explore whether there would be differences in cortisol reactivity to an acute stress task (Trier Social Stress Test (TSST): Kirschbaum et al., 1993), depending on the type of social support behaviours involved. The hypotheses were that (a) higher proportions of negative social support behaviours would increase cortisol reactivity across the TSST, while higher proportions of positive social support behaviours would reduce cortisol reactivity, and (b) having more PE than PI support behaviours would lead to a larger decrease in cortisol reactivity. 28 participants (21 female, 6 male, 1 transgender), ranging in age from 18 to 33 years (M = 21.32, SD = 3.13) completed the TSST with a romantic partner support interaction recorded immediately prior to the task. Salivary cortisol samples were collected at baseline, post-task, and 10, 25, and 40 minutes. Speech samples from the partner support interaction were coded into PI, PE and N behaviours using the Social Support Interaction Coding Scheme (Bradbury & Pasch, 1994). Positive and negative support did not significantly influence cortisol reactivity. However, higher levels of PI support behaviours led to a more rapid rise in cortisol and greater cortisol secretion across the task (AUCi) when compared to PE behaviours. These findings validate prior research that instrumental support is not as effective as emotional support for decreasing stress reactivity (Taylor, 2007; Cutrona et al., 2007). Additionally, they suggest that PI support behaviours could exacerbate one's cortisol response when stressed. These findings, if replicated, may inform relational interventions targeting reductions in stress reactivity.

<u>Socioeconomic Status</u> Thursday, March 8 from 10:35 to 11:50 am

Abstract 1280

NEIGHBORHOOD POVERTY AND BLUNTED HEMODYNAMIC RESPONSE TO STRESS AMONG PATIENTS WITH CORONARY ARTERY DISEASE

Samaah Sullivan, PhD, Epidemiology, Heval M. Kelli, MD, Muhammad Hammadah, MD, Matthew Topel, MD, Ibhar Al Mheid, MD, Kobina Wilmot, MD, Ronnie Ramadan, MD, Amit Shah, MD, Oleksiy Levantsevych, MD, Malik Obideen, MD, Medicine, Laura Ward, MSPH, Michael Kutner, PhD, Yi-An Ko, PhD, Biostatistics and Bioinformatics, Michael R. Kramer, PhD, Tene T. Lewis, PhD, Epidemiology, J. Douglas Bremner, MD, Psychiatry and Behavioral Sciences, Arshed Quyyumi, MD, Medicine, Viola Vaccarino, MD; PhD, Epidemiology, Emory University, Atlanta, GA

Background: Living in neighborhoods characterized by poverty may act as a chronic stressor that results in physiological dysregulation of the body's reactivity to stress through the hypothalamic-pituitary-adrenal axis. The objective of the current analysis was to assess hemodynamic reactivity to acute stress among patients with coronary artery disease (CAD) who live in high (vs. low) poverty neighborhoods. We hypothesized that patients in high poverty neighborhoods would have an abnormal (either enhanced or blunted) hemodynamic response to acute stress. Methods: We studied 632 patients with stable CAD whose addresses were geocoded and merged with poverty data from the 2010 American Community Survey at the census-tract level. A z-transformation was calculated to classify census tracts (neighborhoods) as either having 'high' or 'low' poverty. Systolic blood pressure, diastolic blood pressure, and heart rate were measured before and after a public speaking stress task. The rate-pressure product was calculated as systolic blood pressure x heart rate. Multilevel models for repeated measures and accounting for individuals nested within census tracts were conducted. Models were adjusted for demographics, lifestyle and medical risk factors, medication use, and resting rate-pressure product. Another set of models used propensity scores weighted by the inverse probability of neighborhood status for sex, age, race, and individual-level income. Results: The mean age was 63 years and 173 were women. In adjusted models, participants who live in high (vs. low) poverty neighborhoods had similar hemodynamic values at rest, but significantly (p < .05) lower values during mental stress for systolic blood pressure (156.3 mmHg vs. 160.3 mmHg), heart rate (73.0 beats/min vs. 77.4 beats/min) and rate-pressure product (11729 mmHg x beat/min vs 12388 mmHg x beat/min) (figure). All time x neighborhood poverty interactions for the hemodynamic measurements were below p < .10. Results were similar in the propensity weighted models, and slightly attenuated for systolic blood pressure.

Conclusion: A blunted hemodynamic response to mental stress was observed among participants who live in high poverty neighborhoods. Future studies should explore whether neighborhood poverty and blunted hemodynamic response to stress translate into differences in long-term cardiovascular outcomes.

Comparison of changes in rate-pressure product to mental stress among participants by neighborhood poverty status. Model is adjusted for demographics (age, sex, race, and individual-level income), lifestyle and disease risk factors (smoking status, BMI, hypertension, diabetes, heart failure, revascularization, and previous MI), medication use (beta-blockers and ACE inhibitors), and resting RPP. Error bars represent 95% confidence intervals. * denotes p-value < 0.05.



Abstract 1523

WIDENING SOCIOECONOMIC INEQUALITIES IN CHILD DEVELOPMENT: PATHWAYS ACROSS FAMILY FUNCTIONING, SOCIAL INTERACTIONS, AND HEALTH BEHAVIORS

Meanne Chan, PhD, Psychiatry, Frederick K. Ho, PhD, Patrick Ip, MBBS, Pediatrics and Adolescent Medicine, University of Hong Kong, Pok Fu Lam, Hong Kong

Robust evidence points to developmental health disparities in children from different socioeconomic backgrounds. Mechanistic research has focused on examining psychosocial mechanisms that help explain this socioeconomic gradient. Recent findings suggest a widening socioeconomic gap as children grow up with adversity in the environment. The present study adds to this literature by following a representative cohort of children from low and high-income districts of Hong Kong, to examine mechanisms across key domains relevant to development – family functioning, social interactions, and health behaviors.

A cohort of 567 Chinese preschool children from different socioeconomic backgrounds was initially recruited through a stringent stratified random sampling procedure. Baseline measures at age 5 included teacher-rated holistic development (socio-emotional competence, cognitive performance, and physical health) and parent-rated family dynamics (parent-child interactions during recreation and learning activities). Follow-up assessments at age 9 also included academic performance and behavioral assessments.

Cross-sectional results (cohort at age 5) indicated a socioeconomic gradient in developmental outcomes. For every unit of increment in socioeconomic status (SES) composite score, there was a parallel increment of 0.7 (out of 10) in holistic development score, such that children from resourceful families had better development across socio-emotional, cognitive, and physical domains. At 4-year follow-up (76.2% retention, cohort at age 9), a widening gap in developmental outcomes was observed and predicted by change in SES (β =.10, p=.02). Path analyses revealed that early exposure to electronic devices and family functioning were key mediators of SES and cognitive development, which collectively explained 33.6% of the main effect. Similarly, the association between SES and socioemotional development was mediated by sleep quality, parenting style, and physical activity, which collectively explained 73.8% of the main effect.

Findings suggest widened socioeconomic disparities in child development, which may be partially explained by family functioning and health behaviors. Comprehensive models exploring risk and resilience processes will be discussed. These distinct pathways serve as potential targets for early interventions to mitigate vulnerable trajectories.

Abstract 1110

HAVE EDUCATION AND RACIAL DISPARITIES IN CARDIOVASCULAR HEALTH INCREASED FOLLOWING THE GREAT RECESSION?

Jennifer Morozink Boylan, PhD, Health and Behavioral Sciences, University of Colorado Denver, Denver, CO, Julie A. Kirsch, MA, Carol D. Ryff, PhD, Psychology, University of Wisconsin Madison, Madison, WI

Background: The Great Recession is considered the most consequential global economic crisis since World War II. Importantly, individuals with pre-existing vulnerabilities (e.g., low education, racial and ethnic minorities) suffered more hardships and had a prolonged recovery relative to those more advantaged. This study tests the hypothesis that educational and

racial disparities in cardiovascular (CV) health have become more pronounced in the post-Recession era. Indirect effects via psychosocial factors (e.g. perceived stress, sense of control) are also tested.

Methods: Data came from two national cohorts from the MIDUS (Midlife in the United States) Study situated on either side of the Great Recession (n=1,255 pre-Recession; n = 863 post-Recession). Education was operationalized in three categories (high school or less, some college, and college degree or higher). Racial disparities focused on differences in CV health between non-Hispanic White and Black or African American individuals. CV health was defined as the presence of healthy behaviors (smoking, diet, physical activity) and healthy levels of biological risk factors (BMI, total cholesterol, glucose, blood pressure).

Results: Educational gradients in CV health were larger in the post-Recession sample. Specifically, CV health scores were larger between those with a high school education and less and those with some college education and those with a college degree, respectively, in the post-Recession sample as compared to the pre-Recession sample. Race disparities in CV health were marginally larger post-Recession after accounting for educational disparities. Significant indirect effects from education to perceived stress, sense of control, and recession hardship, respectively, to CV health were also evident.

Conclusions. Results indicate that health disparities in CV health are larger following the Great Recession and highlight the critical public health need to identify mitigating psychological, social, and policy-level factors to combat growing disparities. Higher perceived stress, lower sense of control, and more recession hardships contributed to educational gradients in CV health. This paper addresses the importance of macro-level economic change that has heightened physical and mental health vulnerabilities among disadvantaged segments of society.

Abstract 1175

SOCIODEMOGRAPHIC DISPARITIES IN CORTICOLIMBIC STRUCTURES

Danielle Shaked, M.A., Danielle L. Beatty Moody, Ph.D., Zachary B. Millman, M.A., Psychology, University of Maryland, Baltimore County, Baltimore, MD, William F. Rosenberger, Ph.D., Hui Shao, Ph.D., Statistics, George Mason University, Fairfax, VA, Leslie I. Katzel, M.D., Ph.D., Medicine, University of Maryland School of Medicine, Baltimore, MD, Christos Davatzikos, Ph.D., Biomedical Image Analysis, University of Pennsylvania, Philadelphia, PA, Rao P. Gullapalli, Ph.D., Diagnostic Radiology, Stephen L. Seliger, M.D., Medicine, University of Maryland School of Medicine, Baltimore, MD, Gurav Erus, Ph.D., Biomedical Image Analysis, University of Pennsylvania, Philadelphia, PA, Theresa Kouo, M.D., Diagnostic Radiology, University of Maryland School of Medicine, Baltimore, MD, Michele K. Evans, M.D., Alan B. Zonderman, Ph.D., Laboratory of Epidemiology and Population Sciences, National Institute on Aging Intramural Research Program, Baltimore, MD, Shari R. Waldstein, Ph.D., Psychology, University of Maryland, Baltimore County, Baltimore, MD

Corticolimbic circuitry may play a key role in translating stress to the poor physical health outcomes disproportionately represented among those of lower socioeconomic status (SES) and African Americans (AAs). AAs may be particularly vulnerable to SESrelated structural disparities in stress-sensitive brain regions due to disproportionate stress exposures. Here, adjusting for age and sex, we examined potential interactive relations of SES and selfidentified race to regional brain volumes on MRI scans in 200 community-dwelling AA and White adults from the Healthy Aging in Neighborhoods of Diversity across the Life Span (HANDLS) SCAN study. Regional brain volumes were derived using T1-weighted MP-RAGE images. Higher SES Whites had significantly greater right (R) and left (L) medial prefrontal cortex (PFC), L orbital PFC, and L anterior cingulate cortex (ACC) volumes than all other groups. Additionally, higher compared to lower SES persons had greater R and L hippocampal and amygdalar volumes. Whites had greater R and L hippocampus, R orbital PFC, and R ACC volumes than AAs. Smaller volumes in brain regions involved in emotion and stress may contribute to dysregulated corticolimbic circuitry. The structural changes associated with psychophysiological stress reactivity may help explain race- and SES-related disparities in adverse physical health outcomes.

Abstract 1200

LIFE COURSE SOCIOECONOMIC STATUS AND LOW-GRADE INFLAMMATION IN ADULTHOOD: A LATENT CLASS ANALYSIS APPROACH

Agus Surachman, MS, Human Development and Family Studies, The Pennsylvania State University, University Park, PA, Tara Grunewald, PhD, Psychology, Chapman University, Orange, CA, Bethany C. Bray, PhD, The Methodology Center, David M. Almeida, PhD, Human Development and Family Studies, The Pennsylvania State University, University Park, PA

Objectives: Life course epidemiological perspectives posit that health is influenced by patterns of socioeconomic status (SES) across the life course. This study analyzes SES trajectories across the life course using latent class analysis (LCA) and tests the association between latent classes of SES trajectories with lowgrade inflammation markers. Methods: This study utilized data from 863 participants (age 25-76, M=50.84, SD=13.41; 52.1% female; 70.6% White, 18.8% Black) who participated in the biomarkers assessment of Midlife in the United States (MIDUS) Refresher study. These analyses incorporated eight indicators of SES across the life course including parental education level, family of origin welfare status, financial level growing up, highest level of formal education, current household income to poverty ratio, current financial status, current availability of money, and current difficulties paying bills. This study used two markers of low-grade inflammation: interleukin 6 (IL-6) and Creactive protein (CRP). LCA was performed using PROC LCA on SAS. Results: A four-class model was the best fitting: 35.9% of the participants are expected to belong to always high class (high in all SES indicators across the life course), 15.6% participants are expected to belong to always low class (low in all SES indicators across the life course), 26.7% are expected to belong to upwardly mobile class (low childhood SES but high adult SES), and 21.9% are expected to belong to subjectively downward class (high childhood SES, high objective adult SES, but low subjective adult SES). The measurement invariance assumption of the latent classes held across gender and age. The always high class had the lowest mean of CRP and IL-6, followed by subjectively downward, upwardly mobile (p < .05compared to always high class), and always low (p < .05compared to always high and subjectively downward classes). Conclusions: LCA provided a picture of the clustering of SES characteristics across the life course and its associations with adult inflammatory burden. Consistent with previous research, inflammation was highest in those with persistently low SES and those with early life SES disadvantage, and lowest in the persistently advantaged. A novel finding was the lower inflammatory burden of those with favorable objective SES characteristics but subjective perceptions of SES burden.

<u>Issues in Primary Care</u> Thursday, March 8 from 1:20 to 2:20 pm

Abstract 1049

PATIENT-REPORTED CAUSES OF HEART FAILURE IN EUROPEAN PATIENTS

Ivy Timmermans, MSc, Cardiology, University Medical Center Utrecht, Utrecht, Netherlands, Johan Denollet, PhD, Medical and Clinical Psychology, Tilburg University, Tilburg, Netherlands, Susanne Pedersen, PhD, Psychology, University of Southern Denmark, Odense, Denmark, Mathias Meine, MD, PhD, Henneke Versteeg, PhD, Cardiology, University Medical Center Utrecht, Utrecht, Netherlands

Background: After being diagnosed with a chronic disease, patients create disease perceptions and formulate causes. These perceptions influence health behavior and emotional wellbeing. This study is the first to examine patient-reported causes and their correlates in patients with heart failure.

Methods: European heart failure patients, participating in the REMOTE-CIED study (N=595), completed questionnaires, including the Brief Illness Perceptions Questionnaire. Patient-reported causes were categorized into *physical, natural, behavioral, psychosocial, supernatural* and *other*, using deductive thematic analysis.

Results: Patients who did not report any cause (11%) were more often lower educated and participated less often in cardiac rehabilitation. Of the remaining patients, 46% reported physical causes (mainly comorbidities), followed by behavioral (38%, mainly smoking), psychosocial (35%, mainly work-related stress), and natural causes (32%, mainly heredity). We found socio-demographic, clinical and psychological group differences between causal categories, and large discrepancies between prevalence of physical risk factors in medical records and patientreported causes (e.g., 58% suffered from hypertension, while only 5% reported hypertension as a cause). Multivariable analyses showed trends towards associations between physical causes and poor health status (Odds ratio (OR)=1.41, 95% confidence interval (95%CI)=0.95-2.09, p=.09), psychosocial causes and psychological distress (OR=1.54, 95%CI=0.94-2.51, p=.09), and behavioral causes and less threatening view of heart failure (OR=0.64, 95%CI=0.40-1.01, p=.06).

Conclusion: Comorbidities, smoking, (work-related) stress and heredity were most frequently reported as causes of heart failure by European patients. However, their awareness of actual physical causes seems to be limited. Cardiac rehabilitation programs may help to enhance patients' understanding and management of heart failure risk factors.

Abstract 1028

STRESS RESPONSE PROFILES FOR METABOLIC RISK STRATIFICATION IN PRIMARY CARE

Lawson Wulsin, MD, Psychiatry, University of Cincinnati, Cincinnati, OH

Background: The robust neuroscience of the relationship between chronic stress and metabolic disorders has not yet contributed to improved risk stratification in primary care. Barriers to translating stress neuroscience into more effective primary care prevention practices include the complexity of chronic stress measurement, the range of individual variation in stress response profiles, and the range of individual variation in response to stress management. There are no published reports of formal efforts to establish stress response profiles for the prediction of metabolic risk.

Method: In the context of a primary care clinic that includes a stress center staffed by a care manager and behavioral health professionals practicing the collaborative care model, we propose a three-step process for developing useful stress response profiles that identify high-risk patients. The aim is to improve on existing risk estimation methods for diabetes, heart disease, and obesityrelated conditions, and to provide a sound basis for early behavior change interventions that reduce risk. At each step the stress response is evaluated with respect to a) exposures to stressors, b) the patient's appraisal of the severity of the stressors, and c) biological measures of responses to stressors. Estimates for low, medium, and high risks at each step lead to recommendations for further observation, evaluation, or intervention. This proposal includes feasibility estimates based on time, procedure costs, and personnel skills at each step. Remaining challenges to implementing this process widely include establishing adequate interrater reliability for risk estimates based on stress response profiles, demonstrating the added value of stress response profiles for risk estimation, and demonstrating that risk response profiles facilitate effective risk reduction through more targeted stress management.

Conclusions: Similar to a neuropsychology assessment or a colonoscopy, stress response profiles could be a cost-effective way of identifying high-risk patients before the onset of metabolic disorders. APS should consider establishing a workgroup to develop proposals for studying the utility of stress response profiles in primary care.

Abstract 1201

PATIENT-PHYSICIAN COMMUNICATION: ASSOCIATIONS WITH PATIENT HEALTH STATUS AND HEALTH CARE UTILIZATION IN THE ADULT NORTH CAROLINA MEDICAID POPULATION

Sara J. Sagui-Henson, Ph.D. Candidate, Health Psychology PhD Program, Keith Carnes, PhD, Public Health Sciences, Lydia Roos, BS, Health Psychology PhD Program, University of North Carolina at Charlotte, Charlotte, NC

Patient-centered care emphasizes respect for and responsiveness to patients' perspectives in the medical decision-making process. Effective communication is essential to this practice; however, physicians may engage in collaborative care less frequently with patients of disadvantaged backgrounds, potentially exacerbating poor health outcomes. To better understand how patientphysician communication relates to patient health status and healthcare utilization in medically underserved populations, we explored these relationships in a probability sample of North Carolina adult Medicaid beneficiaries in 2015 who had a personal health provider for more than 6 months (n = 1,917-1,932). The Consumer Assessment of Healthcare Providers and Systems (CAHPS) survey was administered via computer-assisted telephone interviews. A CAHPS composite measure was assess perceptions of patient-physician calculated to quality. Self-rated overall health and communication mental/emotional health in the prior 6 months were used to assess health status, and the number of emergency room visits in the past 6 months was used to assess urgent healthcare utilization. Covariates included age, sex, level of education, race, rurality, dual eligibility status, and presence of a chronic health condition. Hierarchical linear regressions were conducted to assess the predictive validity of patient-physician communication beyond

covariates. Results revealed that patient-provider communication was significantly related to higher self-rated overall health ($\beta = .08, p < .001$), higher self-rated mental/emotional health ($\beta = .13, p < .001$), and fewer emergency room visits ($\beta = -.10, p < .001$). This suggests that communication quality in the patient-physician relationship is a possible predictor of improved self-reported health status and reduced urgent health care utilization in medically underserved populations. Findings also highlight the importance of integrating communication behaviors and skills that will foster respect and trust with marginalized populations into primary care training.

The authors wish to thank the Division of Medical Assistance of the North Carolina Department of Health and Human Services for funding the survey that provided the data used in this study.

Abstract 1148

ETHNICITY AND CAREER LONGEVITY PREDICT BURNOUT IN HEALTH CARE PROVIDERS

James D. Halbert, PhD, Department of Population Health Sciences, Medical College of Georgia, Augusta University, Augusta, GA, Kathleen Hughes, PhD, Angela L. Bruch, PhD, William G. Huitt, PhD, Harold Abel School of Psychology, Capella University, Minneapolis, MN, Debra R. van Tuyll, PhD, Communication, Augusta University, Augusta, GA, Varghese George, PhD, Gregory A. Harshfield, PhD, Gaston K. Kapuku, MD, PhD, Department of Population Health Sciences, Medical College of Georgia, Augusta University, Augusta, GA

Objective: Many factors have been linked to burnout, such as having a lack of resiliency, being over worked, and under poor leadership. However, some social constructs of healthcare, such as inter-professional collaboration, have never been studied as contributing factors to burnout. This study aimed to fill in this gap by taking into account gender, ethnicity, health-training status, and years in service.

Methods: Eighty-seven people from three categories of healthtraining status, including practicing physicians (n = 29), nurses (n = 29), and other patient care staff (n = 29), were surveyed using the inter-professional collaboration scale and Maslach Burnout Inventory.

Results: There were 82.67% Europeans Americans (EA) and 17.33% non EA. Multiple regressions were computed to predict burnout. The total model, including the five predictors, explained 14% of the variance ($R^2 = .193$, F(5, 81) = 3.884 p < .003). Some predictors did not show significance for predicting burnout, such as inter-professional collaboration, health-training status, and gender. However, years in service (B = -.122, t = -2.857, p = .005) and ethnicity (minority > European Americans) (B = -.288, t = -2.550, p = .013) proved to be significant factors.

Conclusion: European Americans experienced lower burnout than other ethnic groups. Experienced health care employees have lower levels of burnout than those employees who have less experience in their field, suggesting the need for interventions to improve resiliency traits in the health care system.

Obesity & Weight Loss Thursday, March 8 from 1:20 to 2:20 pm

Abstract 1530 STRESS AND CENTRAL ADIPOSITY IN A PROSPECTIVE, LONGITUDINAL STUDY OF CHILDREN AT-RISK FOR OBESITY Eloïse Fairbank, BA, Jennifer J. McGrath, PhD MPH, Pediatric Public Health Psychology Lab, Andreas Arvanitogiannis, PhD, Psychology, Concordia University, Montreal, QC, Canada, Melanie Henderson, MD PhD, Département de pédiatrie, CHU Sainte-Justine, Montréal, QC, Canada

Introduction: Childhood obesity continues to be a global epidemic. The World Health Organization recently reported a 10-fold increase in child obesity over the past 4 decades. Risk factors include parent obesity, physical inactivity, calorically-dense food availability, short sleep duration, and stress. Parent obesity is a robust predictor of childhood obesity, attributable to both intergenerational transmission of excess weight and the social environment. Stress has been convincingly demonstrated to alter metabolic processes, independent of physical activity and dietary behaviour. Experimental, cross-sectional, and longitudinal studies suggest stress plays a plausible role in the development of obesity and central adiposity.

Method: Children aged 8-10 years (N=630) participated in the Quebec Adipose Lifestyle Investigation in Youth (QUALITY) Cohort. Eligibility included having a biological parent with confirmed obesity. Body mass (BMI Z-score, DEXA scan), central adiposity (waist circumference), lifestyle habits (physical activity, diet), puberty, and stressful events were measured at ages 9 and 11 years. Growth curve models using cluster analyses were conducted on residualized change scores for weight gain, waist circumference, and body mass.

Results: Children who endorsed higher stress were nearly twice as likely to be obese later (BMI 95% percentile; OR=1.83, p=.008). Consistent with past cross-sectional research, higher stress was linked to larger BMI Z-scores (β =.097, p = $(\beta = .095, p = .019)$, and waist .020), overall adiposity circumference (β =.098, p=.010) at Visit 1; as well as, overall adiposity $(\beta = .092, p = .023)$ and waist circumference $(\beta=1.29, p=.001)$ at Visit 2. Cluster analyses indicated children who endorsed higher stress at both visits had larger waist circumference at Visit 2, beyond expected growth, compared to low (β =.035, p=.042) and decreasing (β =.041, p=.028) stress groups; higher stress at both visits did not predict BMI-Z score (p=.892) or overall adiposity (p=.538) growth over time.

Conclusion: Results suggest stress partly explains larger body mass and central adiposity among children at high-risk for obesity. Reducing stress may be of particular importance for atrisk youth. These findings have implications for better understanding the pathophysiology of mechanisms linked to childhood obesity.

Abstract 1173

DIET COMPOSITION FACTORS AS CANDIDATE MECHANISMS UNDERLYING THE DEPRESSION-TO-FUTURE OBESITY ASSOCIATION: THE CORONARY ARTERY RISK DEVELOPMENT IN YOUNG ADULTS (CARDIA) STUDY

Elizabeth A. Vrany, MS, Psychology, Indiana University-Purdue University Indianapolis (IUPUI), Indianapolis, IN, Karen A. Matthews, PhD, Psychiatry, University of Pittsburgh, Pittsburgh, PA, Adam T. Hirsh, PhD, Melissa A. Cyders, PhD, Psychology, Indiana University-Purdue University Indianapolis (IUPUI), Indianapolis, IN, Daniel O. Clark, PhD, Internal Medicine, Indiana University, Indianapolis, IN, James M. Shikany, DrPH, FAHA, Preventive Medicine, University of Alabama at Birmingham, Birmingham, AL, Pamela J. Schreiner, MS, MS, PhD, FAHA, Epidemiology & Community Health, University of Minnesota, Minneapolis, MN, Jesse C. Stewart, PhD,

Psychology, Indiana University-Purdue Univ.Indianapolis (IUPUI), Indianapolis, IN

People with depression are at elevated risk for future obesity; however, little is known about the potential mechanistic role of diet composition in this association. Thus, we (1) examined depressive symptom severity as a predictor of change in diet composition factors and adiposity over time, (2) examined change in diet composition factors as mediators of the association between depressive symptom severity and change in adiposity over time, and (3) explored sex and race as moderators of the mediation model. Participants were 2,449 black and white adults who participated in the 1990, 1992, and 2005 years of the CARDIA study (mean baseline age=35 years, 54% female, 56% black, mean baseline waist circumference=84cm, mean waist circumference change=8cm). Depressive symptoms were assessed in 1990 using the Center for Epidemiological Studies-Depression Scale. Waist circumference and diet composition (see conceptual model) were assessed in 1992 and 2005. PROCESS bootstrapping analyses tested for mediation/moderated mediation (adjusting for age; sex; race; education; prevalent and incident cardiovascular disease, diabetes, and cancer; incident pregnancy; and physical activity). Models examining macronutrients further adjusted for change in energy intake. Greater baseline depressive symptoms predicted increases in waist circumference (path $c \beta=0.032$, p=.006). In separate models, there was a trend for greater depressive symptoms predicting increases in energy intake (path $a\beta=0.040$, p=.054), and greater depressive symptoms predicted increases in protein intake (path a β =0.027, p=.028). Depressive symptoms were unrelated to changes in the other diet composition factors $(ps \ge .373)$. Mediation models revealed that change in energy intake partially mediated the association between depressive and waist circumference symptoms change (Indirect effect=0.001, 95%CI=0.0001-0.0004); mediation was not observed for the other diet composition factors. Exploratory models showed no evidence of moderated mediation by sex or race. Findings from this larger longitudinal study suggest that the prospective relationship between depression and future obesity risk may be explained, in part, by increased energy intake over time. Advancing the understanding of the relationship between depression and diet change will inform clinical efforts to prevent or manage depression-related obesity.

VIEW PDF

Abstract 1333

TRANSGENERATIONAL TRANSMISSION OF CHILDHOOD ADVERSITY AND BMI AMONG YOUTH IN THE HCHS/SOL STUDY

Shakira F. Suglia, ScD, Epidemiology, Emory University, Rollins School of Public Health, Atlanta, GA, Danielle M. Crookes, MPH, Epidemiology, Columbia University, Mailman School of Public Health, New York, NY, Robert C. Kaplan, PhD, Epidemiology & Population Health, Albert Einstein College of Medicine, Bronx, NY, Daniela Sotres-Alvarez, DrPH, Biostatistics, University of North Carolina, Gillings School of Global Public Health, Chapel Hill, NC, Maria M. Llabre, PhD, Psychology, University of Miami, Miami, FL, Linda V. Van Horn, PhD, RD, Mercedes Carnethon, PhD, Preventive Medicine, Northwestern University, Feinberg School of Medicine, Chicago, IL, Carmen R. Isasi, MD, PhD, Epidemiology & Population Health; Pediatrics, Albert Einstein College of Medicine, Bronx, NY Background: Childhood adversity has been linked to increased risk for obesity in childhood and adulthood. Some evidence suggests that childhood adversity may have transgenerational effects, yielding adverse health outcomes in the offspring of parents who experienced adversity in their childhood. We examined the relationship between parental adverse childhood experiences (ACEs) and their offspring's BMI.

Methods: Data were derived from the Hispanic Community Health Study/Study of Latinos (HCHS/SOL), HCHS/SOL-Sociocultural study, and HCHS/SOL-Youth study baseline examinations conducted between 2008 and 2014. Parent's ACEs were measured retrospectively using a 10-item index of childhood adversities (e.g., abuse). Offspring's BMI (based on measured height and weight) was classified by age- and sexappropriate CDC BMI percentiles. Weighted, linear regression, stratified by offspring gender, was used to examine the relationship between parental ACEs and offspring's BMI percentiles. Exploratory analyses examined the interaction between ACEs, parental gender, and offspring's gender.

Results: In the sample of 620 children and their parents, 80% of parents reported one or more ACE (mean: 2.7, SD: 0.1). The mean offspring BMI percentile was 72.3 (SD: 1.4). In demographic-adjusted models, ACEs were associated with an increase in BMI percentile among boys (β: 1.85 (95% CI: 0.12, 3.59)), but not among girls. The ACE-BMI percentile relationship was no longer statistically significant after inclusion of parental high depressive symptoms, parental monitoring of offspring's food and physical activity, and parental obesity, but estimates indicate an increased relationship among boys (β : 1.35 (-0.29, 2.99)) and inverse relationship among girls (β : -1.37 (-2.92, 0.18)). Three-way interactions with parental gender were significant (p < 0.05) across models. Father's ACEs were associated with increased BMI among boys and decreased BMI among girls, but mother's ACEs were not associated with BMI. Conclusions: An association between parental ACEs and increased BMI of their offspring was observed. Potential indirect pathways may be parental depression, monitoring of offspring's food and physical activity, and parental obesity. Differences by parental and offspring gender suggests that transgenerational effects of mothers' and fathers' ACEs may differ for boys and girls.

Abstract 1197

USE OF VA WEIGHT LOSS PROGRAM AFTER EVIDENCE BASED PTSD TREATMENT

Jeffrey F. Scherrer, PhD, Joanne Salas, MPH, Family and Community Medicine, Saint Louis University School of Medicine, St. Louis, MO, Beth Cohen, MD, Department of Medicine, University of California, San Francisco, San Francisco, CA, Kathleen Chard, PhD, Psychiatry, University of Cincinnati, Cincinnati, OH, Patrick Lustman, PhD, Psychiatry, Washington University, St. Louis, MO, Sonya Norman, PhD, Psychiatry, University of California, San Diego, San Diego, CA, Peter Tuerk, PhD, Psychiatry, Medical University of South Carolina, Charleston, SC, F. David Schneider, MD, Family and Community Medicine, U.T. Southwestern, Dallas, TX, Paula Schnurr, PhD, Director, National Center for PTSD, White River Junction, VT, Carissa van den Berk-Clark, PhD, Family and Community Medicine, Saint Louis University School of Medicine, St. Louis, MO, Matthew Friedman, MD, Psychiatry, Dartmouth Geisel School of Medicine, Hannover, NH

Background: Posttraumatic stress disorder (PTSD) is associated with obesity and obesity related chronic health conditions. Veterans with PTSD are less likely than those without to

participate in the Department of Veterans Affairs (VA) weight loss program "MOVE!" and among those who do participate, those with PTSD lose less weight. Receipt of evidence based treatment (EBT) for PTSD may be associated with more MOVE! participation. We determined if new MOVE! and completion was more likely in veterans with and without adequate EBT and clinical improvement. Methods: Using VA administrative medical record data we identified patients 18 to 70 years of age with PTSD, (defined as 2 visits with an ICD-9 code for PTSD in the same 12 mo. period) who were eligible for MOVE! (BMI>25 with obesity related health condition or BMI>30). Of these, 1,188 received adequate PTSD treatment (≥8 EBT visits) and 1,303 had inadequate treatment (0-7 EBT visits) in any 16 week period between 2008-2012. In a subset of patients with 2 or more PTSD Symptom Checklist (PCL) scores we compared MOVE! use for those who experienced clinically significant PTSD improvement (PCL decrease ≥ 10 ; n=339) vs. those who did not (<10 PCL decrease; n=557). Regression models were computed before and multivariate adjustment for confounding from after demographics, distance to care, smoking, antidepressants, comorbidities and baseline BMI. Results: In patients with inadequate treatment, 7.9% initiated MOVE! which was significantly less than adequately treated patients of whom 12.8% initiated MOVE! (p<0.03). Only 1% of inadequate and 2% of adequately treated PTSD patients completed MOVE! (p=0.41). MOVE! initiation (13.9% vs. 9.5%) and completion (3.0% vs. 0.09%) were significantly (p<0.05) more prevalent among patients with vs. without clinically significant PTSD improvement. However, neither adequate EBT treatment nor clinical improvement remained significantly associated with MOVE! initiation in adjusted analysis. Discussion: Adequate EBT and decreased PTSD symptoms may help patients with PTSD engage in a VA weight loss program. However, a combination of factors associated with PTSD treatment, improvement and MOVE! use appears to account for this observation. Further research is warranted to determine if EBT is associated with adopting healthy lifestyles in patients with PTSD.

Personality

Thursday, March 8 from 2:25 to 3:25 pm

Abstract 1001

PREDICTIVE VALUE OF TYPE D PERSONALITY FOR IMPAIRED ENDOTHELIAL FUNCTION IN CORONARY ARTERY DISEASE

Johan Denollet, PhD, Romy van Felius, MSc, Paul Lodder, MSc, Paula Mommersteeg, PhD, Medical and Clinical Psychology, Tilburg University, Tilburg, Netherlands, Luc Vanhees, PhD, Rehabilitation Sciences, Katholieke Universiteit Leuven, Leuven, Belgium, Paul Beckers, PhD, Cardiology, University Hospital Antwerp, Antwerp, Belgium, Nele Pattyn, PhD, Rehabilitation Sciences, Katholieke Universiteit Leuven, Leuven, Belgium, Emeline Van Craenenbroeck, MD,PhD, Cardiology, University Hospital Antwerp, Antwerp, Belgium

Background. Type D personality refers to the combination of negative affectivity (NA) with social inhibition (SI), and has been associated with an increased severity of coronary artery plaque and a greater risk of major adverse cardiac events. It is unclear whether Type D is also related to functional vasomotion abnormalities. Therefore, we wanted to examine whether Type D is associated with vascular endothelial dysfunction across time in patients with coronary artery disease (CAD).

Methods. At baseline, 188 CAD patients (90% men; M=58.0 years) completed Type D personality (DS14) and depression (HADS) scales, and entered a 12-week exercise program. Personality profiles were based on a 4-group classification of low/high scores on NA and SI. Flow-mediated dilation (FMD) of the brachial artery and circulating $CD34^+/KDR^+/CD45^+_{dim}$ endothelial progenitor cells (EPCs) were assessed at baseline, 3 months, and 12 months. Linear mixed models and multiple logistic regression models were used to assess the concurrent and predictive association of Type D personality with endothelial function.

Results. Type D personality was associated with decreased FMD across baseline, 3 months, and 12 months (mixed model analysis, p=.04), after adjustment for clinical characteristics, exercise training and depression. There was no significant association between Type D and decreased EPCs (p=.07). Age and smoking were other significant correlates of FMD and EPCs. Using a FMD<5.5% cut-off, Type D patients more often had endothelial dysfunction at baseline (24/37=65%) than non-Type D patients (63/143=44%); OR=4.18, 95%CI 1.43-12.2. This significant Type D effect was confirmed in prospective analyses of endothelial dysfunction at 12 months (OR=3.45, 95%CI 1.11-10.8), and in subgroup analyses of men with CAD (OR_{baseline}=5.47, 95% CI 1.61-18.6; OR_{12 months}=4.43, 95% CI 1.18-16.7). Patients with a high score on NA only (NA≥10 but SI≤9) or SI only (SI≥10 but NA≤9) were not at risk for endothelial dysfunction. Depressive symptoms were not related to FMD or EPCs.

Conclusions. Type D personality was associated with impaired endothelial function. This association was robust across time, independent from depressive symptoms, and supports the notion that Type D has an adverse effect on cardiovascular health in patients with CAD.

Abstract 1044

OBJECTIVE PHYSICAL ACTIVITY LINKS TRAIT CONSCIENTIOUSNESS TO THE METABOLIC SYNDROME

Mark C. Thomas, MS, Thomas W. Kamarck, PhD, Psychology, Matthew Muldoon, MD, MPH, Medicine, Stephen Manuck, PhD, Psychology, University of Pittsburgh, Pittsburgh, PA

Research has shown higher trait conscientiousness associated with lower cardiometabolic risk. Physical activity (PA), which covaries with both conscientiousness and the metabolic syndrome (MS), is thought to mediate this relationship. Although shown previously shown for self-reported PA (Dermody et al., 2016), such mediation has not yet been tested with respect to objectively assessed PA. In a cross-sectional analysis of 476 healthy, employed middle-aged adults (mean age=42.7 years, 81% white, 53% female), participants were instructed to wear a multichannel accelerometry device (SenseWear Pro3, Body Media) over a 4-8 day monitoring period. Mean PA was operationalized as the average level of metabolic expenditure (METs units) during this monitoring period, and PA intensity as a proportion of the waking day spent at each level of PA: sedentary (< 1.5 METs), light (≥ 1.5 METs and < 3 METs), moderate-to-vigorous (> 3 METs). MS was expressed as the mean of the standardized distributions (z-scores) of fasting glucose, triglycerides, HDL cholesterol, systolic and diastolic blood pressure, and waist circumference. Five-factor personality traits were assessed by the NEO-PI-R. Standardized indirect effects for each mediator were computed separately using 5,000 bootstrapped samples in Mplus (Version 8). After controlling for demographics (sex, age, race, education), we found a significant main effect of trait

conscientiousness (NEO-C) on MS (B=-0.101, p=.021). None of the other Big Five personality traits were associated with MS. Of the PA measures, mean PA (B=-0.075, p<.001), the proportion of minutes spent in sedentary (B=-0.044, p=.002), and moderate-tovigorous activity (B=-0.043, p=.005) appeared to be candidate mechanisms linking NEO-C with MS. The proportion of light PA (B=-0.011, p=.097) did not appear to explain this relationship. When included in the same model, the proportion of minutes in moderate-to-vigorous activity remained significant (B=-0.032, p=.018) but not sedentary behavior (B=-0.020, p=.076). These findings extend the current literature in demonstrating that conscientious people may be more physically active, as assessed by objective measures of metabolic expenditure during daily life, and these differences may partially account for the relationship between trait conscientiousness and the metabolic syndrome. Supported by HL40962 and P01HL040962.

Abstract 1250

PERSONALITY AS A MODERATOR OF THE RELATION BETWEEN CHILDHOOD ABUSE AND BODY MASS INDEX IN YOUNG ADULTHOOD

Leonie K. Elsenburg, MSc, Nynke Smidt, PhD, Epidemiology, University Medical Center Groningen, Groningen, Netherlands, Shakira F. Suglia, ScD, Epidemiology, Rollins School of Public Health, Emory University, Atlanta, GA

Objective: To examine whether childhood abuse is related to body mass index (BMI) and whether personality traits moderate the relation between childhood abuse and BMI in young adult females and males.

Methods: Data are from the fourth wave (n=13,482; mean age=28.8 years; 51.5% female) of the National Longitudinal Study of Adolescent to Adult Health (Add Health). Sexual, physical and verbal abuse before age 18 and the Big Five personality traits (i.e. extraversion, neuroticism, agreeableness, conscientiousness and openness) were measured by self-report questionnaires. Participants' BMI was based on measured weight and height. The relation between abuse, personality and their interaction with BMI was examined using linear regression analyses. Analyses were adjusted for age, race/ethnicity, parental and participants' education and stratified by sex.

Results: Verbal abuse was related to higher BMI in females (b=0.16, 95%CI=[0.05,0.27]). Conscientiousness was related to lower BMI in both sexes (females: b=-1.27, 95%CI=[-1.73,-0.81], males: b=-0.70, 95%CI=[-1.02,-0.38]). No other associations between abuse or personality and BMI were identified in females and males. In females, there was a positive interaction between both physical and verbal abuse and agreeableness (b=0.37, 95%CI=[0.05,0.68] and b=0.34, 95%CI=[0.09,0.58], respectively) and a negative interaction between verbal abuse and extraversion (b=-0.17, 95%CI=[-0.35,0.01]). In males, there was a positive interaction between sexual abuse and neuroticism (b=2.35, 95%CI=[0.11,4.58]) and between physical abuse and both conscientiousness and openness (b=0.31, 95%CI=[0.07,0.56] and b=0.26, 95%CI=[-0.01,0.53], respectively) and a negative interaction between verbal abuse and extraversion (b=-0.20, 95%CI=[-0.37,-0.03]).

Conclusions: Verbal abuse is related to higher BMI in young adult females. Personality traits moderate the relation between childhood abuse and BMI in an abuse- and trait-specific fashion. Specific types of childhood abuse are related to higher BMI in females low on extraversion and high on agreeableness and in males low on extraversion and high on neuroticism, conscientiousness and openness. Individuals who are more likely

to experience inner distress are most prone to higher BMI after chidlhood abuse. Incorporating this knowledge into intervention studies will likely increase their effectiveness.

Abstract 1536

PRELIMINARYEVIDENCEFORASSOCIATIONSBETWEENPERSONALITYTRAITSANDPOLYSOMNOGRAPHICALLY-ASSESSEDSLEEPDURATIONANDLATENCYINSTUDENTSVINIVERSITY

Katherine A. Duggan, PhD, Danielle M. Turk, BS, Jacob P. Hollander, BS, Martica H. Hall, PhD, Psychiatry, University of Pittsburgh, Pittsburgh, PA

Prior research has shown that high conscientiousness, high agreeableness, and low neuroticism are associated with better sleep quality and sleep hygiene, and less daytime sleepiness (Duggan et al., 2014). Some work suggests that high conscientiousness and agreeableness may correlate with longer sleep durations, whereas neuroticism may be associated with both short and long sleep durations (Hintsanen et al., 2014; Randler, 2008; Vincent et al., 2009), yet other studies (e.g., Gray & Watson, 2002) find null associations. To our knowledge, no study has yet examined associations between personality traits and polysomnographically-assessed sleep. As part of an experimental study on stress and sleep, undergraduates (N = 59, 49% F) who scored in the upper or lower third on an intrusion tendency questionnaire spent one night in a sleep laboratory. Immediately prior to bedtime, approximately half (n = 29) of participants were told they would give a 15-minute speech that would be audiotaped and evaluated; the remainder (30) were control participants. Participants completed the NEO-PI-R assessment of Big Five personality traits during their laboratory visit (Costa & McCrae, 1992). Polysomnography records were visually scored; sleep duration, sleep latency, and wake after sleep onset were calculated. After controlling for stress group assignment, neuroticism was associated with significantly longer sleep duration (Std. B = 0.26, p = .04), and agreeableness was associated with less sleep latency at trending significance (Std. B = -0.21, p = .08). Additionally, shorter sleep latency was associated with higher conscientiousness (Overall model fit: p =.008, 14.37%) and lower neuroticism (Overall model fit: p = .01, 13.07%) in control participants only. Overall, the current results provide preliminary evidence for associations between conscientiousness, agreeableness, and neuroticism with polysomnographically-assessed sleep duration and latency. Because both personality traits and sleep duration are correlates of all-cause mortality risk, these results have implications for objective sleep parameters as a potential mechanism linking personality with long-term health outcomes.

Discrimination

Thursday, March 8 from 2:25 to 3:25 pm

Abstract 1529

LIFETIME DISCRIMINATION BURDEN, RACISM, AND SUBCLINICAL CEREBROVASCULAR DISEASE AMONG AFRICAN AMERICANS: HANDLS SCAN

Danielle L. BeattyMoody, PhD, Shari R. Waldstein, PhD, Psychology, University of Maryland, Baltimore County, Baltimore, MD, Alan B. Zonderman, PhD, Michele K. Evans, MD, Laboratory of Epidemiology and Population Science, National Institute on Aging, Baltimore, MD, Daniel K. Leibel, MA, Antione D. Taylor, MA, Psychology, Leslie I. Katzel, MD, Medicine, University of Maryland, Baltimore County, Baltimore, MD, Guray Erus, PhD, Christos Davatzikos, PhD, Radiology, University of Pennsylvania, Philadelphia, PA, Rao P. Gullapalli, PhD, Radiology, University of Maryland, Baltimore, MD

African Americans (AA) have an accelerated trajectory towards and disproportionate burden of poorer clinical and subclinical brain health outcomes. Compared with Whites, AAs are 3-4 times more likely to experience a stroke at 45 years of age, and they display greater and more severe indicators of white matter disease - a subclinical disease marker known to presage stroke and dementia. AAs further bear a disproportionate burden of traditional vascular (e.g., hypertension) and sociodemographic (e.g., < education) stroke risk factors. However, it is unknown whether chronic stress due to racial bias may partially underlie observed racial disparities in white matter disease. Here, we examined potential interactive relations of self-reported lifetime burden of discrimination and racism and age with magnetic resonance imaging (MRI)-assessed white matter lesion volume (WMLV). Urban-dwelling AAs (N= 71; 60.6% female, mean age = 50 years) participating in the Healthy Aging in Neighborhoods of Diversity across the Life Span (HANDLS) SCAN study underwent quantitative MRI coded for WMLV. Participants selfreported interpersonal-level burden of lifetime discrimination and racism approximately five years earlier. Multivariable regression models assessed interactions of linear and quadratic effects of discrimination (and racism) and age with WMLV adjusted for sex and socioeconomic status, revealing interactive relations of age and (1) quadratic, self-reported lifetime burden of discrimination, B = .05, p = .01, $\eta^2_{partial} = .09$, and (2) quadratic, self-reported racism, B = .03, p = .01, $\eta^2_{partial} = .15$ with WMLV. Among older AA, higher lifetime burden of discrimination and racism were associated with greater WMLV (p's < .03); in younger AAs, lower racism was associated with greater WMLV, B = -.41, p = .006. These findings were unattenuated in subsequent sensitivity analyses with hypertension, cholesterol, diabetes, smoking, alcohol, body mass index, waist circumference, depressive symptoms, and cardiovascular disease. Thus, with older age, the physiological wear and tear of lifetime exposure to discrimination and racism may yield poor subclinical brain health among older AA. Discrimination and racism-related suppression or coping styles may be factors of particular concern in younger AAs. Screening for history of self-reported discrimination and racism using established instruments may identify those at risk for subclinical brain disease who may then be evaluated with MRI.

Abstract 1520

A QUADRATIC RELATIONSHIP BETWEEN VAGALLY MEDIATED HEART RATE VARIABILITY AND PERCEIVED ETHNIC DISCRIMINATION

DeWayne P. Williams, PhD, Nicholas Joseph, Mr., Briana Brownlow, Ms., Psychology, The Ohio State University, Columbus, OH, Julian Koenig, Dr. sc hum, Section for Translational Psychobiology in Child and Adolescent Psychiatry, Heidelberg University, Heidelberg, Germany, Julian F. Thayer, PhD, Psychology, The Ohio State University, Columbus, OH

Ethnic discrimination (ED) is defined as the negative treatment of an individual based on their ethnic background, and uniquely impacts African Americans (AAs) and other individuals of ethnic minority status. Perceived ethnic discrimination (PED) is defined as the degree to which an individual consciously perceives a negative event as discriminatory. Two recent studies (Hill et al., 2016; Williams et al., 2017) showed a negative association

between PED and resting vagally mediated heart rate variability (vmHRV) - an index of emotion regulation abilities and overall health. Interestingly, a meta-analysis showed AAs to have greater resting vmHRV in comparison to European Americans (EAs). A recent investigation (Kemp et al., 2016) showed ED to explain this relationship - darker-skin tone was associated with more experiences of ED, which was associated with higher vmHRV. Taken together, these reports suggest a complex relationship between ED/PED and resting vmHRV. Thus, the following investigation attempted to better understand the relationship between resting vmHRV and PED by reexamining this association in a larger sample of AA participants than reported previously (45 AAs; Williams et al., 2017). In the current sample, 75 AAs were attached to an electrocardiogram and completed a 5-minute baseline-resting period. Self-reported PED was assessed using the PED Questionnaire. Results did not show a significant negative association between resting vmHRV (r = .050, p = .670). Curve estimates showed a significant quadratic relationship between resting vmHRV and PED ($F_{(2,72)} = 4.29$, p = .017), such that lower and higher resting vmHRV was associated with higher PED. We performed a median split on HF-HRV values that stratified AAs into high and low groups of vmHRV. The high vmHRV group showed a significant positive association between resting vmHRV and PED (r = .428, p = .008) whereas the low vmHRV showed a trending negative association between resting vmHRV and PED (r = -.144, p = .388), and these correlations were significantly different (p = .014). Overall, while there was no significant linear relationship between resting vmHRV and PED as seen previously. However, this significant quadratic function makes sense given previous research - higher PED can be both negatively and positively associated with resting vmHRV depending upon the relative levels of resting vmHRV.

Abstract 1390

PERCEIVED DISCRIMINATION AND AMBULATORY CARDIOVASCULAR ACTIVITY IN HEALTHY MIDLIFE ADULTS: THE ROLE OF SYSTEMIC INFLAMMATION

Kimberly G. Lockwood, MS, Thomas W. Kamarck, PhD, Stephen B. Manuck, PhD, Anna L. Marsland, PhD, Peter J. Gianaros, PhD, Psychology, University of Pittsburgh, Pittsburgh, PA

Perceived discrimination associates with risk factors for cardiovascular disease, including elevated blood pressure (BP) and heart rate (HR) in daily life. The pathways linking perceived discrimination with BP and HR remain unclear. One possible pathway is systemic inflammation, which relates to perceived discrimination, BP, and HR. Animal models indicate that the marker interleukin(IL)-6 inflammatory contributes to vasoconstriction and BP regulation. Alternatively, perceived discrimination may impact autonomic modulation of both IL-6 and cardiovascular activity. Here, we tested two mediation models to examine whether 1) IL-6 partly explained the association between perceived discrimination and ambulatory BP or HR or if 2) BP or HR explained the relationship between discrimination and IL-6. Participants were 459 healthy midlife adults (30-54 years, 53% female, 82% White, 16% Black, 2% other ethnic minority) from Phase II of the Adult Health and Behavior project. Participants completed the Brief Perceived Ethnic Discrimination Questionnaire-Community Version (PEDQ-CV), 4 days of ambulatory cardiovascular monitoring, and a blood draw for circulating IL-6. BP and HR were averaged over the monitoring period for each participant. Due to skew on the PEDQ-CV, participants were divided into 3 groups: No, Moderate, and High Discrimination. ANOVAs controlling for age, sex, race, and BMI showed IL-6 and HR to differ by

discrimination (IL-6: F=3.484, p=.03; HR: F=4.89, p=.01), with higher IL-6 and HR in the High Discrimination group. Race did not moderate the effect. Similar effects were initially seen for BP, but attenuated after covariate adjustment. Bootstrapped mediation tests revealed an indirect effect of discrimination on HR via IL-6, b=0.70, 95% CI [.32-1.30], which remained significant after adjusting for age, sex, race, BMI, smoking, hostility, and depressive symptoms. However, the effect did not survive control for education. Alternate models with HR as the mediator and IL-6 as the outcome were also initially significant b=0.06, 95% CI [.03-.09], but nonsignificant after covariate adjustment. In sum, systemic inflammation may be a physiological pathway linking perceived discrimination with HR, and education may contribute to this relationship. As the present work is cross-sectional, future longitudinal work is needed to further test this inflammatory pathway.

Abstract 1499

DISCRIMINATION, SOCIAL COGNITION, AND HEALTH

Elizabeth Brondolo, Ph.D., Psychology, St. John's University, Jamaica, NY, Irene Y. Blair, Ph.D., Psychology and Neuroscience, University of Colorado at Boulder, Boulder, CO

Discrimination affects social cognition, including negative relational schemas --the linked networks of thoughts and emotions individuals hold about others. Schemas are hypothesized to influence health via effects on stress mediators including health behavior and stress reactivity and recovery. These hypotheses were tested in a longitudinal study assessing 47 young adults (26 women, all identified as Black, ages 18-28 years) tested 4 times over 8 months. Discrimination was assessed with the Brief Perceived Ethnic Discrimination Questionnaire -Community Version (Brief PEDQ-CV: Brondolo et al 2005). Schemas were assessed with the Stereotype Confirmation Concern Scale (Contrada et al 2000), Own Group Conformity Pressure Scale (Contrada et al 2000), Social Vigilance Questionnaire (Ruiz et al 2014), Social Constraints Questionnaire (Lepore et al., 1996), and the Cynicism and Hostile Attributions subscales of the Cook-Medley Hostility Scale (Barefoot et al 1989). Outcomes included daily mood and health habits assessed via an electronic diary. Rumination was assessed with the Behavioral Anger Response Questionnaire (Linden, 2003); sleep quality was assessed with three items from the Pittsburgh Sleep Quality Inventory (Buysse, 1989), and depressive symptoms were assessed with the Centers for Epidemiological Studies -Depression Scale Revised.

Variations over time in discrimination were positively associated with variations in daily negative mood (Estimate = 5.58, SE = 2.60, t = 2.15, p < .05); rumination (Est. =.49, SE = .18, t = 2.74, p < .01), sleep (Est. .37, SE = .12, t = 3.15, p < .01), and depressive symptoms (Est. = .36, SE = .11, t = 3.37, p < .01). Factor analyses revealed schemas sorted into two dimensions reflecting concerns about Rejection/Invalidation and Mistrust/Vigilance. Increases in discrimination were associated Rejection/Invalidation, with increases in but not Mistrust/Vigilance. In turn, variations in Rejection/Invalidation were positively associated with variations in negative mood, rumination, and depressive symptoms (all ps < .05). Discrimination is associated with a wide range of stress mediators, and schemas concerned with rejection and invalidation may account for some of these effects. Decreasing health disparities may require reducing discrimination and addressing its effects on social cognition.

<u>New Directions in Psychophysiology</u> Thursday, March 8 from 3:40 to 4:55 pm

Abstract 1429

PSYCHOLOGICAL STRESS AND MITOCHONDRIA: A SYSTEMATIC REVIEW AND CONCEPTUAL FRAMEWORK

Martin Picard, Ph.D., Psychiatry and Neurology, Columbia University, New York, NY, Bruce S. McEwen, Ph.D., Laboratory of Neurondocrinology, The Rockefeller University, New York, NY BACKGROUND: Mitochondria are multifunctional lifesustaining organelles which represent a potential intersection point between psychosocial experiences and biological stress responses. An emerging concept proposes that mitochondria sense, integrate, and transduce psychosocial and behavioral factors into cellular and molecular modifications.

METHODS: A systematic review of the literature investigating the effects of psychological stress on mitochondrial function was conducted, focusing on experimentally controlled studies allowing to draw causal inference about the effect of induced psychological stress on mitochondria. A narrative literature review was also conducted to evaluate evidence supporting a conceptual model implicating mitochondria in the stress response, and its implementation in behavioral and psychosomatic research.

RESULTS: A total of 23 studies met inclusion criteria for the systematic review. All studies involved male laboratory animals, and most demonstrated that acute and chronic stressors influenced specific facets of mitochondrial function, particularly within the brain. 19 studies showed significant adverse effects of psychological stress on mitochondria and 4 found increase in function or size following stress. In humans, only 6 studies were available, none with experimental designs, and most only measured biological markers that do not directly reflect mitochondrial function, such as mitochondrial DNA (mtDNA) copy number. Evidence also indicates that mitochondrial dysfunction contributes to systemic physiological regulation through the release of "mitokines". At the cellular level, mitochondrial signaling influences gene expression and cellular aging.

CONCLUSONS: Overall, evidence supports the notion that acute and chronic stress influence multiple aspects of mitochondrial biology, and that chronic stress exposure can lead to molecular and functional recalibrations among mitochondria. Maladaptive mitochondrial changes that characterize this subcellular state of stress is termed mitochondrial allostatic load (MAL). Limitations of current animal and human studies will be discussed. Prospective studies with sensitive measures of specific mitochondrial functions will be needed to establish the link between psychosocial stressors, emotional states, and mitochondrial energetics relevant to mind-body research in humans.

Abstract 1399

SOCIO-EVALUATIVE STRESS SELECTIVELY INCREASES SERUM CIRCULATING CELL-FREE MITOCHONDRIAL DNA (CCF-MTDNA)

Caroline Trumpff, PhD, Department of Psychiatry, Columbia University, New York City, NY, Anna L. Marsland, PhD, Department of Psychology, University of Pittsburgh, Pittsburgh, PA, James L. Martin, BSc, Center for Metabolism and Mitochondrial Medicine and Vascular Medicine Institute, University of Pittsburgh School of Medicine, Pittsburgh, PA, Judith E. Carroll, PhD, Semel Institute for Neuroscience and Human Behavior, University of California, Los Angeles, CA, Gabriel Sturm,, Department of Psychiatry, Columbia University, New York, NY, Zhenglong Gu, PhD, Division of Nutritional Sciences, Cornell University, Ithaca, NY, Brett A. Kaufman, PhD, Center for Metabolism and Mitochondrial Medicine and Vascular Medicine Institute, University of Pittsburgh School of Medicine, Pittsburgh, PA, Martin Picard, PhD, Department of Psychiatry, Columbia University, New York, NY

Background: Mitochondria are organelles sustaining life through energy production and intracellular signaling. Emerging evidence position the mitochondria as a key component of the stress response and as a potential mediator of stress pathophysiology. Increased circulating levels of mitochondrial genome accompany life-threatening stressors such as sepsis and physical trauma, possibly signaling a threat to physical integrity. Despite evidence that psychological stress impacts other aspects of mitochondria biology, its effect on circulating levels of mitochondrial DNA (mtDNA) remains to be determined. Accordingly, the goal of this study was to investigate whether exposure to a brief laboratory social-evaluative stressor known to evoke sympathetic nervous system activation might impact circulating levels of cell freemtDNA (ccf-mtDNA) among midlife adults.

Methods: 50 healthy, midlife adults were exposed to two versions of a 5-minute socio-evaluative stress on separate occasions separated by one month. Circulating levels of ccf-mtDNA and cell free-nuclear DNA (ccf-nDNA) were measured in serum samples collected before, immediately after, and 30 minutes after stress exposure. The concentrations of two mtDNA (ND1 and Cytb) and two nDNA (B2M and GUSB) amplicons were measured by qPCR to assess the robustness and specificity of the mitochondrial response.

Results: Findings showed an increased concentration in both ccfmtDNA markers in serum collected 30 minutes after the stress exposure relative to before and immediately after (ND1, F (2,60) = 39.4, η^2 = .567, p < .0001; Cytb, F (2,60) = 43.0, η^2 = .602, p = <.0001). These findings were replicated at the second visit (ND1, F (2,60) = 42.1, η^2 = .584, p = <.0001; Cytb, F (2,60) = 37.4, η^2 = .555, p = <.0001). In contrast, there were no significant stressrelated changes in ccf-nDNA (B2M and GUSB), suggesting that the response is specific to mtDNA.

Discussion: Our findings provide initial evidence that exposure to brief psychosocial stress increases serum levels of mitochondrial, but not nuclear DNA. This identifies ccf-mtDNA as a possible mitochondria-derived cytokine or "mitokine", and as a potential mediator of stress pathophysiology. Future studies are needed to determine the origin and physiological consequences of stress-induced increases in circulating mitochondrial genome.

Abstract 1434

PHYSIOLOGICAL AND AFFECTIVE RESPONSES TO STRESS ARE ENCODED IN VOCAL ACOUSTIC PROPERTIES

Paula G. Williams, Ph.D., Brian Baucom, Ph.D., Psychology, University of Utah, Salt Lake City, UT, Arindam Jati, B.E., Panayiotis Georgiou, Ph.D., Electrical Engineering, University of Southern California, Los Angeles, CA

Physical properties of the human voice, particularly fundamental frequency (f_0) , have been linked to a variety of physiological, behavioral, and affective outcomes that suggest it may be a promising new method of stress measurement. Because the same neural substrates control both characteristics of vocal expression and cardiovascular responses to stress, it is likely that physiological stress reactivity is encoded in the physical properties of speech. The current research sought to examine the

association between vocal acoustic summary indices and psychophysiological and affective responses to stress across two different laboratory protocols. In Study 1, associations between vocal acoustic characteristics during a well-validated stressor recall task (Social Competence Interview; SCI) and corresponding physiological (heart rate [HR], blood pressure, and respiratory sinus arrhythmia [RSA]) and affective stress responses were examined in a sample of 98 young adults (mean age = 23; SD = 5.8). Average model R^2 across stress reactivity measures was .32 (SD = .10), with robust associations for negative affect reactivity (Model $R^2 = .45$ and associations with 14 vocal indices) and systolic blood pressure reactivity ($R^2 = .33$ and associations with 9 vocal indices). These results were replicated and extended in a second data set examining HR and RSA during a couple conflict discussion of 60 married couples (mean age = 29.62, SD = 7.65). The set of 87 acoustic variables correctly classified the top and bottom deciles of RSA and HR reactivity for 70% and 83% of samples, respectively. In both data sets, vocal features other than fundamental frequency were also significant predictors of stress component processes with loudness being the most robust of the additional predictors, particularly for parasympathetic (RSA) withdrawal. Findings suggest that vocal acoustic properties reliably reflect stress responses across paradigms and interpersonal context.

Abstract 1461

BIOELECTRICAL IMPEDANCE AND ALL-CAUSE MORTALITY RISK IN YOUNG ADULTS

Jerrald L. Rector, PhD, Human Development and Family Studies, Purdue University, West Lafayette, IN, Marc N. Jarczok, Dr., Clinic for Psychosomatic Medicine and Psychotherapy, Ulm University, Ulm, Germany

Background There is mounting evidence that raw parameters captured by whole-body bioelectrical impedance – the resistance to the flow of electrical current through the body – have considerable prognostic value in a variety of clinical conditions and are predictive of survival in older adults. These recent findings have spurred a reconceptualization from this technique's early application in approximating body composition to utilizing it as a novel, non-invasive, *in vivo* measure of health. However, the predictive value of parameters, such as phase angle, for survival in younger adults is unclear. We hypothesized that higher phase angle would be associated with increased survival in young adults.

Methods Participants (N=2,980; 47.4% female; aged 18-49 years) were from a subsample of the National Health and Nutrition Examination Survey (NHANES) collected from 1999-2004. Phase angle at 50 kHz was calculated from the resistance and reactance values obtained using bioelectrical impedance spectroscopy. Mortality status was assessed by linking study participants with data from the National Death Index. Personmonths of follow-up were calculated from baseline to 2011. Cox proportional-hazard models were used to examine the association between phase angle and all-cause mortality.

Results Among the 2,980 participants, 55 (1.9%) died during the follow-up period, with the median follow-up being 9.5 years (IQR = 8.3 - 10.9 years). Increased phase angle, measured at 50 kHz, was associated with reduced mortality, HR (95% CI) = .54 (.30 - .98), p=.044, after adjustment for age, sex, education, ethnicity, and marital status. That is, for every 1° increase in phase angle, participants had a 46% reduction in all-cause mortality risk.

Conclusion Although further replication is warranted, this study provides preliminary evidence that a higher phase angle may be

protective against mortality, not only clinical and older populations, but also in younger adults. To the extent that phase angle can be modified by resilience factors (e.g., physical activity), it may represent a non-invasive, *in vivo* biomarker for the real-time monitoring of health interventions across adulthood.

Abstract 1466

BETA ADRENERGIC BLOCKADE IMPAIRS PERFORMANCE ON AN EMOTIONAL LEARNING TASK

Emma L. Armstrong-Carter, BA, Psychology & Neuroscience, University of North Carolina-Chapel Hill, Chapel Hill, NC, Kathryn L. Humphreys, Ph.D, Psychology, Stanford, Stanford, CA, Jennifer K. MacCormack, Ph.D Candidate, Psychology & Neuroscience, Samantha Meltzer-Brody, M.D, Psychiatry, Keely Muscatell, Ph.D, Kristen A. Lindquist, Ph.D, Psychology & Neuroscience, University of North Carolina-Chapel Hill, Chapel Hill, NC

Emotional learning, the fundamental process by which a once neutral object acquires value or valence because of its capacity to predict a rewarding or threatening outcome, is complex and dynamic. Research suggests that emotional learning is influenced in part by underlying peripheral physiology, specifically the sympathetic nervous system. However, no known studies have manipulated sympathetic arousal to examine its causal role in emotional learning outcomes. Thus, in the present study, we administered a beta adrenergic receptor blocking medication propranolol, which attenuates sympathetic activation, in a randomized, double-blind, placebo-controlled study to determine if blunting of sympathetic arousal impairs individuals' adaptive emotional learning. Eighty-five young adults (55% male, average age 21) were randomly assigned to take either 40 mg of propranolol or a placebo. Three hours later, participants completed the Balloon Emotional Learning Task (BELT), a computerized exploration-based instrumental emotional learning task that presents a series of balloons which are pumped up for points. Critically, balloons explode after either a short, long, or variable number of pumps, and thus participants must learn the association between the color of the balloon and the number of pumps after which it explodes. Results indicated that participants who received propranolol performed worse, ie. scored fewer points, on the BELT (M = 336, SD = 72) compared to those on placebo (M = 380, SD = 78), t(87)=2.70, p = .008. Thus, participants on the beta-blocker appeared to have compromised emotional learning when compared to those on the placebo. These results suggest that the sympathetic adrenergic response is a critical component to effective emotional learning. Given that emotional learning is known to impact health behavior and downstream health outcomes, these findings contribute to our understanding of the specific physiological processes that may play a role in linking emotional learning and health.

<u>Physical Activity</u> Thursday, March 8 from 3:40 to 4:55 pm

Abstract 1472

LONGITUDINAL INTERACTION BETWEEN CHRONIC MEDICAL CONDITIONS AND PHYSICAL ACTIVITY ON DISABILITY OVER TIME: RESULTS FROM MIDUS

Jerrald L. Rector, PhD, Elliot M. Friedman, PhD, Human Development and Family Studies, Purdue Univ., West Lafayette, IN **Background** With advancing age comes an increased likelihood of living with multiple chronic conditions (MCC). These conditions are linked to higher mortality rates through their hastening of disablement. Physical activity (PA) is a well known resilience factor associated with numerous health benefits, including reduced disability. However, it is unclear whether longterm PA participation helps protect against disability over time in the face of increasing MCC. We hypothesized that long-term PA would moderate the relationship between the longitudinal trajectories of MCC and disability.

Methods Participants (N=1,936) were from the longitudinal Survey of Midlife Development in the United States (MIDUS). At all three waves, participants reported the number of chronic conditions (out of 13), moderate and vigorous PA participation, and functional limitations (activities of daily living). Hierarchical linear modeling examined the impact of MCC, PA, and their interaction on disability across 18-20 years of follow-up.

Results Baseline MCC (β =.62, p<.001) and PA (β =-.43, p<.001) were both independently associated with baseline disability after full adjustment. There was also a significant interaction between baseline MCC and PA (MCC X PA; β = -.30, p<.001) on disability. Neither individual long-term trajectory (MCC or PA X time) was associated with disability. However, the slope of PA significantly interacted with the change in MCC over time to impact the long-term trajectory of disability (MCC X PA X time; β =.01, p=.026). That is, those participants with higher chronic conditions who maintained long-term PA had less disability over time than those with low PA. **Conclusion** Utilizing a national sample across 18-20 years, this study provides evidence that in the face of increasing chronic conditions, long-term PA participation may be protective against increasing disability over time.

Abstract 1026

PHYSICAL ACTIVITY DURING BREAST CANCER SURVIVORSHIP: DOES DEPRESSION MAKE EXERCISE FEEL MORE EFFORTFUL THAN IT ACTUALLY IS?

Avelina C. Padin, MA, Department of Psychology, Institute for Behavioral Medicine Research, The Ohio State University, Columbus, OH, Janice K. Kiecolt-Glaser, PhD, Institute for Behavioral Medicine Research, Department of Psychology, Department of Psychiatry, Ohio State University; Ohio State University Wexner Medical Center, Columbus, OH

Breast cancer patients are less physically active and have poorer fitness compared to their age-matched peers, and their fitness tends to decline throughout cancer treatment. Elevated depressive symptoms may influence these declines, as depressive symptoms prior to adjuvant therapy (i.e., chemotherapy or radiation) have been associated with decreased activity up to five years later. Depression may influence activity level by distorting perceived exertion, which is meant to reflect an individual's perception of how hard their body is working during activity. To assess the impact of clinically elevated depressive symptoms or major depression history on perceived exertion during exercise, breast cancer survivors (N=106) were recruited after breast cancer surgery but prior to initiating adjuvant therapy. Women provided information about their current and past depressive symptoms and completed a graded cycle ergometer test, during which heart rate and perceived exertion were collected every two minutes. Compared to women below the clinical cutoff, women with clinically significant depressive symptoms showed steeper increases in perceived exertion (p=.019). In contrast, they had lower heart rates during the test (p=.005) and did not evidence significantly different heart rate changes (p=.882). Women with a

major depression history reported marginally greater perceived exertion compared to those without such a history (p=.076). Major depression history was unrelated to overall heart rate during the test (p=.532) and heart rate change (p=.459). Women with elevated depressive symptoms or a history of major depression experienced exercise as more difficult compared to non-depressed peers, but this did not reflect actual heart rate differences. These results may indicate a mismatch between depressed individuals' perceived exertion and their actual, objective exertion. These findings are consistent with prior research demonstrating that depressed individuals perform more poorly on heartbeat detection tasks. This novel finding identifies an important, but understudied mechanism linking depression and decreased physical activity among breast cancer survivors; namely, depression makes exercise feel more difficult, which may decrease survivors' likelihood of engaging in regular exercise.

Abstract 1053

SMOKING AND PHYSICAL ACTIVITY EXPLAIN INCREASED MORTALITY RISK FOLLOWING MARITAL DISSOLUTION: EVIDENCE FROM THE ENGLISH LONGITUDINAL STUDY OF AGEING (ELSA) Kyle J. Bourassa, M.A., John M. Ruiz, PhD., David A. Sbarra,

PhD., Psychology, University of Arizona, Tucson, AZ

Marital dissolution is associated with an increased risk of early mortality, but the specific psychosocial and behavioral mechanisms that may explain this association remain largely unknown. Using data from the English Longitudinal Study of Ageing, a representative sample of aging adults (N=5,786), we sought to identify the putative psychological, behavioral, and biomarker variables that might explain the association of marital dissolution and increased risk of mortality using a longitudinal design over eight years. To do so, we used structural equation modeling to examine the associations of marital dissolution and life satisfaction, health behaviors measured two years later, biomarkers measured four years later, and mortality outcomes four to eight year later, consistent with the ELSA data collection timeline. Age and gender were included as covariates predicting all endogenous variables. Consistent with prior literature, we found that marital dissolution (marital separation and/or divorce) was associated with greater risk of early mortality relative to intact marriages over the study period, OR = 1.70, 95% CI [1.35, 2.14]. We next examined whether our proposed mediator variables might explain this association. Marital dissolution was associated with lower life satisfaction, $\beta = -0.25$ [-0.30, -0.20]. Lower life satisfaction predicted less frequent physical activity, β = 0.16 [0.12, 0.20], and increased likelihood of smoking, β = -0.08 [-0.12, -0.04], two years later. Less physical activity and smoking, in turn, predicted poorer later lung functioning two years later, $\beta = 0.06$ [0.02, 0.10], $\beta = -0.28$ [-0.32, -0.24], and poorer lung function predicted increased likelihood of mortality over the following four years, $\beta = -0.11$ [-0.21, -0.02]. There was a significant total indirect effect of marital dissolution on mortality through these psychological, behavioral, and biomarker variables, $\beta = 0.06$ [0.04, 0.08], which fully explained increased risk for early mortality. Following a marital separation, decreased life satisfaction predicts poor health behaviors, and that these health behaviors are linked to increased risk for early mortality via reduced lung function. These results suggest life satisfaction, smoking behavior, and physical activity level are potential targets for interventions designed to reduce risk for early death among separated/divorced adults.

VIEW PDF

Abstract 1194

A SPORTS PROGRAM IMPROVES ADOLESCENT MENTAL HEALTH THROUGH RESILIENCE AND SLEEP QUALITY: A RANDOMIZED CONTROLLED TRIAL

Frederick K. Ho, PhD, Paediatrics & Adolescent Medicine, The University of Hong Kong, Queen Mary Hospital, Hong Kong, Lobo H. Louie, DPE, Physical Education, Hong Kong Baptist University, Hong Kong, Hong Kong, Wilfred H. Wong, MMedSc, Chun Bong Chow, MD, Paediatrics & Adolescent Medicine, Meanne Chan, PhD, Psychiatry, The University of Hong Kong, Hong Kong, Hong Kong, Patrick Ip, MPH, Paediatrics & Adolescent Medicine, The University of Hong Kong, Queen Mary Hospital, Hong Kong

Background

Research showing the mental health benefits of physical activity usually based on at-risk subjects, e.g. psychiatric patients. Randomized controlled trial on healthy subject yielded no significant improvement on mental outcomes. This study aims to assess the effectiveness of a positive youth development (PYD)based sports mentorship program on mental well-being of adolescents recruited in a community setting, as well as the mechanism in-between.

Methods

This is a randomized controlled trial recruiting students from 12 secondary schools in Hong Kong, China. Participants were randomly assigned in a 1:1 ratio to an intervention or a control arm after stratification for school, from October 2013 to June 2014. Participants were not blinded to allocation due to the nature of intervention. Students in the intervention arm received an after-school PYD-based sports mentorship for 18 weeks. Each weekly session lasted for 90 minutes. Students in the control arm received exclusive access to a health education website.

Results

664 students (mean age 12.3 [SD 0.76]; 386 females [58.1%]) completed baseline and post-intervention assessments. The intervention improved students' mental well-being (Cohen's d 0.25, 95% confidence interval 0.10–0.40, P=0.001), sleep quality (0.17, 0.02–0.32, P=0.03), self-efficacy (0.22, 0.07–0.37, P=0.01), resilience (0.19, 0.03–0.34, P=0.02), physical fitness (flexibility [0.28, 0.13–0.43, P=0.02], lower limb muscle strength [0.18, 0.03–0.33, P=0.03], dynamic balance [0.21, 0.06–0.37, P=0.01]), and physical activity level (0.39, 0.24–0.55, P<0.0001). Path analysis shows that the benefits on mental health are partially mediated through resilience and sleep quality.

Conclusions

This study shows that a PYD-based sports mentorship intervention could improve healthy adolescents' mental wellbeing through resilience and sleep quality. Implications will be discussed.

Abstract 1043

OBJECTIVE PHYSICAL ACTIVITY MODERATES THE ASSOCIATION BETWEEN DAILY PSYCHOSOCIAL STRESSORS AND AMBULATORY BLOOD PRESSURE REACTIVITY

Mark C. Thomas, MS, Thomas W. Kamarck, PhD, Psychology, Xingyuan Li, MS, Biostatistics, Peter Gianaros, PhD, Kirk Erickson, PhD, Stephen Manuck, PhD, Psychology, University of Pittsburgh, Pittsburgh, PA

Do physically active individuals exhibit less stressor-evoked cardiovascular reactivity in daily life than their sedentary counterparts? We addressed this question in 461 healthy, middleaged adults using ambulatory methods. Physical activity (PA) was assessed during waking hours (mean metabolic expenditure in METS units) over a 4-8 day period using a multi-channel accelerometry device (SenseWear Pro3, Body Media). During 4 of these days, participants also completed hourly electronic diary interviews with ambulatory blood pressure (ABP) monitoring. We derived measures of daily psychosocial stressors from multiitem diary scales: Task Strain (high demand, low decision latitude) and Social Conflict (rating of recent social interaction). We measured CVR as the increase in ABP associated with increases in Strain or Conflict (regression slopes). Multilevel modeling was used with adjustments for between-person demographics and within-person covariates (e.g., posture, recent cigarette consumption).

PA moderated the relationship between Task Strain and SBP (b for interaction effect = -1.66, F (1, 22E3) = 4.57, p = 0.0325) and DBP (b = -1.30, F (1, 460) = 4.82, p = 0.0281). Simple slope analyses revealed that periods of Strain were associated with significant increases in SBP (b = 1.14, F(1, 22E3) = 13.33, p = 0.0003) and DBP (b = 0.99, F (1, 22E3) = 17.26, p<.0001) for sedentary individuals but not for their physically active counterparts (SBP: b = 0.21, F (1, 23E3) = 0.45, p = 0.50; DBP: b = 0.26, F(1, 23E3) = 1.21, p = 0.27). Using comparable models, PA moderated the relationship between Social Conflict and mean PA and DBP (b = -0.93, F (1, 14E3) = 5.84, p = 0.0157) but not SBP (b = -0.69, F (1, 14E3) = 1.65, p = 0.19). Like Task Strain, a similar pattern of simple slopes emerged for DBP for low sedentary individuals (b = 0.42, F (1, 14E3) = 6.96, p = 0.0084) but not for active individuals (b = -0.11, F (1, 14E3) = 0.54, p = 0.46). This work extends prior mixed laboratory-based findings to indicate for the first time to our knowledge that PA may moderate the effects of recurrent, daily life stressors on ambulatory CVR. Supported by HL40962 and P01HL040962.

Sleep

Thursday, March 8 from 3:40 to 4:55 pm

Abstract 1076

SLEEP-RELATED BIOMARKERS OF RESILIENCE TO POSTTRAUMATIC STRESS DISORDER

Thomas A. Mellman, MD, Psychiatry and Behavioral Sciences, Howard University, Washington, DC, Nancy Cowdin, PhD, Neuroscience, Georgetown College of Medicine, Washington, DC, Ihori Kobayashi, PhD, Psychiatry, Howard University, Washington, DC

A significant minority of survivors of severe trauma develop persisting posttraumatic stress disorder (PTSD). An emerging paradigm is to investigate factors that contribute to resilience to developing the disorder that can be leveraged for intervention development. Disturbed sleep is prominent with PTSD and healthy sleep has restorative functions, which include adaptive processing of emotional memories. The objective of this investigation is to identify measures from electrophysiological recordings of sleep that distinguish resilient individuals from those with PTSD.

Healthy young adult African Americans were recruited for research relating stress to sleep and cardiovascular risk. The Clinician Administered PTSD Scale was used to evaluate trauma exposure and PTSD. Additional evaluations included 2 nights of overnight polysomnography on a clinical research unit and ambulatory monitoring that included 24 hour ECG recording and actigraphy. In addition to visually scored sleep stages, artifact free epochs extracted from REM sleep were analyzed for spectral EEG frequencies. Ambulatory ECGs were edited for R-wave detection and artifact exclusion and analyzed for heart rate variability (HRV) spectra from wake and sleep. Eighty three percent of the sample were trauma exposed and among those with trauma exposure, there were similar rates for full or subthreshold current PTSD, recovery from lifetime PTSD, and no PTSD. The following analyses compared the participants with high impact traumas who never developed significant PTSD symptoms (resilient; n = 33) with those with full current PTSD (n = 33).

Resilient participants had higher percentages of REM sleep than those with PTSD (23.7% vs. 20.8%, p = .026); greater right frontal theta power during the first (p = .03) and last (p = .014) REM sleep periods; greater normalized high frequency power from HRV (an indicator of parasympathetic tone) during sleep in their home environments (p < .05) which was strongly correlated with sleep duration in the resilient group (r = .75, p < .001) but not in the PTSD group (r = -.01, p = .96).

Potential sleep-related biomarkers of resilience to developing PTSD from high- impact trauma include measures linked to emotional memory processing (REMS% and frontal theta spectral power), and the effect of sleep on autonomic balance. These measures may mark modifiable processes.

Abstract 1497

SUBJECTIVE SLEEP COMPLAINTS ARE INDEPENDENT PREDICTORS OF FUNCTIONAL LIMITATIONS IN AGING ADULTS.

Elliot Friedman, PhD, Human Development and Family Studies, Purdue University, West Lafayette, IN

Approximately 10% of older adults have some degree of functional impairment, and likelihood of disability rises with advancing age. While there are well-established risk factors for age-related disability, most notably chronic medical conditions, the potential role of sleep is under examined despite links between sleep and diverse health outcomes. In recent work, we found that reports of sleep problems significantly increased the risk of the onset or exacerbation of functional limitations at 9-10 year follow-up. In the present study we extend this earlier work by incorporating more rigorous subjective and objective assessments of sleep. Data are from the second (2004-2006) and third (2012-2013) waves of the Survey of Midlife Development in the United States (MIDUS). A composite subjective sleep quality rating constructed from 4 questionnaire items asking about frequency of trouble falling asleep, staying asleep during the night, waking too early, and feeling unrested during the day; scores on the Pittsburgh Sleep Quality Index (PSQI); and actigraphic recording of sleep, all collected at the second wave, were used to predict ADL disability 8-9 years later (wave 3). Covariates included age, sex, race, education, chronic conditions, depression, and baseline disability. Neither subjective reports of sleep duration nor duration estimates from actigraphy were associated with ADL disability at follow-up. Poorer subjective sleep quality and higher scores on the PSQI (indicating poorer sleep quality) at wave two both predicted greater ADL disability at follow-up in adjusted regression models. They also predicted greater risk of disability onset between baseline and follow-up. In contrast, none of the sleep parameters obtained from actigraphic records (latency to fall asleep, sleep efficiency, or time spent awake after sleep onset) was associated with later ADL disability. These results show that an individual's subjective experiences of poor sleep quality, assessed using widely used instruments, predict future onset of and increases in functional impairments. This was true after adjustment for other factors that are robust predictors of functional decline, including single and multiple

chronic medical conditions and depression. Assessment and treatment of sleep complaints may thus help ensure sustained functional abilities and associated independence in aging adults.

Abstract 1292

SHORT SLEEP EXACERBATES NEGATIVE EMOTIONAL RESPONSES TO DAILY STRESSORS: EVALUATION OF BIDIRECTIONAL, WITHIN-PERSON ASSOCIATIONS

Nancy L. Sin, PhD, Psychology, University of British Columbia, Vancouver, BC, Canada, Orfeu M. Buxton, PhD, Biobehavioral Health, David M. Almeida, PhD, Human Development and Family Studies, Pennsylvania State University, University Park, PA

Background: In past research, we and others have shown that people who are more emotionally reactive to daily stressors (i.e., greater increases in negative emotions or decreases in positive emotions on stressor days versus stressor-free days) had poorer sleep quality, lower heart rate variability, elevated inflammation, and greater subsequent risks of mental and physical health conditions and mortality. Emotional reactivity to stressors is not a fixed individual difference, however, as it can fluctuate withinpersons and may be reciprocally associated with health.

Objective: To evaluate the within-person, bidirectional associations between nightly sleep duration and daily stressor-related changes in emotions.

Methods: A national sample of 2,022 adults ages 35-85 in the Midlife in the United States II Study self-reported sleep duration, stressors, and emotions during telephone interviews for 8 consecutive days.

Results: Findings from multilevel models revealed that sleep duration predicted next-day negative emotional reactivity to daily stressors (Interaction Est = -0.08, SE = 0.003, p = 0.005), but not positive emotional reactivity. Specifically, stressors were linked to more pronounced within-person increases in negative emotions following nights of shorter sleep than following nights of longer sleep (p's < 0.001 for simple slopes), adjusting for demographics, socioeconomic status, and mean levels of stressors, sleep duration, and emotions. Results for the reversed direction of association showed weaker evidence of emotional reactivity to stressors as predictors of subsequent sleep duration. In particular, stressor-related decreases in positive emotions marginally predicted shorter sleep duration that night, controlling for priornight sleep duration and other covariates (Interaction Est = 0.06, SE = 0.03, p = 0.06), whereas negative emotional reactivity to stressors was not associated with sleep that night.

Conclusions: Findings demonstrate that emotional responses to daily stressors vary based on sleep, such that shorter-than-usual sleep may amplify negative emotional responses to daily stressors. These results underscore the importance of considering contextual factors in everyday life, including sleep and stressful events, when examining the links between emotion dynamics and health.

Abstract 1159

ASSOCIATIONS OF ACTIGRAPHICALLY MEASURED DAYTIME SEDENTARINESS AND NIGHTTIME RESTFULNESS WITH WAKING AND BEDTIME SALIVARY CORTISOL LEVELS

Chelsea Siwik, B.A., Psychological and Brain Sciences, University of Louisville, Louisville, KY, Suzanne Segerstrom, Ph.D., Psychology, University of Kentucky, Lexington, KY, Kala Phillips, M.S., Psychological and Brain Sciences, University of Louisville, Louisville, KY, Elizabeth Cash, Ph.D., Whitney Rebholz, Ph.D., Otolaryngology-HNS and Communicative Disorders, University of Louisville School of Medicine, Louisville, KY, Lauren Zimmaro, M.A., Allison Hicks, B.A., Kathleen van der Gryp, B.A., Sandra Sephton, Ph.D., Psychological and Brain Sciences, University of Louisville, Louisville, KY

Circadian rhythm disruption has prognostic significance across several cancers. However, daily effects of physical activity on diurnal cortisol levels remain untested. Understanding day-to-day effects of rest and activity on endocrine biomarkers should aid development of behavioral interventions relevant to cancer patients' circadian physiology.

Non-small cell lung cancer patients (N=65) provided ten days of wrist-worn actigraphy data and collected saliva at waking and bedtime for cortisol assessment. Missing cortisol collection times and values were replaced using multiple imputation (m=25). Relationships between daytime sedentariness and nighttime restfulness and waking and bedtime cortisol were tested using multilevel modeling with Kenward-Roger correction, with people at Level 2 and days at Level 1. For waking cortisol, the predictor was daytime sedentariness on the previous day and nighttime restfulness on the preceding night; for bedtime cortisol, the predictor was same-day sedentariness and nighttime restfulness on the previous night. Three models were run for each predictor: an unadjusted model, a model adjusting for medical and demographic factors (and time since waking for waking cortisol models), and a model testing disease stage as a moderator of the examined associations, adjusted for medical and demographic factors. Each model was run without, and then with imputation of missing cortisol values.

On days patients were less sedentary and more restful at night, they had higher mean waking cortisol (p=.014; p=.020). These effects persisted after adjustment (p=.013; p=.006), but not after imputation. On days patients were more sedentary, they had higher bedtime cortisol, only after imputation in the unadjusted (p=.001) and adjusted model (p=.002). On nights patients were less restful, they had higher bedtime cortisol the next night (p=.031). This effect persisted after adjustment and imputation (p=.003). Effects were not moderated by disease stage.

Results suggest individual differences in daytime sedentariness and nighttime restfulness affect daily waking and bedtime cortisol levels among lung cancer patients. These findings offer opportunity for translational biobehavioral intervention, such that encouraging daytime activity and sleep hygiene may protect a patient's endocrine function and improve clinical outcomes.

Abstract 1389

DAILY AFFECT AND SLEEP EFFICIENCY IN COLORECTAL CANCER PATIENTS AND THEIR SPOUSES: A PRELIMINARY REPORT OF DYADIC EFFECTS

Marcella May, M.A., Hannah-Rose Mitchell, M.P.H., Amanda Ting, B.S., Charles S. Carver, Ph.D., Youngmee Kim, Ph.D., Psychology, University of Miami, Miami, FL

Background: Poor sleep quality has been a substantial concern among not only cancer survivors but also their spousal caregivers. Studies have examined the effects of daytime mood and stress on sleep quality, but these have been limited to the individual level and non-cancer populations. This study aimed to preliminarily test the associations of daily mood and stress with sleep efficiency among colorectal cancer survivors and their spouses at the individual and dyadic levels across 14 days. Method: Colorectal cancer survivors and their spouses (n=20, x=59 years old, 50% female) completed daily mood and sleep logs individually across 14 consecutive days (weekday vs weekend coded). Positive and negative mood were measured using the PANAS; perceived stress and life satisfaction using single items; and sleep efficiency using the Consensus Sleep Diary.

Results: Both patients and caregivers reported moderate levels of positive and negative mood, life satisfaction, and stress, as well as poor sleep efficiency (85% and 86%, respectively). Only among patients, greater positive mood and satisfaction, and less stress, were correlated with better sleep efficiency (|r| > .19). Dyadic multilevel modeling revealed that patients' better sleep efficiency was predicted by weekday (vs weekend) and poorer caregivers' sleep efficiency the day before ($|\beta| \ge .08, p < .02$), whereas caregivers' better sleep efficiency was predicted by weekday, their own greater negative mood on the day, their own poorer sleep efficiency the day before, less negative mood of their patient the day before, and less positive mood of their patient on the day ($|\beta| \ge .08, p \le .05$).

Conclusion: The preliminary findings support the accumulating evidence that poor sleep efficiency is common not only among cancer survivors but also their sleep partner caregivers. Findings also support the premise that sleep is a dyadic concern. Future studies must replicate the current investigation with a larger sample and across different phases of illness trajectory, and examine discrete affect and various sleep quality indices, which will provide useful information for clinical and research practices.

<u>Adherence</u> Friday, March 9 from 11:20 am to 12:35 pm

Abstract 1232

IDENTIFYING TARGETS FOR CARDIOVASCULAR MEDICATION ADHERENCE INTERVENTIONS THROUGH LATENT CLASS ANALYSIS

Talea Cornelius, Ph.D, MSW, Medicine, Columbia University Medical Center, New York, NY, Corrine I. Voils, PhD., Surgery, University of Wisconsin-Madison School of Medicine & Public Health, Madison, WI, Jeffrey L. Birk, PhD., Emily K. Romero, BA, Donald Edmondson, PhD, MPH, Ian M. Kronish, MD, MPH, Medicine, Columbia University Medical Center, New York, NY

Objective. Reasons for nonadherence to cardiovascular medications vary widely between individuals. Yet, adherence interventions are often uniformly applied, limiting their effectiveness. This study employed latent class analysis (LCA) to identify multidimensional profiles of reasons for nonadherence to cardiovascular medications that may for useful for tailoring adherence interventions.

Methods. Participants (N = 137; $M_{Age} = 58.8$, $SD_{Age} = 11.8$) were drawn from an observational study of the impact of cardiacinduced posttraumatic stress disorder (PTSD) on cardiac medication adherence in patients presenting to the emergency department with a suspected acute coronary syndrome. Demographics and depressive symptoms were assessed at baseline. Extent of nonadherence to cardiovascular medications, reasons for nonadherence, and PTSD symptoms were assessed 1 month after discharge.

Results. LCA identified three classes of reasons for medication nonadherence (see Table 1): *capacity+motivation* (related to routine/self-regulatory plus emotional or psychological barriers;

approximately 14% of the sample), *capacity* (related to routine or self-regulatory barriers; approximately 45% of the sample), and no reasons (low probability of endorsing any items; approximately 41% of the sample). Participants reporting greater nonadherence were more likely to he in the *capacity+motivation* or *no* reasons classes compared to the capacity class. Participants endorsing higher PTSD severity likely were more to be in the capacity+motivation or capacity classes compared to the no reasons class

Conclusion. Three distinct classes of reasons for nonadherence were identified, suggesting opportunities for tailored adherence interventions: *capacity+motivation*, *capacity*, and *no reasons*. These classes could identify patients at the greatest risk for medication nonadherence and inform tailored interventions to improve adherence.

VIEW PDF

Abstract 1271

INSIGHT IN NON-PARTICIPATION AND DROP-OUT AMONG CORONARY ARTERY DISEASE PATIENTS IN A PROSPECTIVE COHORT STUDY - THE THORESCI STUDY

Nina Kupper, PhD, Eveline van Montfort, MSc, Medical & Clinical Psychology, Tilburg University, Tilburg, Netherlands, Jos Widdershoven, MD PhD, Cardiology, Elisabeth - TweeSteden Hospital, Tilburg, Netherlands, Johan Denollet, PhD, Medical & Clinical Psychology, Tilburg University, Tilburg, Netherlands

Background: High study participation is essential to minimize selection bias. Non-participation might tap into a deeper societal inequality. We therefore investigated the role of demographic, psychosocial and disease-related factors in non-participation and drop-out among patients with coronary artery disease in a prospective cohort study (THORESCI).

Methods: 865 participants of THORESCI were compared with 376 drop-outs and 149 patients who refused participation but consented to the use of their medical data. Multinomial regression was used, with research participation status as dependent variable, and demographic (sex, age, SES, marital status), classical risk factors (cholesterol, diabetes, hypertension, smoking), medical history (cardiac, non-cardiac), and presence of emotional stress were tested in four separate models. Risk of death and starting in-hospital cardiac rehabilitation were tested in logistic regression models.

Results: Women were more likely to drop out (OR=1.46(1.05-2.03), p=.025), as tended to be people who were living alone (OR=1.35(0.97-1.89), p=.076). Drop-outs were more often smokers (OR=1.53(1.05-2.23), p=.028), and more often had noncardiac comorbidities (OR=1.31(.999-1.71); p=.051), but a lower risk of death than participants (2.9% vs. 5.5%; OR=.51(.26-.999), p=.050). Depression increased the risk of drop-out (OR=1.07(1.001-1.135), p=.047). Starting in-hospital cardiac rehabilitation was significantly lower in drop-outs (OR=.610(.392-.949), p=.028).

Patients in the lowest SES class were most likely to refuse participation (OR=8.07 (1.01-64.47), p=.049). Refusers were more likely to have both a cardiac (OR=1.56 (1.03-2.37), p=.035) and a non-cardiac medical history (OR=1.97 (1.24-3.13), p=.004), especially diabetes. Refusers showed a trend of increased mortality (9.4% vs. 5.5%) compared to participants (OR=1.77 (.947-3.29), p=.074. Higher anxiety scores actually slightly reduced the risk of study refusal (OR=.87(.75-1.01), p=.069). No differences were observed in starting in-hospital

cardiac rehabilitation compared to participants. **Conclusion:** Patients who refuse to participate are of lower socio-economic status, experience a larger burden of illness, and are at increased risk of death compared to study participants. These findings suggest we lack a group of individuals at most risk for poor health, which may bias study results.

Abstract 1071

FACTORS AFFECTING HEALTH BEHAVIOR ADHERENCE IN HEART FAILURE: THE REACH FOR HEALTH STUDY QUALITATIVE RESEARCH PHASE

Christopher M. Celano, M.D., Psychiatry, Harvard Medical School, Boston, MA, Melanie Freedman, B.A., Psychiatry, Massachusetts General Hospital, Boston, MA, Eleanor Beale, B.A., Psychology, Case Western Reserve University, Cleveland, OH, Carol Mastromauro, L.I.C.S.W., Psychiatry, Massachusetts General Hospital, Boston, MA, Elyse Park, Ph.D., Psychology, Jeff C. Huffman, M.D., Psychiatry, Harvard Medical School, Boston, MA

Background: Adherence to health behaviors, including physical activity, medications, and a low sodium diet, are critical for patients with heart failure (HF); however, these patients frequently struggle to adhere to these health behaviors. Psychological states have been associated with adherence to health behaviors but have had limited study in patients with HF. We aimed to identify barriers to health behavior adherence and associations between psychological states and adherence in patients with HF.

Methods: We performed semi-structured, qualitative interviews with 30 patients with moderate HF during a medical hospitalization, then again 3 months later. Interviews focused on current health behaviors, barriers to these behaviors, and the associations between psychological states and health behavior adherence. Interviews were professionally transcribed, and content analysis was performed in NVivo 8.

Results: Participants noted the greatest difficulty with increasing physical activity and attributed this to medical (e.g., HF symptoms), environmental (e.g., weather), social (e.g., lack of social support), and psychological (e.g., fear of worsening symptoms) factors. Barriers to a low sodium diet included inconvenience, the complexity of dietary recommendations, and lack of knowledge about how to reduce sodium intake. Medication nonadherence was attributed to forgetfulness and side effects. Participants also noted links between psychological states and adherence. Negative psychological states could serve as motivators (e.g., through fear) or inhibitors of adherence. In contrast, positive psychological constructs (e.g., connectedness, determination) consistently led to improved adherence.

Conclusions: Both physical and psychological factors may influence health behavior adherence in patients with HF. Interventions that combine psychological and behavioral approaches may be well-suited to increasing adherence in this high-risk population.

Abstract 1103

THE RELATIONSHIP BETWEEN POSITIVE AFFECT AND MEDICATION ADHERENCE IN CHRONIC CONDITIONS: A SYSTEMATIC REVIEW

Sarah M. Bassett, MA, Medical Social Science, Northwestern University, Chicago, IL, Stephanie A. Schuette, BA, Psychology and Neuroscience, Duke University, Durham, NC, Linda C. O'Dwyer, MA, MSLIS, Galter Health Sciences Library, Feinberg School of Medicine, Chicago, IL, Judith T. Moksowitz, PhD, MPH, Medical Social Science, Northwestern Univ. Chicago, IL

Suboptimal medication adherence (MA) causes increased morbidity and mortality, and inflates U.S. healthcare costs by \$100 billion annually. Those suffering from chronic conditions are at increased risk of non-adherence compared to those with acute conditions. Although there is ample evidence that negative affect (NA) is associated with poor health outcomes, and some evidence that positive affect (PA) improves health outcomes, to date, no systematic review examining the relationship between PA and MA in those living with chronic conditions has been published.

Searches were carried out in PsycINFO, PubMed, CENTRAL and Embase. There were no limits on study type, publication date, or language. Studies of adults living with chronic medical conditions and reporting a relationship between PA and MA were eligible for inclusion if PA was measured prior to or concurrently with MA, regardless of participant demographics.

Eight studies met inclusion criteria. All studies were prospective cohort or cross-sectional, and examined PA and MA in those living with HIV or cardiovascular conditions. All but one (null) study outcome indicated a positive relationship between PA and MA (e.g. Pregnant HIV-positive participants who felt happy all/most of the time were more likely to report perfect MA postpartum, OR=1.69; 95% CI=1.14-2.51, d=0.42) (Bardeguez et al., 2008). While the literature on the relationship between PA and MA in chronic conditions is nascent, results of this systematic review suggest a positive relationship between PA and MA in HIV and cardiovascular conditions with varying effect sizes, d=0.03-d=1.27. As studies controlling for NA revealed small but positive results for this relationship (e.g. HIV-positive participants with PA one SD above mean at baseline were more likely to report medication persistence over 18-month follow-up, OR=1.08, 95% CI=1.01-1.16, d=0.04) (Carrico & Moskowitz, 2014), the current review provides some indication that PA independently positively impacts MA.

In order to elucidate this relationship, research must examine whether the positive association seen in this review remains similar in bivariate analyses and over other chronic conditions. Should the relationship between PA and MA remain after more comprehensive assessment, healthcare providers have an opportunity to implement potentially low-cost, effective interventions to increase MA.

Abstract 1105

DEPRESSIVE SYMPTOM SEVERITY AS A PREDICTOR OF ATTENDANCE IN THE HOME BEHAVIORAL WEIGHT LOSS TRIAL

Aubrey L. Shell, B.A., Loretta Hsueh, M.A., Elizabeth A. Vrany, M.S., Psychology, Indiana University-Purdue University Indianapolis, Indianapolis, IN, Daniel O. Clark, Ph.D., NiCole R. Keith, Ph.D., Indiana University Center for Aging Research, Indiana University School of Medicine, Indianapolis, IN, Huiping Xu, Ph.D., Biostatistics, Indiana University, Fairbanks School of Public Health, Indianapolis, IN, Jesse C. Stewart, Ph.D., Psychology, Indiana University-Purdue University Indianapolis, Indianapolis, IN

In low income populations, people with obesity have limited access to behavioral weight loss programs. Such programs are notorious for poor attendance. Moreover, depression is common in people with obesity and is linked with poor treatment adherence. Using data from the recently completed HealthyMe Online Weight Management Education/HealthyMe at Home (HOME) randomized controlled trial, we examined whether

baseline depressive symptom severity predicts behavioral weight loss program attendance. In the HOME trial (R01 DK092377, NCT02057952), adults from Federally Qualified Health Centers aged 40-68 years with a body mass index 30-50 kg/m² were randomized to one of three arms: usual care (n=51), in-person weight loss program (n=49), or video conference weight loss program (n=50). Video conference and in-person arms consisted of group sessions targeting diet and exercise. Sessions were ~75 minutes each, with 54 possible sessions over a 12-month period. We selected the 99 participants in either the inperson or video conference arms, of whom 94 had complete depressive symptom severity and attendance data (mean age=53 years, 85% women, 67% non-white). Baseline depressive symptom severity was determined by the Patient Health Questionnaire (PHQ-8; *M*=7.3, *SD*=5.5). Due to the high number of zeros (those who did not attend any sessions) and the positive distribution, percent of attendance skew of the (M=17%, SD=25%, range: 0%-89%) was categorized into three levels: no attendance (0%, n=44), poorer attendance (1-32%, n=24), and better attendance (33%+, n=26). Multinomial logistic regression models (adjusted for baseline age, sex, race/ethnicity, numeracy, and waist circumference) revealed that higher PHQ-8 score (z-scored) predicted an increased odds of being in the poorer attendance group compared to the better attendance group (OR=2.07, 95%CI: 1.07-4.01, p=.031). A similar association between PHQ-8 score and odds of being in the no attendance group compared to the better attendance group fell just short of significance (OR=1.67, 95%CI: 0.96-2.94, p=.073). Our findings indicate that greater depressive symptom severity at the start of a behavioral weight loss program predicts poorer attendance, suggesting that screening for and addressing depression in such programs may improve intervention uptake.

Mindfulness

Friday, March 9 from 11:20 am to 12:35 pm

Abstract 1057

ACCEPTANCE LOWERS NEUROENDOCRINE AND CARDIOVASCULAR STRESS REACTIVITY: DISMANTLING MINDFULNESS TRAINING IN A RANDOMIZED CONTROLLED TRIAL

Emily K. Lindsay, PhD, Psychology, University of Pittsburgh, Pittsburgh, PA, Shinzen Young, PhD, Clinical Neuroscience Research Unit, University of Vermont, Burlington, VT, Joshua M. Smyth, PhD, Biobehavioral Health and Medicine, Penn State University, University Park, PA, Kirk W. Brown, PhD, Psychology, Virginia Commonwealth University, Richmond, VA, J. David Creswell, PhD, Psychology, Carnegie Mellon University, Pittsburgh, PA

Objective: Mindfulness interventions, which train practitioners to *monitor*their present-moment experience with a lens of *acceptance*, are known to buffer stress reactivity. Little is known about the active mechanisms driving these effects. We theorized that acceptance is a critical emotion regulation mechanism underlying mindfulness stress reduction effects.

Method: In a three-arm parallel trial, mindfulness components were dismantled into three structurally equivalent 14-lesson smartphone-based interventions: (1) training in both monitoring and acceptance (Monitor+Accept; MA), (2) training in monitoring only (Monitor Only; MO), or (3) active control training (Coping control). 153 stressed adults (mean age = 32 years; 67% female; 53% white, 21.5% black, 21.5% Asian, 4% other race) were randomly assigned to complete one of the three

interventions. At follow-up, participants first completed a booster lesson tied to group assignment, then underwent a modified Trier Social Stress Test to assess cortisol, blood pressure, and subjective stress reactivity. **Results**: As predicted, Monitor+Accept training reduced biological stress reactivity compared to Monitor Only and control trainings. Specifically, cortisol area-under-the-curve with respect to increase was lower following MA training compared to both MO (p=.04, d=.40) and control trainings (p=.03, d=.47). Similarly, systolic blood pressure reactivity was lower following MA compared to both MO (p=.04, d=.41) and control trainings (p=.001, d=.72). Although diastolic blood pressure was lower during the TSST performance following MA compared to MO (p=.02, d=.45) and control trainings (p=.02, d=.53), there were no condition differences in diastolic blood pressure reactivity when accounting for pre-stress levels (MA vs. MO: p=.20, d=.25; MA vs. control: p=.11, d=.35). Participants in all three conditions reported moderate levels of subjective stress, with no between group differences. Conclusions: This study provides the first experimental evidence that brief smartphone mindfulness training can impact stress biology, and that acceptance training drives these effects. These findings have implications for basic and applied research in contemplative science, emotion regulation, stress and coping, health, and clinical interventions.

Abstract 1392

THE ROLE OF ACCEPTANCE TRAINING ON CIRCULATING CRP: A MINDFULNESS RANDOMIZED CONTROLLED TRIAL

Daniella K. Villalba, Ph.D, Psychology, Carnegie Mellon University, Pittsburgh, PA, Emily K. Lindsay, Ph.D, Psychology, Carol Greco, Ph.D, Psychiatry, Anna Marsland, Ph.D, Katarina Gray, B.S., Psychology, University of Pittsburgh, Pittsburgh, PA, Joshua Smyth, Ph.D, Biobehavioral Health, Pennsylvania State University, University Park, PA, Brian Chin, B.S, David Creswell, Ph.D, Psychology, Carnegie Mellon University, Pittsburgh, PA

Background & Significance: Mindfulness, the practice of monitoring present-moment experiences with an attitude of acceptance, has garnered significant attention as а complementary health treatment for many physical conditions. However, evidence is mixed regarding the effects of mindfulness training on reducing markers of systemic inflammation (IL-6, CRP). In addition, little research has focused on clarifying the underlying psychological mechanisms that explain how mindfulness training exerts its effects on health. We suggest that developing an accepting attitude towards present-moment experiences is a key emotion regulation skill that can help explain the beneficial effects of mindfulness on health outcomes. The present study provides evidence from a pre-registered randomized controlled trial (RCT) that sought to dismantle the components of mindfulness and examine the role of acceptance on circulating levels of CRP. This 3-arm RCT compared a standard 8-week MBSR course that teaches attention monitoring + acceptance skills (MA) to an MBSR course that teaches attention monitoring skills only (MO) and an assessment only group (AO). We hypothesized the MA group would experience decreases in circulating CRP compared to the MO and AO groups.

Method: A total of 137 stressed community adults (92 women; $M_{age} = 37$, SD = 13) were randomly assigned to 1 of the 3 conditions (MA, MO, AO). They came to our lab before and after the intervention where they completed surveys and provided dried blood spot samples for assessment of CRP.

Results: Randomization was successful as demographic characteristics did not differ across the 3 groups. Also 91% of participants returned to the post-treatment session and 73% of those assigned to the MBSR courses attended all sessions. While results show that participants in the MA group showed decreased daily stress compared to the MA and AO groups, there were no significant reductions in CRP for either the MA and MO groups compared to the control group.

Conclusions: While previous research found that acceptance training successfully lowered stress reactivity to a social stressor task, the present study does not support the notion that mindfulness interventions can impact stress-related health outcomes for a sample of stressed (but healthy) community adults. Implications of these findings will be discussed.

Abstract 1528

MINDFULOMICS: SEARCHING FOR THE MOLECULAR SIGNATURE OF MINDFULNESS AND RESILIENCE TO STRESS

Jeffrey Greeson, PhD, Psychology, Rowan University, Glassboro, NJ, Mary Keenan, BA, Psychology, University of Memphis, Memphis, TN, Devin Barney, BA, Psychology, University of Hawaii, Honolulu, HI, Jonathan Reda, BS, Vanessa Anyanso, BA, Psychiatry, University of Pennsylvania, Philadelphia, PA, Xiangdong Ren, MD, PhD, Institute for Translational Medicine and Therapeutics, Children's Hospital of Philadelphia, Philadelphia, PA, Jonathan Schug, PhD, Genetics, University of Pennsylvania, Philadelphia, PA

Mindfulness can confer resilience to stress, yet the biological mechanisms are unclear. New studies have emerged showing changes in gene expression with mindfulness meditation, a field we term Mindfulomics. Mindfulness, though, is a multifaceted construct; it is at once a state (induced during meditation), a trait (an enduring disposition), and a skill (developed through practice). No published studies have examined genomic or other biologic "signatures" of mindfulness to our knowledge. Our pilot study on healthy, stressed adults (n=30, F=63%, White=70%, mean age=40) aimed to advance the field by testing the hypothesis that greater mindfulness - operationalized all three ways - is signified by lower levels of stress biomarkers and stress-related/proinflammatory gene expression, using targeted RNA-sequencing (Conserved Transcriptional Response to Adversity [CTRA], 44 genes; NFkB signaling pathway, 105 genes). Biological measures were collected at rest and in response to acute stress in the lab, both before and after an 8week Mindfulness-Based Stress Reduction (MBSR) program. Contrary to hypotheses, there were no differences in resting-state blood biomarkers or gene expression post-MBSR, nor any difference in gene expression as a function of either state mindfulness (meditation vs. quiet rest) or traitmindfulness (Cognitive and Affective Mindfulness Scale -Revised [CAMS-R] score; median split). There was a significant decrease in resting-state salivary α -amylase (p<.05) post-MBSR, consistent with lower sympathetic nervous system (SNS) activation. In addition, a trend toward decreased CTRA gene expression was found for MBSR responders who showed a 50% increase in mindfulness (n=14, p=.12). Several changes in stress responsivity were also observed, including decreased emotional reactivity (p<.001), lower BP reactivity (p=.059), and stronger innate immune system reactivity (p=.049 for WBC count; p=.005 for Neutrophils). Collectively, these findings demonstrate evidence for increased resilience to stress after 8-weeks of mindfulness training, using a number of objective biomarkers. Moreover, genomic results suggest that among relatively young,

healthy adults, changes in stress-related and proinflammatory gene expression may serve as a molecular "signature" of treatment response for those who experience the greatest change in mindfulness after MBSR training.

Abstract 1422

MINDFULNESS INTERVENTION INCREASES NEURAL REWARD RESPONDING TO POSITIVE, NONSOCIAL STIMULI IN BREAST CANCER SURVIVORS

Janine M. Dutcher, PhD, Psychology, Carnegie Mellon University, Pittsburgh, PA, Chloe Boyle, MA, Naomi I. Eisenberger, PhD, Steve W. Cole, PhD, Julienne Bower, PhD, Psychology, UCLA, Los Angeles, CA

Background. Young breast cancer survivors are at increased risk of depression. Previous work has found that young breast cancer survivors who completed a 6-week mindfulness class showed increased meaning and positive affect (Bower et al., 2015), important predictors of adjustment to cancer. Other work has found that mindfulness may lead to reduced proinflammatory cytokine production. However, the neural mechanisms of mindfulness's effects on positive affect and inflammation are not clear.

Methods. 20 young breast cancer survivors (mean age = 46.5 years) participated in a 6-week mindfulness meditation intervention and completed a blood draw and an fMRI scan before and after the intervention. Participants completed a task during the scans in which they viewed blocks of images of neutral images (e.g. chairs), nonsocial but positive images (e.g. sunsets), and social images (e.g. children playing). Participants reported on their feelings of positive affect during each block.

Analyses. For our fMRI analyses, we used a region of interest approach in an anatomical ventral striatum ROI (a key region in the neural reward pathway) to investigate the change in neural activity pre- and post-intervention. We investigated neural activity in two contrasts: nonsocial compared to neutral and social compared to neutral. IL-6 data was log corrected.

Results. VS activity to the nonsocial-neutral contrast was higher at post- compared to pre-intervention. There were no significant differences in VS activity to the social-neutral contrast at postcompared to pre-intervention. Participants reported marginally more positive affect in the nonsocial blocks at post- compared to pre-intervention. Positive affect ratings did not change for the social blocks. Furthermore, changes in VS activity to nonsocial vs. neutral images after the intervention correlated with decreased IL-6, such that the more IL-6 decreased after the intervention, the more VS activity to the nonsocial vs. neutral images increased.

Conclusions. In summary, in breast cancer survivors, decreases in inflammation after a mindfulness intervention is associated with increased neural reward activity to positive, nonsocial images. It is possible that mindfulness may lead an individual to see nonsocial images as more positive and rewarding and may lead to reductions in inflammation.

Abstract 1355

DIFFERENTIAL ASSOCIATIONS AMONG FACETS OF DISPOSITIONAL MINDFULNESS WITH SELF-REPORTED MENTAL AND PHYSICAL HEALTH

Amanda M. Mitchell, PhD, Department of Counseling & Human Development, Paul Salmon, PhD, Sandra E. Sephton, PhD, Department of Psychological and Brain Sciences, University of Louisville, Louisville, KY

Objective: Greater mindfulness has been linked with better psychological and physical health; however, studies examining

differential associations among facets of dispositional mindfulness with health are limited. The current study assessed relationships among four facets of dispositional mindfulness (observing, describing, acting with awareness, acceptance without judgment) with self-reported mental and physical health in a sample of college students. Given race-related health disparities in these outcomes, preliminary analyses were moderating conducted considering the role of race. Method: Participants (n=85, 66 non-Hispanic White and 19 racial/ethnic minority students) completed data collection at two time points during the semester, approximately one month apart. Measures included the Kentucky Inventory of Mindfulness Skills (KIMS) and Short-Form Health Survey (SF-36). Results: Mean scores across the two time points were calculated for each variable. Regression results showed that, after adjustment for GPA, race/ethnicity, hours of paid employment per week, and living situation, greater acting with awareness was associated with better self-reported physical health (p=0.02) while greater acceptance without judgment was linked with better self-reported mental and physical health (ps<0.01). No significant effects emerged in relation to the observing or describing facets of mindfulness. Using PROCESS, moderation analyses showed that greater acting with awareness was associated with better selfreported mental and physical health only among racial/ethnic minority students (ps<0.02). Conclusion: In sum, these findings indicate that acting with awareness and acceptance without judgment are important facets of mindfulness in relation to selfreported mental and physical health among college students. In addition, these data suggest that the protective effects of acting with awareness may be most readily observable among racial/ethnic minority students. Of clinical relevance, it is possible that interventions targeting these facets of mindfulness may benefit self-reported health among college students. The protective effects of particular facets of mindfulness in the context of race-related health disparities warrants further attention.

<u>Cardiovascular Disease</u> Friday, March 9 from 2:00 to 3:00 pm

Abstract 1385

EFFECT OF HEART RATE VARIABILITY BIOFEEDBACK ON MYOCARDIAL BLOOD FLOW IN PATIENTS WITH CORONARY ARTERY DISEASE: A RANDOMIZED CONTROLLED PILOT TRIAL

Amit J. Shah, MD, MSCR, Viola Vaccarino, MD, PhD, Epidemiology, Marina Piccinelli, PhD, Jonathon Nye, PhD, Radiology, Naser Abdelhadi, MD, Medicine, Oleksiy Levantsevych, MD, Belal Kaseer, MD, Brad Pearce, PhD, Epidemiology, Laura Ward, MPH, Biostatistics, Tene Lewis, PhD, Epidemiology, Muhammad Hammadah, MD, Medicine, Emory University, Atlanta, GA, Maggie Johnson, PhD, Psyhologist, Atlanta Veterans Affairs Medical Center, Decatur, GA, Kandi Felmet, PhD, Psychiatry, Emory University, Atlanta, GA, Jay P. Ginserg, PhD, Psychology, Dorn Veterans Affairs Medical Center, Columbia, SC, Michael Kutner, PhD, Biostatistics, Emory University, Atlanta, GA, J. Douglas Bremner, MD, Psychiatry, Emory University, 12 Executive Park Dr., GA, Ernest Garcia, PhD, Radiology, Arshed Quyyumi, MD, Medicine, Emory University, Atlanta, GA, Paolo Raggi, MD, Medicine, University of Alberta, Edmonton, AB, Canada

Introduction: Myocardial blood flow may decrease during acute mental stress via vasoconstriction. This may lead to ischemia and downstream adverse outcomes. Heart rate variability biofeedback (HRVB) is a practice which involves slow, paced breathing, mindfulness, and compassionate awareness, and may strengthen baroreceptor homeostasis. As a result, it may attenuate the pathological cardiac effects of acute mental stress. In a randomized controlled pilot trial, we explored the hypothesis that HRVB, versus waitlist control, increases mental stress myocardial blood flow (MBF) in subjects with coronary artery disease (CAD).

Methods: We randomized 24 subjects with CAD to HRVB vs. waitlist control. HRVB training lasted 6 weeks, including 3 phone-based and 3 in-person weekly coaching sessions. Myocardial blood flow was quantified with Rb-82 Positron Emission Tomography at baseline and 8 weeks after enrollment. An arithmetic stress challenge was performed in the scanner to induce acute mental stress, and the mental stress myocardial flow reserve (MS-MFR) was calculated as the ratio of MBF during stress divided by rest. Multivariable modeling was performed to adjust for baseline imbalances in socio-demographic and health factors with >5% difference between groups.

Results: Of the 24 patients randomized, 21 had both baseline and follow-up MBF data and were included in the analysis. The mean (SD) age of the group was 60 (6) years; 62% were men, and 48% were African American. During baseline testing, there was a nonsignificant reduction in MBF with mental stress in both groups (figure 1). In the HRVB group (n=12), the MS-MFR increased from 0.96 at baseline to 1.12 at follow-up (difference of 0.16, 95% C.I. 0.06 - 0.27, p<0.01). In the control group (n=9), no significant difference in MS-MFR was found between baseline and follow-up. The change in MS-MFR from baseline to followup was not significantly different between groups in unadjusted analysis. However, the difference became significant after multivariable adjustment; MS-MFR was higher in the HRVB group by 0.37 (95% C.I. 0.14 - 0.50, p=0.01; figure 2). No differences were found in hemodynamic responses to stress or depressive symptoms.

Conclusion: HRVB improves mental stress myocardial flow reserve in patients with CAD, possibly by counteracting mental stress-induced vasoconstriction. Further study is needed.

VIEW PDF

Abstract 1100

NEUTROPHIL GELATINASE-ASSOCIATED LIPOCALIN AND DEPRESSIVE SYMPTOMS IN PATIENTS WITH NON-OBSTRUCTIVE CORONARY ARTERY DISEASE.

Paula M.C. Mommersteeg, PhD, Medical and clinical psychology, Tilburg University, Tilburg, Netherlands, Pieter Naudé, PhD, Department of Neurology and Alzheimer Research Center, University of Groningen; University Medical Center Groningen, Groningen, Netherlands, Wart Bagijn, MSc, Medical and clinical psychology, Tilburg University, Tilburg, Netherlands, Jos W. Widdershoven, MD, PhD, Cardiology, Elisabeth-Tweesteden Hospital; Tilburg University, Tilburg, Netherlands, Regien Schoemaker, PhD, Neurobiology GELIFES, University of Groningen; University Medical Center Groningen, Groningen, Netherlands

Background: Non-obstructive coronary artery disease (NOCAD; visible wall irregularities with less than 50% obstructive stenosis) is more prevalent in women and associated with increased risk for adverse cardiac events. Neutrophil gelatinase-associated

lipocalin (NGAL) is an acute phase pro-inflammatory protein, and elevated NGAL levels have been associated with depressive symptoms and adverse cardiac events. Women report more depressive symptoms than men, but it remains to be investigated if this translates in different levels of NGAL.

Methods: In total, 425 patients with NOCAD (mean age 61.4 ± 9.4 years, 52% women) reported depressive symptoms (Hospital Anxiety and Depression Scale HADS) as part of the TweeSteden Mild Stenosis (TWIST) observational cohort study., Serum NGAL levels were analyzed with ELISA at baseline and 12-month follow-up. Mixed model analyses were used to examine NGAL in multivariate models.

Results: Depressive symptoms were significantly associated with higher serum levels of NGAL (F = 6.97, p = .008) when adjusted for time, age, sex, and interaction effects. There were no differences between women and men in level of NGAL (F = 2.48, p = .116). NGAL showed a significant decline over the 12 months (F = 40.5, p<.001), but no significant time x depression (F = 0.09, p=.766), time x sex (F = 0.53, p=.468), or time x sex x depression (F = 1.24, p = .291) interaction effects were observed. The association of depression and NGAL (F = 2.16, p = .142) became nonsignificant after further adjustment for education level, CAG or CT diagnosis, diabetes, hypertension, smoking and BMI.

Discussion: This study found that higher serum NGAL levels are modestly associated with depressive symptoms over a 12 month period, but no longer after adjustment for lifestyle factors. No sex and gender differences were observed. NGAL may be part of a mechanistic pathway relating lifestyle factors to depressive symptoms in patients with NOCAD.

Abstract 1421

ISCHEMIA, PSYCHOSOCIAL FACTORS, AND CHEST PAIN IN PATIENTS REFERRED FOR MYOCARDIAL PERFUSION SCAN: PRELIMINARY DATA FROM THE HEART INSIDE OUT (THIO) STUDY.

Maria T. Bekendam, MSc., Willem J. Kop, PhD., Medical and Clinical Psychology, Tilburg University, Tilburg, Netherlands, Ilse A. Vermeltfoort, M.D., Jeroen A. de Jong, Drs., Nuclear Medicine, Institute Verbeeten, Tilburg, Netherlands, Jos W. Widdershoven, MD, PhD, Department of Cardiology, Elizabeth-Tweesteden hospital, Tilburg, Netherlands, Johan Denollet, PhD., Paula M. Mommersteeg, PhD., Medical and Clinical Psychology, Tilburg University, Tilburg, Netherlands

Background: Chest pain (Angina Pectoris, AP) is a common complaint in ischemic heart disease (IHD), either in the presence (CAD) or absence (INOCA) of obstructive coronary arteries. When minimal or no obstructions are found yet complaints are equally severe and impairing, the (mal)functioning of the microvasculature, coronary microvascular dysfuntion (CMD), can be an underlying cause. In addition, personality and other psychosocial factors are hypothesized to have a mediating role in this relationship between CMD and complaints. Preliminary data from the THIO study, concerning patients with AP and ischemia are examined.

Methods: In total 95 patients (mean age 66 ± 9 yr, 50% women) referred for a MIBI-SPECT scan between January and September 2017 filled out questionnaires on Type D personality (DS14), depression (PHQ-9), anxiety (GAD-7), and well-being (MHC-SF). Patients were questioned about physical complaints during stress testing. Medical records were retrieved for each patient indicating the diagnosis from the MIBI-SPECT and cardiac history including earlier coronary angiography (CAG).

Results: Of the referred patients, 37% underwent exercise stresstesting and 48% Adenosine stress-testing. According to medical records 29 patients (30%) had some form of ischemia (39% female, 61% male, $X^2(2)=3.25$, p=.197), of which severe ischemia was more prevalent in men (9% male, 2% female, $X^2(4)=8.35$, p=.039). Patients with some form of ischemia less often reported AP during stress testing (27% versus 41%, $X^2(1)=$ 1.86, p=.173), and more often underwent previous coronary angiography (47% versus 14%, $X^2(1)=$ 11.98, p=<.001). No differences were observed in psychosocial factors between the ischemic and non-ischemic group (all p's>.05). Patients with AP during stress testing more often had 'languishing' well-being (19% versus 4%, $X^2(2)=$ 10.08, p= .006).

Conclusion: Preliminary analyses show that this group of patients had less AP complaints during stress-testing and that most ischemic patients are men. Levels of well-being differ within this group. Psychosocial impairments are indeed present among these patients, but a higher number of patients are needed to conduct analyses and gain more insight into this group. More medical records will be retrieved and data collection, including facial emotional recognition using FaceReader software, is ongoing.

Abstract 1409

INSOMNIA AS AN INDEPENDENT PREDICTOR OF INCIDENT CARDIOVASCULAR DISEASE IN HIV: DATA FROM THE VETERANS AGING COHORT STUDY

Brittanny M. Polanka, B.S., Psychology, Indiana University-Purdue University Indianapolis, Indianapolis, IN, Suman Kundu, DSc, MSc, Cardiovascular Medicine, Vanderbilt University School of Medicine, Nashville, TN, Kaku A. So-Armah, PhD, General Internal Medicine, Boston University School of Medicine, Boston, MA, Matthew S. Freiberg, MD, MSc, Cardiovascular Medicine, Vanderbilt University School of Medicine, Nashville, TN, Samir K. Gupta, MD, Infectious Diseases, Indiana University School of Medicine, Indianapolis, IN, Roger J. Bedimo, MD, MS, Infectious Diseases, VA North Texas Healthcare System, Dallas, TX, Matthew J. Budoff, MD, Medicine, Los Angeles Biomedical Research Institute, Los Angeles, CA, Adeel A. Butt, MD, MS, Infectious Diseases, VA Pittsburgh Healthcare System, Pittsburgh, PA, Chung-Chou H. Chang, PhD, General Internal Medicine, University of Pittsburgh, Pittsburgh, PA, Stephen Gottlieb, MD, Medicine, University of Maryland School of Medicine, Baltimore, MD, Vincent C. Marconi, MD, Medicine, Emory University School of Medicine, Atlanta, GA, Julie A. Womack, PhD, CBM, FNP-BC, Nursing, Yale School of Nursing, West Haven, CT, Jesse C. Stewart, PhD, Psychology, Indiana University-Purdue University Indianapolis, Indianapolis, IN

Insomnia (a) predicts cardiovascular disease (CVD) in the general population and (b) is highly prevalent in people with human immunodeficiency virus (HIV). Thus, we examined whether insomnia symptoms were an independent predictor of incident CVD among 3,138 CVD-free, HIV-infected Veterans (M_{age} =49 years, 94% men, 65% African American) in the Veterans Aging Cohort Study-9 (VACS9). Veterans are continuously enrolled in VACS9 since the study start date (June 2002); we defined baseline as –ever to +6 months of enrollment date and follow-up as +6 months of enrollment date to study end date (December 2011). Baseline insomnia symptoms were measured and dummy coded with the item, "Difficulty falling or staying asleep?", with the following options: 0="I do not have this symptom" (reference) or "I have this symptom and..." 1="it doesn't bother me", 2="it bothers me a little", 3="it bothers me",

4="it bothers me a lot". Incident CVD events (acute myocardial infarction, stroke, or coronary artery revascularization) were identified with VA and Medicare administrative data and VA feefor-service data. During median follow-up time of 8.2 years, 181 (5.8%) CVD events occurred. HIV-infected Veterans bothered a lot by difficulty falling or staying asleep exhibited a greater risk of incident CVD events than HIV-infected Veterans without these symptoms after adjustment for demographics (hazard ratio [HR]=1.66, 95% CI=1.10-2.51, p=.016), CVD risk factors (hypertension, diabetes, body mass index, smoking, total medication; *HR*=1.64, cholesterol. statin 95% CI=1.08-2.50, p=.020), other potential confounders (hepatitis C infection, renal disease, anemia, alcohol use, cocaine use; HR=1.77, 95% CI=1.15-2.73, p=.010), and HIV-specific factors (HIV-1 RNA, CD-4⁺, ART regimen; *HR*=1.73, *CI*=1.12-2.68, *p*=.013). These results were minimally affected after additional adjustment for non-benzodiazepine sleep medication (HR=1.66, 95% CI=1.07-2.59, p=.023) or depressive symptoms (HR=1.71, 95% CI=1.01-2.88, p=.045). However, adjusting for antidepressant medication attenuated the association (HR=1.48, 95% CI=0.94-2.33, p=.094). No associations between insomnia symptoms and incident CVD were observed in a matched cohort of 3,010 uninfected Veterans. Ultimately, research examining the insomnia-CVD relationship in HIV could lead to the identification of a novel and treatable risk factor for CVD in HIV.

Mental Disorder

Friday, March 9 from 2:00 to 3:00 pm

Abstract 1237

THE IMPACT OF LIFETIME STRESS EXPOSURES AND MENTAL HEALTH SEQUELAE ON CURRENT HEALTH AND FUNCTIONING IN VIETNAM-ERA WOMEN VETERANS

Brian N. Smith, PhD, National Center for PTSD and Department of Psychiatry, VA Boston Healthcare System and Boston University School of Medicine, Boston, MA, Avron Spiro, PhD, Departments of Epidemiology and Psychiatry, Boston University and VA Boston Healthcare System, Boston, MA, Kathryn M. Magruder, PhD, MPH, Departments of Psychiatry and Behavioral Sciences and Public Health, Medical University of South Carolina, Charleston, SC

Background: Trauma exposure and its mental health sequelae can have negative implications for health outcomes, particularly in high-risk populations. However, these associations are understudied in older adults and especially among women. The present study examined the impact of exposures during military service and throughout life on later life health and functioning in a cohort of older women veterans using data from The Health of Vietnam-Era Women's Study (HealthVIEWS).

Methods: Of 9263 eligible women veterans who were active duty during the Vietnam era, 4219 (46%) completed both a mail survey and a computer assisted telephone interview (M_{age} =68). Wartime exposures were assessed using the Women's War-Zone Stressor Scale-revised (WWSS-R); the Elders Life Stress Inventory (ELSI) measured exposure to stressful events common in later life; and other lifetime trauma exposures, PTSD, and major depressive disorder (MDD) were assessed using the Composite International Diagnostic Interview (CIDI). Physical health-related quality of life (HRQOL) was assessed using the VR-36, and disability was assessed using the World Health Organization Disability Assessment Schedule 2.0. Regression analyses examined associations in multivariate models adjusting for wartime location, nursing status, ethnicity, military branch, marital status, and education.

Results: Several salient wartime exposures—including wartimespecific experiences and sexual discrimination and harassment were associated with lower HRQOL and greater disability, as were other lifetime exposures outside of military service. Specifically, as the number of stress exposures increased, health and functioning decreased. These associations held even after controlling for PTSD and depression. Current PTSD and both current and former MDD were strongly linked with lower HRQOL and greater disability.

Conclusions: Study results suggest that trauma and other stress exposures during and outside of military service are predictive of lower HRQOL and greater disability later in life for women veterans. Mental health conditions associated with stress exposure were also found to have particularly strong associations with these indicators of health. These findings highlight the importance of examining exposures and mental health correlates across the life course in this important and understudied population.

VIEW PDF

Abstract 1343

ELECTROCARDIOGRAPHIC ABNORMALITIES AND STRESS PROTEINS IN WOMEN WITH PTSD IN VENEZUELA

Jose R. Pena, MD PhD, Internal Medicine, University of Carabobo, Valencia, Venezuela, Babette Weksler, MD, Medicine, Weill Medical College Cornell, New York, NY, Sabrina Islam, MD, Cardiology, Drexell Medical College, Philadelphia, PA, Maria A. Lopez, Psy, Psychology, Psychotrauma University of Carabobo, Valencia, Venezuela, Cesar A. D'Hoy, Psy Tech, Psychology, Metropolitan University of Caracas, Caracas, Venezuela, Jose M. Poveda, MD PhD, Psychiatry, University Autonoma of Madrid, Madrid, Spain

Introduction/Background : Research on socio-political conflicts has focused on the association between political violence, economic instability, psychological trauma, and health as is the current situation in Venezuela. Post-Traumatic Stress Disorder (PTSD) is associated with high levels of sympathetic activation of the autonomic nervous system, therefore individuals with PTSD have a high propensity for electrocardiographic (ECG) abnormalities. Heat Shock Proteins (Hsps) play a role in protecting cardiac cells against ischemic injury and ant ibodies against these Hsps are associated with the development and prognosis of atherogenesis, coronary heart disease and hypertension. In stressed patients Hsps antibodies have been associated with abnormal ECG; therefore we investigated the association of ECG abnormalities and the level of Ant i-Hsps 60 in chronic PTSD. Method: This is a research in progress of a case control study of Venezuelan women diagnosed with chronic PTSD (n=25) due to political violence and healthy controls (n=25) matched by age. Clinical exam, resting standard 12-lead ECG, routine laboratory tests, 2 psychosocial tests [the life event scale (Holmes) and the Stress Reactivity lndex (SRI-32)] were performed, a blood sample was collected and serum frozen for determination of Anti-Hsp60 antibodies. Results: 48% of women with chronic PTSD showed short PR (< 0.12 sec) interval in the ECG versus no abnormality found in controls (PR interval in all controls >0.14 seconds). 75% of PTSD patients referred to tachycardia. The mean Antihsp60 level in PTSD patients was 330ng/ml versus 181ng/ml in controls (P<0.05). Pearson correlation showed a moderate

tendency that the shorter the PR interval the higher the Anti-Hsp60 concentration. Psychosocial test scores were high in both PTSD and controls.**Conclusions:** 48% of women with Chronic PTSD had abnormal short PR interval as compared tocontrols who had 0% PR abnormalities and 75% of patients had history of tachycardia versus no history of tachycardia in controls. The higher the concentration of Anti-Hsp60 the shorter PR interval (ECG) therefore the serum Anti-HSP 60 titer and abnormal short PR interval could serve as markers of cardiovascular risk in women with PTSD.

Abstract 1011

SERUM POLYUNSATURATED FATTY ACIDS AND RISK OF PSYCHIATRIC DISORDER AFTER ACUTE CORONARY SYNDROME: A PROSPECTIVE COHORT STUDY

Yutaka Matsuoka, MD, PhD, Health Care Research, National Cancer Center Japan, Tokyo, Japan, Hiroko Noguchi, PhD, Creating Happiness Incubation, Musashino University, Tokyo, Japan, Akihiro Yamashita, MD, PhD, Psychiatry, National Disaster Medical Center, Tokyo, Japan, Tomomi Narisawa, MS, Ryo Okubo, MD, PhD, Health Care Research, National Cancer Center Japan, Tokyo, Japan, Kei Hamazaki, MD, PhD, Public Health, University of Toyama, Toyama, Japan

Purpose of the study Accumulated evidence have shown a robust association between depression and increased morbidity and mortality after acute coronary syndrome (ACS). Omega 3 polyunsaturated fatty acids (n-3 PUFAs) have been reported to play an important role "resilience" in the etiology of cardiovascular disease and depression and other psychiatric disorders. We previously reported that high serum linoleic acid level immediately after cardiac event predicted new-onset psychiatric disorder at 3 months (Yamashita et al, 2017). Hence, this study is aimed to investigate effects of PUFAs after ACS onset and comorbid psychiatric disorder at 6 months. Subject sample and statement of methods Subjects were ACS patients consecutively admitted to the National Disaster Medical Center, Tokyo. Psychiatric morbidity was measured using structured clinical interview at 6 months after percutaneous coronary intervention. At baseline, serum n-3 PUFAs and n-6 PUFAs were measured by gas chromatography and patients were interviewed to evaluate medical and psychosocial information. Multiple logistic regression analysis was performed to calculate odds ratios (ORs) and 95% confidence intervals (95%CI) to examine the association between serum PUFAs at baseline and psychiatric disorder after ACS. This study was approved by the Ethics Committee of the National Disaster Medical Center and we obtained written informed consent for participation in this study.

Summary of results Between March 2014 and September 2016, 280 patients were taken percutaneous coronary intervention. Of 176 patients, 101 met the inclusion criteria, 100 completed the follow-up assessment. Eight patients (8%) showed some form of psychiatric disorder at 6 months, mainly depression (major, n=4; minor, n=1), agoraphobia (n=3) and PTSD (full, n=1; partial, n=1). Psychiatric disorder was predicted by baseline serum linoleic acid level (OR=4.57, 95%CI=1.01-20.68), Body Mass Index (OR=1.24, 95%CI=1.08-1.53), and Hospital Anxiety and Depression Scale total score (OR=1. 49, 95%CI=1.09-2.01) at baseline. No significant associations were seen with other PUFAs. Serum linoleic acid at baseline remained to be significant risk factor for developing psychiatric disorder at 6 months. Dietary education to reduce intake of linoleic acid-containing foods is important to prevent psychiatric disorder for ACS high risk population.

Abstract 1228

THE EFFECTIVENESS OF INTERVENTIONS TO TREAT MEDICALLY-INDUCED POSTTRAUMATIC STRESS DISORDER: A SYSTEMATIC REVIEW

Mytra Haerizadeh, BA, Jennifer Sumner, PhD, Jeffrey L. Birk, PhD, Center for Behavioral Cardiovascular Health, Christopher Gonzalez, MD, Medicine, Reuben Heyman-Kantor, BA, Center for Behavioral Cardiovascular Health, Columbia University Medical Center, New York, NY, Liliya Gershengoren, MD, Psychiatry, Weill Cornell Medical College, New York, NY, Peter Shapiro, MD, Psychiatry, Donald Edmondson, PhD, MPH, Medicine and Psychiatry, Ian M. Kronish, MD, MPH, Medicine, Columbia University Medical Center, New York, NY

Background: Acute medical events such as myocardial infarction and cancer diagnosis can induce posttraumatic stress disorder (PTSD). The optimal treatment of PTSD in this context is unknown. This systematic review examined the effectiveness of treatments for PTSD secondary to medical illness.

Methods: A literature search of 6 biomedical electronic databases was conducted from database inception to January 2016. Studies were eligible if they used a randomized design and evaluated treatments for medical illness-induced PTSD in adults. Studies that evaluated PTSD induced by a non-medical event which resulted in medical conditions (e.g. combat injuries) were not included. Two authors assessed study eligibility based on abstract and then full text review, with consensus achieved with a third author. Data pertaining to study characteristics were extracted and quality was assessed using the Cochrane Risk of Bias Assessment Tool.

Results: The search identified 3327 unique articles and 6 trials met inclusion criteria. Studies ranged in size from 21 to 81 patients and included patients with PTSD induced by cardiac disease, cancer, HIV, multiple sclerosis, and stem cell transplantation. All trials were of at least moderate quality. All assessed psychological interventions. 3 trials investigated a type of cognitive behavioral therapy (CBT: conventional CBT, prolonged exposure therapy, and relaxation therapy) versus a control group. 3 trials compared types of CBT (conventional CBT, imaginal exposure, and relaxation therapy) with eve movement desensitization and reprocessing (EMDR). In 2 studies comparing CBT with a control, CBT decreased PTSD symptoms compared to the control group, with modest to moderate effect sizes (Hedges' g 0.35, 95% CI -0.09-0.79, and Hedges' g 0.68, 95% CI 0.10-1.25, respectively). There was no difference between CBT and the control in a third study. Two studies found EMDR to be more effective in reducing PTSD symptoms compared to CBT and imaginal exposure, respectively. One study found no difference between EMDR and relaxation therapy in reducing PTSD symptoms.

Conclusions: CBT is a promising approach to reducing medically-induced PTSD symptoms, though few RCTs have investigated interventions for PTSD in this setting. Future studies are needed to better understand if CBT, EMDR, or other interventions are effective in treating medically-induced PTSD.

<u>Early Life Adversity</u> Friday, March 9 from 3:05 to 4:20 pm

Abstract 1447

EFFECTS OF CHILDHOOD TRAUMA, DAILY STRESS AND EMOTIONS ON DIURNAL CORTISOL LEVELS IN INDIVIDUALS VULNERABLE TO SUICIDE

Daryl B. OConnor, PhD, Branley Dawn, PhD, Jessica Green, MSc, Psychology, University of Leeds, Leeds, United Kingdom, Eamonn Ferguson, PhD, Psychology, University of Nottingham, Nottingham, United Kingdom, Rory O'Connor, PhD, Psychology, University of Glasgow, Glasgow, United Kingdom

Objectives: Suicide is a global health issue. Dysregulated hypothalamic-pituitary-adrenal (HPA) axis activity, as measured by cortisol levels, has been identified as one potential risk factor for suicide. Recent evidence has indicated that blunted cortisol reactivity to stress is associated with childhood trauma. The current study investigated whether childhood trauma and daily stressors and emotions were associated with diurnal cortisol levels over a 7-day study. Methods: 154 participants were recruited and grouped according to history of previous suicidal attempt, suicidal ideation or as control participants. Participants completed background questionnaires including the Childhood Trauma Questionnaire before commencing at 7-day daily diary study. Cortisol samples were provided immediately upon waking, +15 mins after waking, +30 mins, +45 mins, + 3 hours, +6 hours, + 9 hours and +12 hours on 7 consecutive days. Measures of daily stressors, mood and defeat and entrapment were completed at the end of each day. Diurnal cortisol slope was calculated as the change in cortisol from the peak following waking to late analysed using evening. Data were multi-level modelling. Results: Participants who had made a previous suicide attempt exhibited significantly flatter diurnal cortisol slopes across the 7 days compared to participants in the control group; suicide ideators were intermediate to both groups. Childhood trauma was found to be associated with flatter diurnal cortisol slopes, such that individuals who had experienced higher levels of trauma exhibited flatter cortisol slopes across the day. In particular, physical abuse was identified as being the most important subscale. Higher levels of daily defeat/entrapment were found also to be associated with a flatter diurnal cortisol slope. Conclusions: These results extend other findings from the laboratory into naturalistic settings and indicate that dysregulated hypothalamic-pituitary-adrenal (HPA) axis activity is associated with suicidal behaviour. Childhood trauma and perceptions of defeat/entrapment may be important proximal and distal factors associated with the development of HPA axis dysregulation. The challenge for researchers is to elucidate the precise causal mechanisms linking trauma, cortisol and suicide risk in order to develop interventions to help build resilience in vulnerable populations.

Abstract 1417

INFLUENCE OF CHILDHOOD ADVERSITY ON METABOLOMIC PROFILING IN OVERNIGHT URINE

Shaoyong Su, PhD, Population Health Sciences, Augusta University Medical College of Georgia, Augusta, GA, Michael Stefanek, PhD, Psychology, Augusta University College of Science and Mathematics, Augusta, GA, Frank Treiber, PhD, Center of Economic Excellence, Medical University of South Carolina College of Nursing, Charleston, SC, Gregory Harshfield, PhD, Population Health Sciences, Augusta University Medical College of Georgia, Augusta, GA, Harold Snieder, PhD, Epidemiology, University Medical Center Groningen, Groningen, Netherlands, Xiaoling Wang, MD PhD, Population Health Sciences, Augusta University Medical College of Georgia, Augusta, GA

Background: We recently reported that adverse childhood experiences (ACEs) were associated with elevated 24-hour ambulatory BP, particularly in nighttime. However, the underlying biological mechanisms remain unclear. Metabolome, referring to a full set of metabolites, represents a variety of physiologic, metabolic and cellular biochemical processes of living systems in response to any stimuli. We hypothesize that exposure to ACEs can induce a series of metabolic biochemical changes and the altered metabolite profiles may facilitate the identification of early stress-related pathways.

Methods: We selected 20 black young males who reported severe exposure to ACEs and 20 matched controls with no ACEs. Overnight urine samples were collected, and a sensitive high-throughput UPLC-MS/MS method was applied.

Results: A total of 681 compounds of known identity were identified in urine. A significant increase in tryptophan-derived inflammatory metabolites such as kynurenine and xanthurenate was found in stress exposed subjects (P<0.05), indicating elevated inflammation in response to stress, as well as a significant decrease in branched amino acid (BCAA) metabolism (e.g. tiglylcarnitine and isovalerylcarnitine) and fatty acid conjugated carnitines (e.g. octanoylcarnitine and decanoylcarnitine), suggesting altered fatty acid beta oxidation and potential differences in mitochondrial function.

Conclusions: We found that young adults with high levels of early life stress showed differences in a number of metabolites in overnight urine compared to their counterparts with no ACEs, suggesting potential metabolomic homeostasis shifts in several pathways including inflammation, fatty acid beta oxidation and mitochondrial function. A larger scale of study is warranted to minimize noise, improve the statistical power and clarify the role of these metabolite changes in the risk of cardiovascular disease.

Abstract 1426

CHILDHOOD ADVERSITY AND LEVELS OF CORTISOL AND DHEA IN ADOLESCENCE

Lotte van Dammen, MSc, Obstetrics and gynaecology, University of Groningen, University Medical Center Groningen, Groningen, Netherlands, Susanne R. de Rooij, PhD, Biostatistics and Bioinformatics, Academic Medical Centre, University of Amsterdam, Amsterdam, Netherlands, Pia Behnsen, MSc, Psychology, Education and Child Studies, Erasmus University Rotterdam, Rotterdam, Netherlands, Anja C. Huizink, PhD, Developmental Psychology, VU University Amsterdam, Amsterdam, Netherlands

Background: Childhood adversity has been demonstrated to increase the risk of impaired mental health and general wellbeing in later life. Developmental programming of the HPA-axis has been suggested to underlie this association. Cortisol and dehydroepiandrosterone (DHEA) are both output hormones of the HPA-axis, the latter received little attention from researchers thus far. **Methods:** A total of 215 Dutch adolescents consented to participation in the study and filled out the 27-item Adverse Life Events Questionnaire for the assessment of childhood adversity, divided into a person-related and environment-related sub score. Cortisol and DHEA concentrations and cortisol:DHEA ratio were determined in proximal 3 cm long hair segments, which reflect hormone secretion over the three-month-period prior to hair sampling. Additionally, saliva samples were collected immediately after waking up, 30 minutes after waking up, at

noon and at 8 pm. Multiple linear regression analyses were used to test associations separate for boys and girls, with age and pubertal development as covariates. Results: 74 boys and 116 girls with a mean age of 15.7 years (SD=2.0) participated. The outcomes showed significant higher DHEA levels in the last month and 3 months in girls with more person-related adversity, and in boys with more environment-related adversity. Hair cortisol levels in the last month and the last 3 months were only higher in boys with more person-related adversity. A trend towards significance was observed for a negative association between environment-related adversity and mean cortisol:DHEA over the last 3 months in boys only. The saliva cortisol day curve showed a trend towards lower cortisol secretion in boys with environment-related adversity (first morning sample: [F(1, 31)=3.122, P=0.087]; mid-day sample: [F(1, 31)=3.558, P=0.069], compared to boys without adversity. A significant lower evening cortisol was observed in girls with person-related adversity, compared to girls without adversity [F(1, 49)=4.108,P=0.048]. Conclusion: Adolescents with more childhood adversity had higher levels of cortisol and DHEA in hair, but a tendency to lower saliva cortisol levels during the day or evening. In addition, we found uncoupling of adversity effects on DHEA in boys and girls, for respectively environment-related and person-related adversity.

Abstract 1196

CHILDHOOD TRAUMA ASSOCIATES WITH GLUCOCORTICOID RESISTANCE, SUPPRESSED CORTISOL RESPONSE, AND ELEVATED PERIPHERAL INFLAMMATION IN RESPONSE TO A PROVOCATIVE LIFE STRESSOR

Catherine P. Walsh, MS, Psychology, University of Pittsburgh, Pittsburgh, PA, Linda J. Ewing, PhD, RN, Jennifer L. Cleary, BS, Alina D. Vaisleib, MA, Chelsea H. Farrell, MA, Psychiatry, University of Pittsburgh Medical Center, Pittsburgh, PA, Katarina Gray, BS, Anna L. Marsland, PhD, RN, Psychology, University of Pittsburgh, Pittsburgh, PA

Childhood trauma (CT) confers increased risk of poor physical and mental health outcomes in adulthood and maladaptive responses to life stress; however, biological pathways underlying these associations remain unclear. Proposed pathways include dysregulation of HPA-axis and immune system functioning. Indeed, CT has been shown to confer epigenetic impairment in glucocorticoid receptor expression that may explain dysregulated HPA-axis and inflammatory responses to adulthood life stress. Caring for a child with cancer is a provocative life stressor; although most mothers cope well, caregivers with Hx of CT may be at increased risk for poor mental and physical health outcomes. Here, we examined 120 mothers (aged 18-56, 86%Caucasian) within one month of their child's initial cancer diagnosis. We assessed history of CT (Childhood Trauma Questionnaire(CTQ)), psychological distress (composite of POMS: anger, anxiety, depression, 4-item PSS, and SF-36: nervous, downhearted and blue, down in the dumps), glucocorticoid resistance (GCR: in vitro whole blood assay), hair cortisol (CORT; avg of 2nd&3rd months prior to Dx), and circulating levels of interleukin(IL)-6. In path analyses adjusted for age, education, race, BMI, child's cancer treatment intensity, and CTQ minimization/denial, we found a best fit model wherein CT positively associated with GCR (β =.480,p=.003), GCR associated with depressed levels of CORT (β =-.311,p=.012), and suppressed levels of CORT predicted elevated levels of peripheral IL-6 (B=-.256,p=.029). A model including distress response as a mediator between CT and GCR and/or CORT did

not reveal significant mediation, nor did it improve model fit. Alternate models specifying a direct effect of CT on CORT, CORT driving GCR, and GCR predicting levels of peripheral IL-6 revealed poor fit to the data. Our data suggests that CT may associate with early biological programming that promotes glucocorticoid resistance and dampened CORT responses to a provocative life stressor. Further, we elucidate a plausible biological pathway between CT and elevated levels of peripheral inflammation, a marker of increased health risk. Identifying and exploring molecular mechanisms through which early life experiences may confer health risk is important in developing targeted treatment strategies for this vulnerable population. Supported by American Cancer Society RSG118367

Abstract 1460

EARLY LIFE ADVERSITY IS ASSOCIATED WITH CORTICAL ACTIVATION DURING SLEEP

Matthew R. Cribbet, PhD, Psychological Sciences, Texas Tech University, Lubbock, TX, Ryan C. Brindle, PhD, Ellen Frank, PhD, Psychiatry, University of Pittsburgh Medical Center, Pittsburgh, PA, Julian F. Thayer, PhD, Psychology, The Ohio State University, Columbus, OH, Robert T. Krafty, PhD, Biostatistics, University of Pittsburgh, Pittsburgh, PA, Martica H. Hall, PhD, Psychiatry, University of Pittsburgh Medical Center, Pittsburgh, PA

Early life adversity (ELA) confers risk for physical health problems in adulthood. Research suggests that ELA may alter the development of regulatory systems that govern immune and neuroendocrine pathways that impact physical health. As a key regulatory system, sleep is a plausible pathway linking ELA and adult physical health. Prior research has focused on associations between ELA and self-reported sleep in adulthood. Aside from moving beyond self-reports, polysomnography (PSG) assessed sleep provides a plausible physiological mechanism for testing associations between ELA and adult physical health. We hypothesized that ELA would be positively associated with cortical activation during sleep and negatively associated with sleep depth. Participants (N=108;Mage=60.17(9.01);65% Female) completed demographic, perceived stress, social support, childhood socioeconomic status (SES) measures, and the Trauma History Questionnaire, a self-report retrospective measure that captures age, frequency and total number of adverse life events across several domains. ELA was defined as the total number of adverse events multiplied by the frequency of each event occurring before age 18. Following mental health and sleep diagnostic interviews, participants slept in the laboratory, while continuous electroencephalogram (EEG) data were collected using PSG. Spectral analysis was applied to the EEG data to derive delta and beta power during NREM sleep, measures of sleep depth and cortical activation during sleep, respectively. In regression analyses controlling for age, gender, BMI, insomnia and major depression diagnoses, childhood SES, social support, perceived stress, and adverse life events in adulthood, ELA was significantly positively associated with cortical activation during sleep (b=0.009,t=2.396,p=0.019,R²=.249). ELA was unrelated to sleep depth (p>.41). In follow-up analyses, physical and sexual abuse, $(b=0.023, t=2.352, p=0.024, R^2=.372)$, but not crime-related events or exposure to general disasters (ps>.05) were associated with cortical activation during sleep. These results are important, as cortical activation during sleep is associated with dysregulation of neuroendocrine and immune pathways that have downstream effects on physical health. Identifying pathways linking ELA and adult health is critical for developing interventions and mitigating future health risk.

<u>Cancer & Social Relationships</u> Friday, March 9 from 3:05 to 4:20 pm

Abstract 1009

STAYING HEALTHY AFTER CANCER: THE HIDDEN INFLUENCE OF SOCIAL NETWORKS

Jennifer L. Guida, PhD, MPH, Basic Biobehavioral and Psychological Sciences Branch, National Cancer Institute/National Institutes of Health, ROCKVILLE, MD, Hongjie Liu, PhD, MS, Xin He, PhD, Cher Dallal, PhD, Epidemiology and Biostatistics, Cheryl Holt, PhD, Robert Gold, PhD, MS, Community and Behavioral Health, University of Maryland, College Park, MD

Background: Social networks may confer resilience for cancer survivors, however, few rigorous empirical studies have used social network models to investigate changes to the relationships most important to cancer survivors and their effects on health. The objective of this study was to longitudinally examine the associations between egocentric social network change over time and physical, physiological, and mental health among cancer survivors and older adults without a history of cancer.

Method: The National Social Life Health and Aging Project (NSHAP) (2004-2011) is a nationally representative cohort of older adults aged 57 and older. Physical functioning was measured with the Activities of Daily Living Scale and inflammation was measured by C-reactive protein (CRP), tumor necrosis factor-alpha (TNF- α), and vascular endothelial growth factor (VEGF). Depressive symptoms were measured with the 11-item version of the Centers for Epidemiologic Studies Depression (CES-D) Scale. Multiple logistic and linear regression and structural equation modeling were used to assess the relationships of interest.

Results: Older cancer survivors and older adults without cancer experienced similar social network changes over time. In the overall NSHAP sample, adding new network members was protective of functional decline [odds ratio (OR): 0.64, 95% confidence interval (CI): 0.41-0.99] and experiencing a change in the frequency of contact was positively associated with functional decline (OR: 1.92, 95% CI: 1.15- 3.20). CRP levels were significantly 26% lower among cancer survivors who added two network members compared to those who added no network members. Experiencing a change in the frequency of contact was associated with a 19% higher level of TNF- α . Social support was directly associated with depressive symptoms and did not vary by cancer status. No mediation effects between social support, inflammation, and depressive symptoms were observed in path models and latent variable models.

Conclusion: Together these results suggest that when new relationships form or when stable relationships remain strong over time, their effects on health are positive. Alternatively, negative health effects may emerge when relationships become weaker over time. This study provides timely information to develop effective interventions for cancer survivors and older adults.

Abstract 1310

DISTRESS AND UNMET SUPPORTIVE CARE NEEDS DURING CANCER TREATMENT AFFECT THE QUALITY OF LIFE IN EARLY CANCER SURVIVORSHIP FOR HAEMATOLOGICAL CANCER SURVIVORS- A LONGITUDINAL STUDY Devesh V. Oberoi, PhD, Psychosocial Oncology, Cummings School of Medicine, University of Calgary, Calgary, AB, Canada, Victoria M. White, PhD, Psychological Oncology, Deakin University, Melbourne, Australia, John F. Seymour, PhD, H. Miles Prince, PhD, Simon Harrison, PhD, Michael Jefford, PhD, Oncology, Peter MacCallum Cancer Centre, Melbourne, Australia, David Hill, PhD, Centre for Behavioural research in Cancer, Cancer Council Victoria, Melbourne, Australia, Damien Bolton, PhD, Surgery, Austin Health, Melbourne, Australia, Jeremy Millar, PhD, Radiation Oncology, Alfred Health, Melbourne, Australia, Nicole Wong W. Doo, PhD, haematology, University of Sydney, Sydney, Australia, Graham Giles, PhD, Cancer Epidemiology Centre, Cancer Council Victoria, Melbourne, Australia

Aim: The study aimed to examine the influence of anxiety, depression and unmet supportive care needs on quality of life (QoL) during follow up care phase in multiple myeloma (MM) and diffuse large B-celllymphoma (DLBCL) patients. Methods: MM and DLBCL patients were recruited through the populationbased Victorian Cancer Registry in the sate of Victoria, Australia's secod largest State. Data were collected through two telephone interviews: (T1) on average 7 months postdiagnosis, (T2) on average 15 months post doagnosis. Quality of Life (OoL) was examined at T2 using the Functional Assessment of Cancer Therapy (FACT-G) scale. The Hospital Anxiety and Depression Scale (HADS) measured anxiety and depression, and the Supportive Care Needs Survey (SCNS) measured unmet needs at T1. Multivariate linear regression examined associations between QoL subscales (physical, emotional, social and functional wellbeing and overall QoL) and T1 anxiety, depression and unmet needs. Results: The sample was aged on average 63.82 (SD: ± 11.08) years at diagnosis. Mean (SD) time since diagnosis at T1 was 6.71 (±1.98) months and time between T1 and T2 was 8.38 (±0.89) months, which did not differ by cancer type. While most unmet needs domains had weak-to- moderate correlations with anxiety and depression, T1 physical needs were strongly correlated with T1 depression. Except physical well-being, all other OoL subscales and overall OoL were significantlyassociated with T1 anxiety. All OoL subscales and overall QoL were significantly associated with T1 depression. Only patient care needs were associated with physical and social well-being and overall QoL. Conclusion: Anxiety, depression and patient care unmet needs during treatment were associated with diminished physical and emotional well-being in the following Findings patient's months. show that addressing psychological distress alone is not sufficient to ensure improved QoL in future. Unmet supportive care needs, particularly the patient care needs and physical and daily living needs, during treatment need to be addressed for potentially improved QoL in the follow-up care phase.

VIEW PDF

Abstract 1284

BREAKING THE STEREOTYPE: WHY MEN WITH GI CANCERS JOIN SUPPORT GROUPS

Maryam Qureshi, Ba Psychology, Psychology, Oncology, Linda Carlson, Ph. D., R. Psych, Medicine, Psychology, University of Calgary, Calgary, AB, Canada, Celestina Martopullo, MSw, Psychosocial Oncology, Alberta Health Services, Calgary, AB, Canada

Introduction: Support groups in cancer care are typically only attended by women, and often not even offered to men, under the
assumption that men are uncomfortable sharing emotions in groups. When groups are offered they are usually focused on education and not emotional support, and often participation is restricted to men with prostate cancer. This innovative mixedmethods study challenged assumptions by offering supportive expressive group therapy to men with GI cancers, and exploring who joined and why. We examined demographic and diseaserelated characteristics as well as levels of distress, motivations for joining, and expectations of benefit. Method: Demographics, distress level, and quality of life were assessed through quantitative surveys. Qualitative interviews were conducted with men before they started the program, or within the first few weeks of attending, and analyzed thematically for distress disclosure, factors that motivated men to join, and their hopes and expectations for the group. Preliminary Results: 31 men consented to the study over the period of years. All men were diagnosed with GI cancers and ranged in age from 28 to 72. Questionnaires showed lower quality of life and higher anxiety than population norms but lower mood disturbance than norms, before beginning the group. Interview analysis showed that men were motivated to join for several reasons including: encouragement from family or medical teams, the fact that it was gender-specific, because they had an open-minded attitude or an active coping style. Hopes and expectations for the group included: sharing, learning, comparing, helping and coping.

Conclusion: the myriad reasons that men identified for joining and long-term group attendance counters the idea that men are not interested in attending such support groups. Further interviews were conducted with men once they had attended the support group for 3 and 6 months, which will be analyzed and presented in the future. This data should help us better understand if men's hopes were realized in the groups, potential benefits identified from participation, and factors that support group continuation.

Abstract 1494

CANCER CAREGIVERS' POST-TRAUMATIC STRESS SYMPTOMS RELATED TO THEIR NEUROENDOCRINE STRESS BIOMARKERS

Hannah-Rose Mitchell, MPH, Psychology, University of Miami, Coral Gables, FL, Armando Mendez, PhD, Medicine, University of Miami, Miami, FL, Amanda Ting, BS, Patricia Pedreira, BS, Youngmee Kim, PhD, Psychology, University of Miami, Coral Gables, FL

Background: Cancer can present post-traumatic stress symptoms (PTSS) to family caregivers as a secondary trauma. PTSS include symptom clusters of hyper-arousal, intrusive thoughts, and avoidance, which may be associated with physiological stress response markers. The current study examined relations between PTSS clusters and neuroendocrine biomarkers in family cancer caregivers around the time of diagnosis and treatment.

Method: Caregivers of colorectal cancer patients, who were diagnosed newly and recently, participated in the study (N=95, age M=49, 74% female, 31% spouse of the patient, 64% Hispanic, time since diagnosis M=3 months). Caregivers completed a questionnaire and provided four daily saliva samples on two consecutive days. Predictors were self-reported PTSS clusters (hyper-arousal, intrusive thoughts, avoidance: Impact of Events Scale). Saliva was assayed for alpha-amylase (sAA) and cortisol. Area under the curve with respect to increase (AUCI) and ground (AUCG) of sAA and cortisol served as outcomes. Age, gender, ethnicity, relationship to patient, and income served as covariates.

Results: Caregivers reported substantially heightened levels of PTSS (22% met criteria suggesting clinical levels). After controlling for covariates, general linear modeling revealed that among the 3 PTSS clusters, hyper-arousal related to higher AUCI of sAA (β =.22, *p*=.03), but lower AUCG of cortisol (β =.45, *p*=.03). Intrusive thoughts related to lower AUCI of sAA (β =-.50, *p*=.02). Avoidance did not relate to neuroendocrine outcomes.

Conclusion: Findings demonstrate psychological and physiological effects of cancer on the family, and suggest that hyper-arousal and intrusive thought symptoms differentially relate to caregivers' dysregulated cortisol and AA. Future research should examine how specific physiological responses associated with PTSS clusters may influence cancer caregivers' long-term health outcomes. Assessment of PTSS shortly after cancer diagnosis may help identify caregivers at risk for physical health effects who could benefit from psychological interventions aimed to treat cancer-related PTSS.

Abstract 1312

ADULT ATTACHMENT, CAREGIVING STRESS, AND DHEA-S CHANGE PREDICT PSYCHOLOGICAL DISTRESS OF CANCER CAREGIVERS

Youngmee Kim, PhD, Amanda Ting, BS, Hannah-Rose Mitchell, MPH, Marcella May, MA, Charles S. Carver, PhD, Psychology, University of Miami, Coral Gables, FL

Background: Elevated levels of psychological distress have been documented among family caregivers of adult patients with chronic illness. Unknown, however, is how interpersonal relationship quality is related to cancer caregivers' psychological distress. This study aimed to examine the extent to which caregivers' relationship quality with the patient, and perceived caregiving stress, link to psychological distress and to explore its neuroendocrine pathways among cancer caregivers.

Method: Family caregivers of newly diagnosed colorectal cancer patients (*n*=118, 3 months post-diagnosis, 50 years old, 71% female, 55% Hispanic, 36% spouse) completed a questionnaire and provided saliva samples. Relationship quality was measured using the MAQ that yielded two-factor dimensions: Anxiety and Dependence; and perceived caregiving stress using the Stress Overload subscale of the Pearlin Stress Scale. Psychological distress was measured using the CES-D for depressive symptoms (DS) and the IES-R for post-traumatic stress symptoms (PTSS). Cortisol, alpha-amylase (AA), and DHEA-s were assayed from saliva samples that were collected at awakening and bedtime on two consecutive days, which served as neuroendocrine mediators. Age and gender served as covariates.

Results: Elevated DS and PTSS were reported (37.3% and 20.3% met the criteria suggesting clinical levels, respectively). SEMs testing main effects revealed that greater anxious attachment and caregiving stress related to greater DS (β > .25) and PTSS (β > .21), and higher awakening AA and DHEA-s marginally related to greater DS and PTSS (β > .17). Greater changes in DHEA-s during the day related to greater DS (β =.21). SEMs including interaction terms between attachment and caregiving stress showed no significant interaction effects.

Conclusion: Illness in the family affects the family caregivers' health, which is readily manifested soon after the cancer diagnosis and initiation of treatment, supporting interpersonal relationship theories and biobehavioral models. Interventions specifically targeting anxiety-prone caregivers early in the patients' illness trajectory may be beneficial to help prevent the development of depressive and post-traumatic stress symptoms. Future studies should examine prospective long-term health

outcomes, diverse indicators of relationship quality and health, and sociocultural moderators.

<u>Cortisol</u>

Friday, March 9 from 4:35 to 5:50 pm

Abstract 1503

CHRONIC STRESS IS ASSOCIATED WITH CORTISOL RECOVERY FROM ACUTE STRESS AMONG WOMEN BUT NOT MEN

Alexander Fiksdal, MA, Luke Hanlin, MA, Yuliya Kuras, MA, Danielle Gianferante, PhD, Psychology, Brandeis University, Waltham, MA, Nicolas Rohleder, PhD, Psychology, Friedrich Alexander Universität, Nuremberg, Germany

Background: Chronic stress is often associated with poor health and is thought to negatively impact the body's ability to effectively respond to stressors. Dysregulation of the hypothalamic pituitary adrenal (HPA) axis has also been implicated as a contributing factor for a variety of diseases and may help explain how chronic stress can negatively impact health. Methods: Participants were 130 adults aged 18-65 (median age=20 yrs, 52.3% female) who took part in three separate studies between 2009 and 2016. All participants completed the Trier Social Stress Test (TSST) and provided saliva samples before and after testing. Schedules varied slightly by study, but all included samples immediately before, after, and every 10-15 minutes until 1 hour post-TSST. Chronic stress was assessed using the Trier Inventory for Chronic Stress (TICS). Cortisol concentrations were log transformed to adjust for skewness. Eighty-eight participants aged 18-65 (median age=20 yrs, 51.1% female) were classified as cortisol responders based on the -.32 log nmol/l baseline-adjusted increase criterion described by Miller et al. (2013) and are the focus of this study. Reactivity was defined as baseline-to-peak increases of log cortisol concentrations. Cortisol recovery was analyzed using multilevel modeling incorporating time from peak as a level 1 predictor. Age and BMI were included as covariates in all models, and cortisol baselines and baseline-to-peak increases were included in all multilevel models. Results: Neither chronic stress (β =-.05, p=.31) nor sex (β =-.05, p=.63) predicted baselineto-peak log cortisol increases. Their interaction was also not statistically significant (β =.03, p=.55). Sex moderated cortisol recovery such that females had significantly flatter recovery slopes than males [β =.004, F(1,232.1)=11.62, p<.001]. TICS alone did not moderate recovery from stress [β =-.0001, F(1,232.5)=.08, p=.77]. However, the interaction of TICS and Sex did moderate recovery such that under conditions of greater chronic stress women, but not men, exhibited flatter recovery slopes [β =.003, F(1,230.6)=4.25, p=.04]. Conclusions: These results suggest that sex may play an important role in how chronic stress impacts HPA axis functioning and health, and highlight the importance of examining both reactivity and recovery when analyzing HPA axis responses to stress.

Abstract 1288

CORTISOL AWAKENING RESPONSE MEDIATES THE PROSPECTIVE ASSOCIATION BETWEEN SLEEP PROBLEMS IN ADOLESCENCE AND DEPRESSIVE SYMPTOMS IN EARLY ADULTHOOD

Kate R. Kuhlman, Ph.D., Psychology & Social Behavior, University of California Irvine, Irvine, CA, Jessica J. Chiang, Ph.D., Psychology, Northwestern University, Evanston, IL, Julienne E. Bower, Ph.D., Psychology, Michael R. Irwin, M.D., Semel Institute for Neuroscience and Human Behavior, UCLA, Los Angeles, CA, Ronald Dahl, M.D., Community Health Sciences, University of California Berkeley, Berkeley, CA, Teresa Seeman, Ph.D., Medicine and Epidemiology, Heather McCreath, Ph.D., Medicine, UCLA, Los Angeles, CA, David Almeida, Ph.D., Human Development and Family Studies, Pennsylvania State University, University Park, PA, Andrew J. Fuligni, Ph.D., Semel Institute for Neuroscience and Human Behavior, UCLA, Los Angeles, CA

Background: Sleep disturbance is a symptom of, and a wellknown risk factor for, depression. Atypical functioning of the HPA-axis has been linked to the pathogenesis of depression. This study aims to identify a neurobiological pathway, HPA-axis functioning, through which sleep disturbance may lead to depressive symptoms during the development phase of greatest risk for depressive disorders. Methods: We examined the prospective association between sleep disturbance and depressive symptoms during the transition to adulthood in a sample of 157 individuals (61.8% female). Further, we examined the role of adolescent HPA-axis functioning in the prospective association between sleep disturbance and depressive symptoms. Results: Individuals (age 17-18) with greater sleep disturbance, measured via the Pittsburgh Sleep Quality Inventory (PSQI), demonstrated greater depressive symptoms, measured via the Center for Epidemiological Studies - Depression Scale (CESD), two years later (age 19-20). We also found that this association was partially mediated by adolescent cortisol awakening responses (CAR) (indirect effect = 0.11, 95%CI[.003,.32]), such that individuals with greater sleep disturbance had greater CAR and individuals with greater CAR in adolescence had greater depressive symptoms two years later. Conclusions: Persistent sleep disturbance may up-regulate components of the body's physiological stress response system resulting in a larger CAR in a way that contributes to the development of depression. Effective treatment of sleep disturbance during late adolescence may be a lucrative psychosocial intervention target that has the potential to mitigate risk for depression during emerging adulthood.

VIEW PDF

Abstract 1453

OVERCOMING STATISTICAL CHALLENGES WHEN DEVELOPING A PROTOTYPICAL CORTISOL RECOVERY MODEL IN RESPONSE TO THE TRIER SOCIAL STRESS TEST (TSST)

William K. Goodman, M.A., Psychology, Brandeis University, Waltham, MA, Johanna Janson, M.Sc., Psychology, Friedrich Alexander University Erlangen Nürnberg, Erlangen, Germany, Jutta M. Wolf, Ph.D., Psychology, Brandeis University, Waltham, MA

Background: Dysfunctions in stress response systems are closely tied to both physical and mental well-being. Specifically, the stress-related activation of the hypothalamus-pituitary-adrenal (HPA) axis and associated release patterns of its end hormone cortisol have been extensively studied. Less focus, however, has been placed on the subsequent recovery of peripheral cortisol levels, despite emerging evidence suggesting links between disordered recovery and health relevant outcomes. This paucity of recovery data in the literature as well as inconsistencies in study protocols across studies create barriers to identifying healthy and disordered recovery patterns. The purpose of the present systematic review is to provide a discussion of statistical challenges and pitfalls related to modeling cortisol recovery data. Methods: Searches were conducted using standard databases for English language only studies in peer-reviewed journals published. Key words included Trier Social Stress Test, TSST, Cortisol, Modified TSST, and Laboratory Stressor. 124 studies have met our inclusion criteria of healthy human participants without systemic immunological or endocrine dysfunction.

Data synthesis and Results: First, the current study will review the advantages and disadvantages of common types of analysis (hierarchical linear models, area under the curve, and piecewise growth curve modeling). The major statistical challenges thereby relate to decisions concerning adjustment for peak latency of cortisol and differential effects of data preparation, e.g., standardization vs. centering. Next, we will be using cortisol data (n=155 sub-samples) extracted from the n=124 identified studies, with each study representing an approximation of how cortisol recovers, to demonstrate how meta-analytic growth curve modeling can advantageously handle these complex statistical challenges (e.g. limited sampling during recovery). Specifically, we will show how this approach allows the characterization of a prototypical cortisol recovery curve. This will then build the basis for subsequent evaluation of the effects of TSST protocol variations and cortisol responsivity on cortisol recovery.

Abstract 1537

APPROXIMATING DIURNAL CORTISOL PROFILE MEMBERSHIP IN SMALLER SAMPLES

Natalia O. Dmitrieva, PhD, Psychological Sciences, Northern Arizona University, Flagstaff, AZ, Mattie R. McClaskey, Tianna E. Jordening, Psychological Sciencs, Northern Arizona University, Flagstaff, AZ, Jennifer R. Piazza, PhD, Health Science, California State University, Fullerton, Fullerton, CA, Susan T. Charles, PhD, Psychology and Social Behavior and Nursing Science, University of California, Irvine, Irvine, CA, David M. Almeida, PhD, Human Development and Family Studies, The Pennsylvania State University, University Park, PA, Carl F. Pieper, DrPH, Biostatistics and Bioinformatics, Duke University Medical Center, Durham, NC

Background: Recent studies have demonstrated the utility of analytic approaches that simultaneously model longitudinal mixtures or classes in diurnal cortisol. This work supports that a robust diurnal cortisol profile is characterized by a marked increase in levels 30-45 minutes after awakening, and a gradual decline throughout the rest of the day. In contrast, deviations from this profile may manifest as blunted diurnal trajectories that are either hypoactivated or elevated. These two deviations have been associated with poorer health and well-being. Despite the utility of longitudinal latent class models, these approaches are often computationally intensive and require exceedingly-large sample sizes. Objective: The current study presents two simple methodological short-cuts that allow researchers with smaller diurnal cortisol datasets to assign participants into their respective diurnal cortisol profiles without conducting longitudinal latent class models. Methods: The current study used previouslyestablished 3 day-centered profiles of diurnal cortisol from a national study of 1,101 adults residing in the United States (NSDE; N=2,894 days of cortisol collection). Four within-day cortisol values (i.e., cortisol values at waking, 30-min post waking, pre-lunch and pre-bedtime) were the independent variables predicting most likely class membership, or observed average posterior probabilities within each class. Results: There was high agreement between "observed" (by growth mixture modeling) and "predicted" (by multinomial logistic regression) class membership (unweighted Cohen's $\kappa=0.835$, p<.0001). Adjusted r-squared coefficients from multiple regression models

indicated that the four independent variables explained a high percent of variance in average posterior probabilities within each class (62.5% in the hypoactive flattened class, 28.3% in the hyperactive elevated class, and 53.7% in the normative class). **Conclusion**: The current study demonstrates how relatively small diurnal cortisol datasets can be utilized to examine subgroups of diurnal cortisol profiles. Although there are important limitations to this approach (e.g., class membership is treated as an observed rather than a latent phenomenon), this work presents an applied method that can translate results of latent class models to research and clinical settings.

Abstract 1535

DEXAMETHSONE SUPPRESSION TEST, DEPRESSION-RELATED MEMORY BIAS, AND EARLY LIFE EMOTIONAL ABUSE

Allison E. Gaffey, PhD, Behavioral Sciences, Rush University Medical Center, Chicago, IL, Roxanne M. Hoks, BA, Psychiatry, University of Wisconsin-Madison, Madison, WI, Erin C. Walsh, PhD, Psychiatry, University of North Carolina-Chapel Hill, Chapel Hill, NC, Carlton P. Frost, MPH, Heather C. Abercrombie, PhD, Psychiatry, University of Wisconsin-Madison, Madison, WI

Depression is associated with alterations in emotional memory bias, cortisol negative feedback, and cellular cortisol signaling. A variety of data suggest that cortisol alterations are due to early life stress rather than depression per se. Relatively little is known about whether negative feedback deficits are associated with emotional memory bias. We investigated relations among cortisol suppression after dexamethasone and emotional memory formation in 63 women with varying levels of depression and/or early emotional abuse (EA). We measured severity of depression (Beck Depression Inventory II), EA (Childhood Trauma Questionnaire Emotional Abuse subscale), and memory for emotional pictures encoded during placebo or cortisol administration. On another occasion, we conducted a standard dexamethasone suppression test (DST). We replicated previous observations of an association between greater depression severity and reduced DST cortisol suppression. We found that severity of EA explained the relationship between depression severity and DST cortisol suppression, such that women with severe EA showed reduced cortisol suppression. Furthermore, even after accounting for depression and EA severity, reduced DST cortisol suppression predicted negative memory bias. However, acute cortisol administration abolished the relation between DST cortisol suppression and memory bias. These findings corroborate previous research suggesting that negative feedback deficits in depression may stem from history of early life stress. The findings further suggest that negative memory bias (a core feature of depression) is related to variation in negative feedback, and that exogenous cortisol administration may eliminate the association between negative memory bias and cortisol negative feedback deficits.

<u>Neuroscience</u> Friday, March 9 from 4:35 to 5:50 pm

Abstract 1089 INCREASED SYSTEMIC INFLAMMATION ASSOCIATED WITH ENHANCED REWARD RELATED BRAIN FUNCTION IN EMERGING ADULTHOOD Iris Ka-Yi Chat, MA, Robin Nusslock, PhD, Psychology, Northwestern University, Evanston, IL, Daniel P. Moriarity, MA, Psychology, Temple University, Philadelphia, PA, Gregory E. Miller, PhD, Psychology, Northwestern University, Evanston, IL, Lauren B. Alloy, PhD, Psychology, Temple University, Philadelphia, PA

Background: Both animal and human research indicates that reduced reward-related brain function is associated with elevated peripheral inflammation. Preliminary evidence suggests that abnormally elevated reward sensitivity is also associated with increased inflammation. This suggests that distinct and opposite profiles of reward sensitivity can lead to the same phenotypic outcome - elevated inflammation. To further examine this issue, the present study examined the relationship between rewardrelated brain function and peripheral inflammation among individuals at moderate versus heightened self-reported reward sensitivity. Method: Participants were 75 demographically diverse adults (mean age = 20.93 years; 53% female) from an ongoing longitudinal study of reward sensitivity and mental and physical health. Self-reported reward sensitivity was assessed using Behavioral Activation System (BAS) total scale and the Sensitivity to Reward Subscale of the Sensitivity to Punishment and Sensitivity to Reward Questionnaire (SPSR-R). Participants were categorized into the high reward sensitivity (HR) group for scoring above the 85th percentile on both BAS and SPSR-R, or the moderate reward sensitivity (MR) group for scoring between the 40th and 60th percentile. All participants completed the monetary incentive delay (MID) task during fMRI to assess neural activity during reward anticipation. A priori regions of interest (ROI) included the ventral striatum (VS) and orbitofrontal cortex (OFC). To measure inflammatory markers, serum was collected via antecubital venipuncture and assayed using the Meso Scale Discovery Human ProInflammatory 7-Plex Base Kit. A composite score of inflammatory markers IL-6, IL-8, IL-10, and TNFa was computed. Age, sex, BMI, handedness, and lifetime bipolar disorder diagnosis were included as covariates. Results: There was a significant interaction between self-reported reward sensitivity and inflammation for activity in the OFC during reward anticipation (b = 0.40, t = 2.41, p < 0.05). Specifically, greater OFC activation during reward anticipation was uniquely observed among participants in the HR group who had elevated inflammation. Conclusion: Results suggest that elevated inflammatory signaling may amplify the relationship between reward hypersensitivity and reward-related brain function.

Abstract 1444

INDIVIDUAL DIFFERENCES IN AESTHETIC ENGAGEMENT ARE REFLECTED IN RESTING-STATE FMRI CONNECTIVITY: IMPLICATIONS FOR STRESS RESILIENCE

Paula G. Williams, Ph.D., Brian Curtis, M.S., Kimberley Johnson, B.S., Psychology, Jace B. King, MBA, Psychiatry, Jeff S. Anderson, M.D., Ph.D., Neuroradiology, University of Utah, Salt Lake City, UT

Aesthetic experiences involve being moved by art and beauty and absorbed in music and nature. Recent research identified individual differences in aesthetic engagement as a possible stress resilience factor. Individuals higher in the Aesthetics facet of the personality factor Openness to Experience demonstrate less blood pressure reactivity to stress and greater physiological and affective "positive engagement" during a laboratory stress task compared to their low-aesthetically engaged counterparts. To investigate potential mechanisms, the current study utilized resting state functional MRI scans from 1000 subjects in the

Human Connectome Project (HCP) to examine the neural substrates underlying individual differences in reported aesthetic engagement and proneness to "aesthetic chill" responses. As part of the HCP questionnaire battery, participants completed the NEO-Five Factor Inventory. The Aesthetic Interests subcluster of the Openness scale, identified in previous factor analytic studies, was used to characterize individual differences in aesthetic engagement. Resting state fMRI connectivity was extracted for 361 regions in the brain including cortical, subcortical and cerebellar regions for each subject, using subject-specific segmentation and parcellation of subcortical gray matter nuclei and a network-based statistics analytical approach. Participants reporting higher aesthetic engagement, and particularly those reporting frequent aesthetic chill responses, exhibited significantly higher connectivity between the default network and sensory and motor cortices, higher connectivity between the ventral default and salience networks, and decreased connectivity between the cerebellum and somatomotor cortex. The default network, thought to process internal narrative and cognition, may therefore be more integrated with neural representations of sensory perception and salience detection, suggesting a mechanism for aesthetic appreciation. Weakened connections between the cerebellum and somatomotor cortex may contribute toward paroxysmal motor movements associated with aesthetic chill. Individual differences in aesthetic engagement may reflect general integration of environmental perception with internal emotional experience, which in turn may facilitate comfort with novelty, self regulation, and positive adaptation to potentially stressful experiences.

Abstract 1423

MODIFICATION OF ELECTROENCEPHALOGRAPHIC (EEG) DERIVED BRAIN TOPOLOGY ASSOCIATED WITH PATIENT-REPORTED SYMPTOMS OF FATIGUE IN CHEMOTHERAPY INDUCED PERIPHERAL NEUROPATHY (CIPN)

Sarah Prinsloo, PhD, Palliative, Rehabilitation, and Integrative Medicine, Diane Novy, PhD, Larry Driver, MD, Pain Medicine, Lois Ramondetta, MD, Gynecologic Oncology, Cathy Eng, MD, Gastrointestinal Oncology, The University of Texas MD Anderson Cancer Center, Houston, TX, Randall Lyle, PhD, Marriage and Family Therapy, Mount Mercy University, Cedar Rapids, IA, Lorenzo Cohen, PhD, Palliative, Rehabilitation, and Integrative Medicine, The University of Texas MD Anderson Cancer Center, Houston, TX

Background: Cancer-related fatigue (CRF) occurs in 60% to 90% of patients with cancer and typically increases over the course of cancer treatment. CRF has effects on concentration, cognition, physical, social and psychological functioning. We have demonstrated that there are baseline electroencephalographic (EEG) signatures associated with patients suffering with chemotherapy-induced peripheral neuropathy (CIPN), and that modification of those signatures via a brain computer interface (neurofeedback; NFB) can reduce patient reported symptoms, including fatigue. Here we examine EEG 'signatures' and patient reported outcomes to better understand CRF in CIPN, and how modifications of brain regions resulted in decreased fatigue. Methods: Patients with CIPN (N=71; mean age 63 years; 62 female) completed baseline questionnaires and underwent a resting state EEG. They were then randomized to a NF group (n=35) and underwent 20 sessions of electroencephalography (EEG) NF or a wait-list control group (WL; n=36); the WL control was offered NFB at the end of their time in the trial. At baseline we examined power,

current source density, phase lock, and connectivity of ROIs in patients who reported global fatigue at 5 or above (n=22) and 4 or below (n=38) in a rating scale of 0 (no fatigue) to 10 (extreme fatigue). We then compared ROIs with the Brief Fatigue Inventory (BFI). Correlational analyses determined the activity cerebral and association between symptom measures. Results: Correlation analysis demonstrated that in patients who reported higher levels of fatigue also show increased activity in the beta frequency band (13-21 HZ) along the sensory motor cortices compared to those who reported lower levels of fatigue. Those who reported higher levels of fatigue also showed a decrease in phase lock between the central and parietal cortices; and theta frequency band (4-7 HZ) activity was enhanced from the sensory motor region and extending into the frontal regions. Modifying brain regions with NFB resulted in a reduction of patient reported fatigue. Conclusions: Patients with CIPN and higher levels of fatigue have cortical signatures that are different than those who report lower levels of fatigue. NFB can normalize brain regions which in turn is associated with decreased fatigue.

Abstract 1412

BRAIN MECHANISMS OF STRESS AND DEPRESSION IN CORONARY ARTERY DISEASE

J. Douglas Bremner, M.D., Psychiatry and Radiology, Carolina Campanella, Ph.D., Zehra Khan, M.D., Psychiatry, Negar Fani, Ph.D., Psychiatry & Behavioral Sciences, Emory University, ATLANTA, GA, Nicole Kasher, B.S., Epidemiology, Rollins School of Public Health, ATLANTA, GA, Sarah Evans, B.S., Collin Reiff, M.D., Sanskriti Mishra, M.D., Stacy Ladd, B.S., Psychiatry & Behavioral Sciences, Jonathon A. Nye, Ph.D., Ernest Garcia, Ph.D., Radiology, Emory University, ATLANTA, GA, Viola Vaccarino, M.D., Ph.D., Epidemiology, Rollins School of Public Health, ATLANTA, GA

Major depression is associated with an increased risk for and mortality from coronary artery disease (CAD), however the mechanisms by which this occurs are not clear. Depression, which is linked to stress, is associated with changes in brain areas involved in memory and the stress response, and it is likely that these regions play an important role in this increased risk. This study assessed the effects of stress on brain and cardiac function in patients with CAD with and without depression. Methods: CAD patients with (N=17) and without (N=21) major depression based on the Structured Clinical Interview for DSM-IV (DSM-IV) and/or a Hamilton Depression Scale score of nine or greater underwent positron emission tomography imaging of the brain with [O-15] water and single photon emission tomography (SPECT) imaging of the heart with [Tc-99m] sestamibi under mental stress (mental arithmetic) and control conditions. Results: Patients with CAD and major depression showed increased parietal cortex activation and a relative failure of medial prefrontal/anterior cingulate activation during mental stress compared to CAD patients without depression. Patients who became ischemic had increased activation in parietal, motor and sensory cortex and insula. Conclusions: These findings are consistent with a role of prefrontal/cingulate brain areas, implicated in stress and depression, in the mechanism of increased risk for CAD morbidity and mortality in patients with the diagnosis of major depression.

Abstract 1019

SOCIAL MODULATION OF THE MICROGLIAL RESPONSE TO CEREBRAL ISCHEMIA

Monica M. Gaudier-Diaz, PhD, Psychology and Neuroscience, University of North Carolina, Chapel Hill, Chapel Hill, NC, Adam H. Haines, BS, Medicine, Albert Einstein College of Medicine, Bronx, NY, Ning Zhang, MD, A. Courtney DeVries, PhD, Neuroscience, The Ohio State University, Columbus, OH

Social isolation is a major risk factor for disease. Despite supportive evidence from animal and human studies, the mechanisms by which social environment influences health remain underspecified. In affiliative species, social isolation presents a psychological stressor, capable of activating the hypothalamic pituitary adrenal axis and altering gene expression of immune cells. In response to stress, innate immune cells of the central nervous system, microglia, can become primed and will exert a maladaptive response to additional immune stimulation. Thus, we hypothesized that social isolation can sensitize microglia, and that an exaggerated inflammatory response underlies the detrimental consequences of isolation on disease; specifically, cerebral ischemia induced by blood flow restriction to the brain.

Following a week of social isolation, male mice displayed increased hippocampal and cortical gene expression of major histocompatibility complex II, serving as the first indication of isolation-induced microglial priming. To investigate social modulation of microglial reactivity to cerebral ischemia, experimental animals received a cardiac arrest/cardiopulmonary resuscitation (CA/CPR) or sham procedure a week after the housing manipulation; following 2 or 24 hours of recovery, microglia samples were enriched and analyzed for gene expression. At 2 hours microglia exhibited ischemia-induced inflammation, characterized by the gene expression increase of tumor necrosis factor alpha (TNFa), interleukin 1 beta (IL1b) and interleukin 6 (IL6), regardless of the housing conditions. However, at 24 hours, social attenuation of the inflammatory response was evident; the ischemia-induced increased expression of IL1 and IL6 was exacerbated in isolated mice. A follow-up study examined physiological measures at 96 hours postischemic injury, to investigate the impact of microglial reactivity profile on inflammation and cell death. At this later time point, measures of hippocampal IL1b, cortical TNFa, and counts of Fluoro Jade C positive cells in the hippocampal CA1 region, were intensified among the socially isolated mice. These data indicate that the social isolation exacerbates ischemia-induced neuroinflammation and neurodegeneration, and suggests microglia priming as a possible mechanism underlying the detrimental effects of social isolation on cerebral ischemia outcome

<u>Pain & Physical Symptoms</u> Saturday, March 10 from 11:45 am to 1:00 pm

Abstract 1436

PHYSICAL SYMPTOMS ARE MORE ABOUT STRESSFUL PERSONS, NOT STRESSFUL DAYS : THE ASSOCIATION BETWEEN EXPOSURE TO STRESSORS AND PHYSICAL SYMPTOMS IN LATER LIFE

Hye Won Chai, M.A., Human Development and Family Studies, Pennsylvania State University, University Park, PA, Susanna Joo, M.A., Child and Family Studies, Yonsei University, Seoul, Korea, Republic Of, David M. Almeida, Ph.D, Human Development and Family Studies, Pennsylvania State University, University Park, PA

Objective: The directionality of the association between exposure to stressors and physical symptoms remain unclear. Exposure to

stressors may lead to higher physical symptoms, while physical symptoms may also trigger higher exposure to stressors. In addition, whether these associations differ at within-person and between-person level also requires attention. Therefore, this study examined daily-level and person-level associations between stressor exposure and physical symptoms.

Methods: This study used data from the second wave of the National Study of Daily Experiences (NSDE). NSDE is a national survey that conducted telephone interviews about respondents' daily experiences across eight consecutive days. A subsample of NSDE used in this study were 1,124 participants aged 45 years and older (56% female, mean age = 60.35). Physical symptoms were measured as number of daily physical symptoms experienced, such as headache and muscle pain. Daily stressors were measured as number of stressors experienced, such as interpersonal conflict and stress at work and home. Multilevel models with lagged variables were used to examine daily level and person level associations between number of stressors and physical symptoms.

Results: At the daily level, more physical symptoms in the previous day was associated with higher number of stressors the next day ($\beta = 0.03$, p < .01). However, previous day exposure to stressors was not associated with next day physical symptoms. At the person level, people who had more physical symptoms on average had higher average exposure to stressors ($\beta = 0.03$, p < .01). Those who had higher exposure to stressors had more physical symptoms ($\beta = 0.70$, p < .01). The models controlled for gender, age, education, household income, race, self-reported physical health, self-reported mental health, and chronic health conditions.

Conclusions: These results show that although physical symptoms affect stressor exposure at the daily level, the effect of stressor exposure does not carry over to next day physical symptoms. At the person level, those who experience more stressors had more physical symptoms. These indicate that a) more physical symptoms is related to higher exposure to stressors at both daily and person level, and b) physical symptoms is a response to a person's overall level of exposure to stressors, rather than daily experiences of stressors.

Abstract 1534

ASSOCIATIONS BETWEEN THE DEVELOPMENT OF CLINICAL PAIN AND LABORATORY PAIN INTENSITY IN INNER-CITY WOMEN

Allison E. Gaffey, PhD, Frances Aranda, Ph.D., John W. Burns, Ph.D., Behavioral Sciences, Yanina A. Purim-Shem-Tov, M.D., Emergency Medicine, Helen J. Burgess, Ph.D., Behavioral Sciences, Rush University Medical Center, Chicago, IL, Jean C. Beckham, Ph.D., Psychiatry, Duke University School of Medicine, Durham, NC, Stephen Bruehl, Ph.D., Anesthesiology, Vanderbilt University Medical Center, Nashville, TN, Stevan E. Hobfoll, Ph.D., Behavioral Sciences, Rush University Medical Center, Chicago, IL

Inconsistent evidence indicates that sensitivity to laboratory pain may predict clinical pain (Edwards et al., 2004; Gracely, 1999). Extant research has primarily been cross-sectional, and has often focused on individuals with chronic pain rather than examining if associations between laboratory and clinical pain develop over time. As clinical pain progresses, it may become more closely and negatively associated with sensitivity to laboratory pain tasks. According to the "stress-induced analgesia" model, greater psychological distress (like that connected with clinical pain) may activate the endogenous pain modulatory system and effectively *decrease* subjective pain perception on laboratory

tasks (Kraus et al., 2009). To further explore these associations, we assessed an inner-city sample of women (N=180; M_{Age} = 28.62, 61% African American) presenting to the Rush University Medical Center Emergency Department reporting acute physical pain (unrelated to physical trauma). Participants engaged in a laboratory thermal pain task and rated associated pain intensity. Participants also provided psychosocial and health information that is relevant to pain including sleep, negative affect (i.e., anger), social stress (i.e., social undermining), and clinical pain ratings. The pain task and questionnaires were completed again 3 and 6 months later. We hypothesized 1) lower laboratory pain intensity would be associated with greater clinical pain intensity, and 2) these associations would only be significant at 6 months. Regression models were conducted to predict clinical pain intensity at each time point: Step 1 included sleep, negative affect and social stress and Step 2 included lab pain intensity. All models were significant (p's = .033 to < .001). At 3 and 6 months, there was a significant effect of laboratory pain intensity on clinical pain intensity ($\beta = -.194$, p = .009; $\beta = -.200$, p = .005), whereas lower laboratory pain intensity was associated with greater clinical pain. Thus, lab pain may have an inverse association with clinical pain and the association may become more entrenched over time. Future studies would similarly benefit from using longitudinal designs, as well as including other factors known to influence pain (e.g., PTSD symptoms), to further understand how psychophysiological associations underlying pain may develop over time.

Abstract 1182

PERCEPTUAL CONTRIBUTIONS TO RACIAL BIAS IN PAIN RECOGNITION

Peter Mende-Siedlecki, PhD, Jennie Qu-Lee, MA, Jennie Qu-Lee, MA, Robert Backer, MS, Department of Psychological and Brain Sciences, University of Delaware, Newark, DE, Jay J. Van Bavel, PhD, Department of Psychology, New York University, New York, NY

Decades of research suggest that the pain of Black Americans is systematically under-diagnosed and under-treated, compared to the pain of their White counterparts. While other work has examined social cognitive factors driving such biases (e.g., failures in empathy, biased judgments of status, stereotypes about biological differences between Blacks and Whites), we tested whether racial bias in pain recognition might stem from a perceptual source, as well. (Intervening on these low-level biases in perception may ultimately prove more feasible than changing explicit beliefs and prejudices.) First, we developed and normed a novel stimulus set – a large database of facial expressions of pain, which was designed to be diverse in terms of race, gender, and expression variability. Next, across a series of behavioral experiments (total N = 994), we tested whether race shapes the threshold for pain perception, and if so, whether this bias is associated with subsequent discrepancies in care. We consistently observed that White participants have more stringent thresholds for recognizing pain on Black faces versus White faces. Further, we found that this bias is indeed perceptual in nature - arising from a disruption in configural processing associated with otherrace faces — and that it cannot be explained by differences in low-level stimulus features (e.g., luminance or contrast), or subjective evaluations related to pain (e.g., masculinity, dominance, etc.). We even observed racial bias in pain perception when facial structure and expression intensity were objectively equated across Black and White targets using computergenerated stimuli. Critically, across all experiments, we repeatedly observed that these biases in perception predict biases

in treatment recommendations, over and above explicit anti-Black bias, evaluations of status and strength, and endorsement of false beliefs regarding the Black body. Finally, we observed that increased intergroup contact (measured by White isolation in the participant's home county) was associated with a decrease in racial bias in pain perception. These data both illuminate the perceptual underpinnings of disparities in pain care, and lay the groundwork for developing new techniques to bridge those gaps.

Abstract 1030

CAN OXYTOCIN ENHANCE PLACEBO EFFECTS IN PAIN AND ITCH?

Aleksandrina Skvortsova, M.Sc., Dieuwke Veldhuijzen, Ph.D., Henriët Van Middendorp, Ph.D., Health, Medical and Neuropsychology, Leiden University, Leiden, Netherlands, Omer Van den Bergh, Ph.D., Health Psychology, KU Leuven University of Leuven, Leuven, Belgium, Andrea Evers, Ph.D., Health, Medical and Neuropsychology, Leiden University, Leiden, Netherlands

Placebo effects relieve various somatic symptoms but it is yet unclear how they can be enhanced in order to maximize positive treatment outcomes. Oxytocin may potentially be a mediator of placebo effect due to its trust enhancing and stress relieving actions. In this study we investigated the influence of positive verbal suggestions and oxytocin on treatment expectations and placebo effects for pain and itch. A randomized, placebocontrolled study was conducted in which 108 female participants were allocated to one of four groups: 1) oxytocin with positive verbal suggestions, 2) placebo with positive verbal suggestions, 3) oxytocin without suggestions, and 4) placebo without suggestions. The administration of 24 IU oxytocin or a placebo spray was preceded by positive verbal suggestions regarding the pain- and itch-relieving properties of the spray or no suggestions, depending on group allocation. Pain was assessed with a cold pressor test and itch was assessed with histamine iontophoresis. Positive verbal suggestions indeed induced expectations of lower pain (F = 4.77, p = .031) and itch (F = 5.38, p = .022). Moreover, positive verbal suggestions elicited placebo analgesia (F=5.48, p=.021), but did not decrease itch. No effect of oxytocin either on pain and itch expectation or on placebo effect was found. Future studies should focus on how oxytocin might influence placebo effects, taken into account the role of gender, dose-dependent effects and various expectation manipulations.

VIEW PDF

Abstract 1293

IS THERE A SEX DIFFERENCE IN SUSCEPTIBILITY TO NAUSEA AND MOTION SICKNESS? SUBJECTIVE AND PHYSIOLOGICAL DATA SUPPORT DIFFERENT CONCLUSIONS.

Max Levine, PhD, Psychology, Siena College, Albany, NY

Background: Numerous studies have claimed to demonstrate a significant sex difference in susceptibility to nausea in a variety of evocative contexts. Women, such reports maintain, are more likely than men to report nausea, and to experience it as more severe. These studies are based largely on self-reports of symptoms, however, which suggests a subjective response bias may be responsible for the observed differences. The purpose of the present study was to examine the existence of a sex difference in the experience of nausea induced by the illusion of self-motion assessed by both subjective self-report and physiological responses. **Method:** 155 participants (57 male) were exposed to a

rotating optokinetic drum for a maximum of 16 minutes. Ratings of nausea were obtained from participants at two minute intervals throughout their exposure to the drum. Electrogastrograms (EGGs) were obtained in order to monitor the development of gastric dysrhythmia, which is an objective marker for nausea that typically accompanies subjective reports. It was hypothesized that men would report less severe nausea than women, but that men and women would exhibit similar levels of gastric dysrhythmia. Results: As predicted, nausea ratings were higher on average among women than men, but the difference was not statistically significant (p>.05). Contrary to the hypothesis, estimates of gastric dysrhythmia obtained from the EGG did indicate a sex difference, and in the unexpected direction. Men exhibited significantly more gastric dysrhythmia than women, t(153)=2.42, p=.02, and significantly less normal gastric activity, t(153)=-2.15, p=.03. Conclusion: As subjective reports of physical symptoms are inherently variable, these results should not be considered a compelling contradiction of the results of previous studies, but do raise questions about the consistency of the alleged sex difference. That men exhibited significantly more gastric dysrhythmia suggests that women may only be regarded as more susceptible to nausea and motion sickness when subjective reports of symptoms are used as the basis for comparison. Women may feel freer to honestly express symptoms they are experiencing, whereas men may fear negative evaluation by admitting they are suffering or in need of relief. When objective assessments of nausea were employed, men actually appeared to be more vulnerable than women.

<u>Stress & Emotion</u> Saturday, March 10 from 2:30 to 3:30 pm

Abstract 1119

DAILY NEGATIVE AFFECT UNDERLIES THE LINKS BETWEEN SOCIOECONOMIC STATUS, DAILY CORTISOL ACTIVITY AND ALL-CAUSE MORTALITY

Ledina Imami, M.A., Psychology, Samuele Zilioli, Ph.D., Psychology and Family Medicine, Wayne State University, Detroit, MI

Socioeconomic status (SES) is a well-established predictor of longevity, with risk for mortality increasing toward the lower end of the SES spectrum. Although many studies have documented this association, important questions remain regarding the psychobiological pathways that connect SES to mortality risk. Building on evidence that suggests that being part of socioeconomically disadvantaged groups can contribute to depression and anxiety, we hypothesized that daily negative emotional experiences would serve as psychological mediators of the link between SES, daily cortisol activity, and mortality.

Methods: In a sample of U.S. adults drawn from the MIDUS project (N = 1325) we tested longitudinal associations between SES, daily negative emotional experiences, daily cortisol activity, and all-cause mortality over the course of 10 years. Participants completed an 8-day daily diary study where they reported on daily affect and provided saliva samples for cortisol assessment. Daily negative affect was classified in three clusters reflecting experiences of depression (e.g., ashamed, sad), anxiety (e.g. nervous, afraid), and hostility (e.g., angry, frustrated). Hierarchical linear modeling was used to model daily cortisol activity and empirical Bayes residuals were used to obtain individual differences in cortisol slope.

Results: Higher SES was linked to steeper ("healthier") cortisol slope through lower levels of daily depression. Furthermore, this sequential link between depressive affect and cortisol slope also explained the association between SES and mortality. Negative emotional experiences related to anxiety and hostility were not significantly associated with cortisol activity or mortality.

Discussion: These findings suggest that daily negative emotional experiences may constitute important psychological mechanisms underlying the links between SES and mortality. Future research should continue to investigate if distinct aspects of negative emotionality (such as depression vs. anxiety and/or hostility) may show specific associations with biological processes related to health and longevity.

Abstract 1162

EMOTIONAL AND AUTONOMIC NERVOUS SYSTEM RESPONSES TO SOCIAL STRESS: THE PHYSIOLOGICAL AND EMOTIONAL REACTIVITY (PHEMORE) STUDY

Willem J. Kop, PhD, Nina Kupper, PhD, Medical and Clinical Psychology; Center of Research on Psychology in Somatic diseases (CoRPS), Tilburg University, Tilburg, Netherlands

Background: Exaggerated cardiovascular reactivity and delayed recovery are potential risk factors for cardiovascular disease. Acute psychological challenges result in emotional responses that may influence physiological reactivity. The James-Lange theory predicts a positive correlation between the magnitude of emotional and physiological responsiveness. However, most studies have not found strong associations between these two domains of reactivity. We tested the hypotheses that the magnitude of negative emotions during provocative social challenge is associated with physiological responses reflecting parasympathetic withdrawal and sympathetic activation.

Methods: Participants (N=702; mean age 20 ± 2 years, 71% women) performed the Trier Social Stress Test (TSST) which involves two subtasks, a speech task and a math task with mild harassment. Emotions were assessed prior to the TSST and immediately following the TSST. Physiological measures included blood pressure (SBP/DBP and heart rate (HR) at 90sec intervals) and continuous impedance-cardiography. The primary parasympathetic index was HF-HRV, the sympathetic index was per-ejection period (PEP), and overall autonomic response was indexed by SDNN and LF-HRV.

Results: The TSST resulted in significant responses in all emotional and physiological measures (p's<0.001). The level of tension during TSST-speech was significantly related to HR during speech (r=0.114). TSST-speech-induced sadness was correlated with DBP (r=0.130); all other correlations with BP and HR were <0.10. Analysis of impedance-based measures showed significant emotion-physiology correlations for feeling tense (r-HF-HRV=-0.102,r-LF-HRV=-0.147,r-SDNN= -0.130and stressed (HF-HRV=-0.088,r-LF-HRV=-0.114,r-SDNN=-0.128; all p<0.01). In addition, PEP was inversely related to hostilityrelated emotions during the TSST-math subtask (irritated r= -0.144, annoyed r=-0.145, angry= -0.138) whereas no such associations with PEP were found during the TSST-speech subtask (r'S> -0.72).

Discussion: Small but significant correlations were found between tension-related emotions and physiological measures of parasympathetic withdrawal during the TSST. In addition, hostility-related emotions during the math task were specifically associated with sympathetic activation (lower PEP) suggesting challenge-specific emotion-physiology response patterns.

Abstract 1081

RELATIVES EXPRESSED EMOTION IS RELATED TO POORER ADJUSTMENT IN PEOPLE RECENTLY DIAGNOSED WITH DEMENTIA AND TO DISTRESS IN RELATIVES

Alison J. Wearden, PhD, Roxanne Safavi, MRes, Katherine Berry, PhD, School of Health Sciences, University of Manchester, Manchester, United Kingdom

Caring for loved ones recently diagnosed with dementia can be rewarding but can also be burdensome and distressing for relatives. In turn relatives' responses may impact on the person with dementia, who may themselves have difficulty adjusting to the diagnosis. "Expressed Emotion" (EE) describes a set of key aspects of relatives' responses to people with health conditions (including criticism and emotional over-involvement) and has been shown to be robustly related to patient outcomes in psychiatric conditions. Previous work has examined the relationship between relatives' EE and symptoms, such as cognitive decline, in people with dementia, with inconsistent findings. We aimed to determine whether relatives' EE was related to a) psychological adjustment to dementia and b) to distress in relatives.

61 people recently diagnosed with dementia (34 [56%] male, mean age 72 years, SD 10.1) and their closest significant others (80% spouses) were recruited from UK dementia services and assessed at 2 time points 6 months apart. Significant others completed measures of burden and distress and were interviewed to obtain EE ratings; those with high levels of criticism and/or emotional over-involvement (EOI) according to conventional criteria were designated "High-EE". People with dementia completed measures of anxiety, depression, quality of life and cognitive functioning.

17 (34%) relatives were designated high-EE. After adjusting for baseline levels, people with dementia with high-EE significant others had higher levels of depression and anxiety at 6 month follow up than those with low-EE relatives. Specifically, relatives' criticism and EOI were related to depression and anxiety respectively in people with dementia. High-EE relatives were more distressed at time 1 and, controlling for baseline distress, became more distressed over 6 months than did low-EE relatives.

EE is related to psychological adjustment to dementia in both people with dementia and their relatives. Models of the cognitive and emotional underpinnings of EE have enabled the development of family based interventions in other conditions. Our work provides the basis for the development of an intervention to improve psychological adjustment to dementia for both people with dementia and their families.

Abstract 1415

ASSOCIATION OF PERSEVERATIVE THINKING DURATION WITH SUBJECTIVE STRESS AND AMBULATORY BLOOD PRESSURE

Jeffrey L. Birk, Ph.D., Talea Cornelius, Ph.D., Donald E. Edmondson, Ph.D., Joseph E. Schwartz, Ph.D., Medicine, Columbia University Medical Center, NEW YORK, NY

Background. Perseverative thinking (i.e., the tendency to dwell on negative cognitions about the past or future) has been hypothesized to contribute to risk for hypertension by prolonging the physiological stress response. For example, a predisposition to perseverate is associated with higher blood pressure (BP). Empirical evidence is needed to test the prolongation hypothesis directly at the level of individual perseverative thoughts in an ecologically valid framework. We assessed whether the duration of perseverative thinking was associated with higher momentary BP and whether this relationship might be mediated by subjective feelings of stress.

Method. Participants were part of the Masked Hypertension Study, assessing ambulatory BP and cardiovascular health (Phase 2 assessment; N = 437; $M_{Age} = 52.0$; 38% male). Ambulatory BP readings were taken every 30 minutes for 24 hrs, along with electronic diary questions asking participants to rate how overwhelmed they felt (scale: 0 to 10; M=2.15), if they had just been thinking about something that made them angry, sad, or worried, and, if so, for how long (0 up to "more than 8 minutes"). Multilevel models were used to test whether the associations of perseveration duration with systolic and diastolic BP were mediated by momentary feelings of being overwhelmed.

Results. Estimates are adjusted for demographics (e.g., age, body mass index) and other relevant factors (e.g., recent meal, posture). Longer duration of perseveration predicted higher systolic BP (B = .27 mmHg/min, p < .01) but not diastolic BP (B = .07 mmHg/min, p = .23). Longer duration of perseveration also predicted higher feelings of overwhelm (B = .29 points/min, p < .001), and greater overwhelm predicted higher BP (systolic BP: B = .31 mmHg/point, p < .001; diastolic BP: B = .23 mmHg/point, p < .001). The indirect effect of longer duration on elevated systolic BP was significant (B = .09, p < .05). The indirect effect for diastolic BP was not significant (B = .07, p > .05).

Conclusion. Duration of perseveration on unpleasant thoughts was associated with increased systolic BP on a momentary basis in participants' daily lives. Critically, this association was partially mediated by subjective stress. Future research should test whether interventions (e.g., distraction, mindfulness) can reduce BP by lowering time spent in perseveration.

Depression

Saturday, March 10 from 2:30 to 3:30 pm

Abstract 1122

PATHWAYS LINKING DEPRESSIVE SYMPTOMS AND HEART RATE VARIABILITY: A LONGITUDINAL TWIN DIFFERENCE STUDY

Minxuan Huang, ScM, Amit Shah, MD, MSCR, Epidemiology, Emory University Rollins School of Public Health, Atlanta, GA, Shaoyong Su, PhD, Department of Pediatrics, Georgia Prevention Institute, Augusta University, Augusta, GA, Jack Goldberg, PhD, Department of Epidemiology, University of Washington School of Public Health, Seattle, WA, Rachel J. Lampert, MD, Department of Medicine, Division of Cardiology, Yale University School of Medicine, New Haven, CT, Oleksiy M. Levantsevych, MBBS, Lucy Shallenberger, MPH, Pratik Pimple, MBBS, MPH, Department of Epidemiology, Emory University Rollins School of Public Health, Atlanta, GA, J. Douglas Bremner, MD, Department of Psychiatry and Behavioral Sciences, Emory University School of Medicine, Atlanta, GA, Viola Vaccarino, MD, PhD, Department of Epidemiology, Division of Cardiology, Emory University Rollins School of Public Health, Atlanta, GA

Introduction: Depressive symptoms are associated with lower heart rate variability (HRV), an index of autonomic dysregulation, but the direction of the association remains unclear. **Objective:** To investigate the temporal relationship between depression and HRV in a sample of twins examined twice over 7 years. **Methods:** We recruited middle-aged male twins (n=146, 73 pairs) from the Vietnam Era Twin (VET)

Registry, who were discordant for depression at baseline. At both visits, depressive symptoms were measured using the Beck Depression Inventory-II (BDI-II), and HRV through 24-hour electrocardiogram (ECG) monitoring. To assess the direction of the association, we examined cross-lagged within-pair differences in BDI and HRV using mixed-effects regression models and calculated standardized beta coefficients. This cross-lagged approach enabled us to examine the path from visit 1 BDI to visit 2 HRV and the converse. We progressively adjusted for baseline covariates, including potential confounding factors (smoking, beta-blocker use, education, alcohol use, physical activity, and history of coronary artery disease), cardiovascular risk factors, and antidepressant use. We also evaluated monozygotic (MZ) and dizygotic (DZ) twin pairs separately.

Results: The twins were 95% white, with a mean (SD) age of 54 (3) years at baseline. There were consistent associations between visit 1 HRV and visit 2 BDI across all HRV domains and models (beta-coefficients ranging from -0.15 to -0.23), which were not explained by other covariates. Similar associations were observed in the opposite pathway linking visit 1 BDI to visit 2 HRV, but were largely explained by antidepressant use (Figure). In stratified analysis by zygosity, significant associations were observed in both MZ and DZ twins for the path linking visit 1 HRV to visit 2 BDI, although the associations were slightly stronger in DZ twins.

Conclusions: Autonomic nervous system dysregulation, indexed by reduced HRV, is more likely a risk factor for depression, rather than a consequence. The opposite longitudinal association from depression to lower HRV is mostly driven by antidepressant medication use. These findings highlight an important role of the autonomic nervous system in the risk of depression, and contribute new understanding of the mechanisms underlying the comorbidity of depression and cardiovascular disease.

VIEW PDF

Abstract 1413

DEPRESSION RELATED DNA METHYLATION CHANGES: AN EPIGENOME-WIDE ASSOCIATION STUDY

Shaoyong Su, PhD, Xiaoling Wang, MD PhD, Population Health Sciences, Augusta University Medical College of Georgia, Augusta, GA, Frank Treiber, PhD, Center of Economic Excellence, Medical University of South Carolina College of Nursing, Charleston, SC, Harold Snieder, PhD, Epidemiology, University Medical Center Groningen, Groningen, Netherlands, J. Douglas Bremner, MD, Psychiatry and Behavioral Sciences, Emory University School of Medicine, Atlanta, GA, Jack Goldberg, PhD, Epidemiology, University of Washington School of Public Health, Seattle, WA, Viola Vaccarino, MD PhD, Yan V. Sun, PhD, Epidemiology, Emory University School of Public Health, Atlanta, GA

Background: There is emerging evidence suggesting a key role of epigenetics in the development of major depressive disorder. However, to date, very few studies have investigated depression related DNA methylation changes at a genome-wide level. The objective of this study is to identify DNA methylation sites that are associated with depressive symptoms using an unbiased epigenome-wide approach.

Methods: Genome-wide DNA methylation profiling (Illumina 450K BeadChip) of peripheral blood leukocytes was conducted in two independent cohorts: the Georgia Stress and Heart cohort (N=331) and the Emory Twins Study (N=250). Depressive symptoms were assessed using the Beck Depression Inventory

(BDI) in both cohorts. General linear regression model and mixed linear model were used to examine the associations between methylation levels of each CpG site and BDI scores in these two cohorts, respectively. We then performed a meta-analysis by using the inverse variance and fixed effect model implemented in the Metal package. Overrepresentation of gene ontology categories was examined by gene set enrichment analysis (GSEA).

Results: Meta-analysis revealed 166 differentially methylated CpG sites that were associated with depressive symptoms (false discovery rate <0.05), of which 60 (36%) were positively and 106 (64%) negatively associated with BDI scores. Seven CpG sites were significant after Bonferroni correction (raw p values <1.11'10⁻⁷). The genes that these 7 CpG sites were located in or nearest

were *HMGB1P29*, *PTPRN2*, *ADCYAP1R1*, *SOX11*, *DAB1*, *RPL2* 4P2 and *CES2*. GSEA also identified several pathways associated with psychiatric disorders, including cell adhesion molecules and adherens junction.

Conclusions: Our results provided evidence that depression is associated with DNA methylation levels in blood leukocytes. Further studies are warranted to replicate these epigenetic associations with depression as well as whether such methylation changes can lead to altered gene expression in relevant cell types and tissues.

Abstract 1004

MICROVASCULAR FUNCTION AND COGNITIVE PERFORMANCE AMONG INDIVIDUALS WITH MAJOR DEPRESSION

Patrick J. Smith, PhD, MPH, James A. Blumenthal, PhD, Psychiatry and Behavioral Sciences, Duke University Medical Center, Durham, NC, Alan Hinderliter, MD, Medicine, University of North Carolina at Chapel Hill, Chapel Hill, NC, Andrew Sherwood, PhD, Psychiatry and Behavioral Sciences, Duke University Medical Center, Durham, NC

Background: Neurocognitive deficits are common among individuals with major depressive disorder (MDD)¹ and have been associated with cerebrovascular (CVD) risk factors, as well as subclinical vascular disease. While previous studies have focused on conduit artery functioning² and structural markers of atherosclerosis (e.g. carotid artery plaque), no studies, to our knowledge, have examined markers of microvascular function and neurocognition among individuals with MDD. Methods: We conducted a follow-up analysis of neurocognition and microvascular function among individuals in the SMILE-II trial.³ Participants were assessed at baseline, prior to randomization. Neurocognition was assessed using a test battery comprised of 10 subtests, assessing Executive Function, Working Memory, and Verbal Recall.² Brachial artery hyperemic flow was assessed from the forearm following blood pressure cuff occlusion. Intima medial thickness was measured from the far wall of the left and right carotid arteries. Linear regression analyses were used to examine the associations between CVD risk factors, atherosclerosis (intima medial thickness [IMT]), and hyperemic flow. Results: Participants included 202 middle-aged and older adults, free from clinically significant neurocognitive impairment (mean age 51.7 years [SD = 7.6]). Greater CVD risk factors (r = -0.46, P < .001), age (r = -0.33, P < .001), and intima medial thickness (r = -0.25, P = .001) were associated with lower hyperemic flow. Lower hyperemic flow was associated with poorer Executive Function (r =0.23, P =.001), Working Memory (r = 0.21, P = .003), and Verbal Recall (r = 0.19, P = .007). Lower hyperemic flow tended to remain associated with poorer

Verbal Recall after accounting for background characteristics, CVD risk factors, and IMT (b = 0.18, P = .071; Figure 1), whereas the associations with Executive Functioning (P = .658) and Working Memory (P = .895) were attenuated.

Discussion: Microvascular disease is associated with memory deficits among middle-aged adults with MDD, free from neurocognitive impairment. In addition, conduit artery function and microvascular function may affect different domains of cognitive functioning.

VIEW PDF

Abstract 1414

MEASUREMENT INVARIANCE OF THE PATIENT HEALTH QUESTIONNAIRE-9 (PHQ-9) DEPRESSION SCREENER IN U.S. ADULTS ACROSS SEX, RACE/ETHNICITY, AND EDUCATION LEVEL: NHANES 2005-2014

Jay S. Patel, B.A., Psychology, Indiana University-Purdue University Indianapolis (IUPUI), Indianapolis, IN, Youngha Oh, MEd, Educational Psychology, Research, Evaluation, Measurement, and Statistics (REMS), Texas Tech University, Lubbock, TX, Kevin L. Rand, PhD, Wei Wu, Phd, Psychology, Indiana University-Purdue University Indianapolis (IUPUI), Indianapolis, IN, Kurt Kroenke, MD, Medicine, VA HSR&D Center for Health Information and Communication, Indianapolis, IN, Jesse C. Stewart, PhD, Psychology, Indiana University-Purdue University Indianapolis (IUPUI), Indianapolis, IN

Despite its widespread use in clinical and behavioral medicine research settings, little is known about the psychometric performance of the Patient Health Questionnaire-9 (PHQ-9) across major U.S. sociodemographic groups. Thus, utilizing a large U.S. representative sample and confirmatory factor analysis (CFA) we tested the factor structure and factorial measurement invariance of the PHQ-9 across sex, race/ethnicity, and education level. We used data from NHANES 2005-2014 - a crosssectional, epidemiologic study designed to assess the health and nutritional status of the U.S. population. Excluding missing values, our final sample was 26,202 adults. The groups of interest were sex (49.3% men, 50.7% women), race/ethnicity (48.9% non-Hispanic White, 23.7% non-Hispanic Black, 17.8% Mexican American, 9.7% other Hispanic), and education level (9.9% less than 9th grade, 16.6% 9th-12thgrade but no diploma, 23.7% high school graduate/GED or equivalent, 28.9% some college or Associate's degree, 20.8% college graduate or above). Due to the PHQ-9's ordinal nature, the means and variance adjusted weighted least squares (WLSMV) estimation method was used in Mplus. To determine the factor structure, we ran single group CFAs on five plausible models supported by the literature. Results revealed a two factor model consisting of a cognitive/affective factor (items 1. anhedonia, 2. depressed mood, 6. feelings of worthlessness, 7. concentration difficulties, 8. psychomotor disturbances, and 9. thoughts of death) and a somatic factor (items 3. sleep disturbance, 4. fatigue, and 5. appetite changes) which provides the best balance between model fit and parsimony (RMSEA = 0.034, RMSEA 90% CI = 0.032-0.036, TLI = 0.984, CFI = 0.988). Next, using the previous model, we ran multiple-group CFAs testing configural, weak, strong, and strict factorial invariance models. Because the chisquare difference test is inflated by the large sample size, we used the change in CFI (Δ CFI) to compare the models. All models revealed close fit and ΔCFI was < 0.010 (see Table 1). Our findings indicate that (a) depressive symptom severity, as

measured by the PHQ-9, is best conceptualized as having two distinct symptom clusters and that (b) the PHQ-9 is acceptable to use in major U.S. sociodemographic groups and allows for meaningful comparisons across these groups with minimal risk of measurement bias.

VIEW PDF

Diabetes

Saturday, March 10 from 2:30 to 3:30 pm

Abstract 1388

ASSOCIATION OF FOUR EMOTIONAL FACTORS WITH DIAGNOSED VERSUS UNDIAGNOSED DIABETES Tasneem Khambaty, PhD, Psychology, University of Maryland,

Baltimore County, Baltimore, MD, Gail Ironson, MD, PhD, Psychology, University of Miami, Coral Gables, FL

Intriguing new evidence suggests that elevated depressive symptoms among adults with diabetes may be limited to those with an awareness of their diagnosis. However, it is yet unknown if a similar pattern exists for other emotional factors. Consequently, our objective was to examine four emotional factors among adults with diagnosed diabetes, undiagnosed diabetes and no diabetes. Participants were 1,797 adults included in a nationwide in-person survey [M (SD) age: 52 (19) years; 57% female; 32% Non-White] who completed well-established questionnaires to assess depressive symptoms, anxiety symptoms, positive affect, and distress tolerance. They additionally provided blood samples to assess HbA1c levels, and were asked whether they had been diagnosed with diabetes or had taken medication for it in the past 12 months. Using WHO criteria, participants were grouped into three categories: 1) No diabetes [negative selfreport and HbA1c < 6.0], 2) Undiagnosed Diabetes [negative self-report but HbA1c \geq 6.0], and 3) Diagnosed Diabetes [positive self-report regardless of HbA1c values]. Linear regression analyses (adjusted for age, sex, race, education, smoking, and body mass index) revealed that diagnosed diabetes status was associated with elevated depressive symptoms $(\beta=0.07, SE= .45, p= .03)$, lower positive affect $(\beta= -0.10, SE=$.35, p= .004), and lower distress tolerance (β = 0.07, SE= .31, p= .03), but not anxiety symptoms (p=.96) when compared to undiagnosed diabetes, and when compared to no diabetes status (all ps < .01). Adults with diagnosed diabetes had lower positive affect compared to either undiagnosed diabetes (β = -0.08, SE= .34, p=.02) or no diabetes status ($\beta = -0.08, SE = .25, p < .001$) even after adjusting for depressive symptoms. Individuals with undiagnosed diabetes and no diabetes did not differ on emotional factors. Adults with diagnosed diabetes have elevated depressive symptoms, low distress tolerance, and low positive affect above and beyond depressive symptoms. These differences are not due to elevated HbA1c, and thus may be attributable to factors related to disease management and/or knowledge of diagnosis. A broader evaluation and treatment of emotional distress may be warranted among adults with diagnosed diabetes.

Abstract 1430

TRAJECTORIES OF ANXIETY SYMPTOMS AND INCIDENT CARDIOVASCULAR DISEASE IN ADULTS WITH TYPE 2 DIABETES

Sonya Deschenes, PhD, Psychiatry, McGill University, Montreal, QC, Canada, Rachel Burns, PhD, Psychology, Carleton University, Ottawa, ON, Canada, Norbert Schmitz, PhD, Psychiatry, McGill University, Montreal, QC, Canada

Background: Cardiovascular disease (CVD) is a leading cause of death among adults with type 2 diabetes (T2D). Pathological anxiety is more common in those with T2D than in the general population and is associated with increased risk of CVD. However, longitudinal studies on anxiety and CVD have focused on anxiety measured at a single time-point. Measurement of anxiety over repeated assessments can be more informative than a single assessment as it can prospectively capture anxiety chronicity. This study examined latent longitudinal trajectories of anxiety symptoms in adults with T2D and their associations with incident CVD.

Methods: Data were from the Evaluation of Diabetes Treatment Study, a community-based cohort study of adults aged 40-76 years with T2D. Anxiety and CVD were assessed by self-report at baseline and at four annual follow-up assessments. N=832participants without cardiovascular disease at baseline and follow-up 1 were included in the present study. Group-based trajectories of anxiety at baseline, follow-up 1, and follow-up 2 were modelled using latent class growth modeling. Associations between anxiety trajectories and CVD reported at follow-up 2, 3 or 4 were examined with logistic regression analysis adjusted for sociodemographic and lifestyle characteristics.

Results: Four distinct anxiety trajectories were identified, reflecting chronically low (39.4%), chronically moderate-low (47.4%), chronically moderate-high (11.1%), and chronically high (2.2%) anxiety. The likelihood of CVD was greater for the chronically moderate-low (OR= 2.23, 95% CI= 1.36-3.66), chronically moderate-high (OR= 3.05, 95% CI= 1.54-6.02), and chronically high (OR= 3.61, 95% CI= 1.09-12.00) anxiety trajectory groups compared to the chronically low anxiety group. **Conclusion**: The identified latent trajectories reflected three groups with chronic courses of anxiety symptoms at different levels of severity and one group with chronically low levels of anxiety. Chronic anxiety, even at subthreshold levels, was associated with an increased risk of CVD among people with T2D.

Abstract 1383

HEALTH BEHAVIOUR CHANGES AFTER DIABETES DIAGNOSIS: FINDINGS FROM THE ENGLISH LONGITUDINAL STUDY OF AGEING

Ruth A. Hackett, PhD, Catherine Moore, MSc, Camille Lassale, PhD, Department of Behavioural Science & Health, University College London, London, United Kingdom

Background: A healthy lifestyle is key to disease management in type 2 diabetes (T2D). It is unclear from existing evidence whether individuals change their health behaviours in response to T2D diagnosis and whether changes are maintained over time. This study investigated smoking, physical activity, fruit and vegetable intake and alcohol consumption at three times (prediagnosis, at report of diagnosis and 2 years post-diagnosis) in individuals who developed T2D and a comparison group.

Method: Health behaviours were assessed in 6877 individuals aged 50 years and older. Data were taken from waves 3-7 of the English Longitudinal Study of Ageing (ELSA). Generalised estimating equations were used to examine differences by T2D status (group) and time, and group-by-time interactions.

Results: There were 368 diagnoses of T2D during the study period. The T2D group were less likely to be physically active (p < 0.001) and were more likely to be sedentary (p = 0.003) than the comparison group. Those with T2D were less likely to consume alcohol (p < 0.001). There were no group differences in

smoking or fruit and vegetable consumption. Smoking (p < 0.001), alcohol consumption (p < 0.037) and physical activity (p = 0.042) decreased over time in the entire sample. Whereas fruit and vegetable intake (p = 0.012) and sedentary activity (p < 0.001) increased over time in both groups. A significant group-by-time interaction was found for smoking, with the T2D group having significantly greater reductions in smoking over time (p < 0.001). No significant interactions were detected for the other health behaviours.

Conclusion: In this large sample of community-dwelling sample of English adults, we found limited evidence that T2D encourages positive health behaviour changes, other than a reduction in smoking. Given the importance of healthy lifestyles for long-term outcomes in T2D, strategies for motivating behaviour change in this population need to be identified.

Abstract 1074

HAPPINESS AND INFLAMMATORY RESPONSES TO ACUTE STRESS IN PEOPLE WITH TYPE 2 DIABETES Will not be presented

Inflammation

Saturday, March 10 from 3:35 to 4:50 pm

Abstract 1373

HIGH DAILY STRESSOR EXPOSURE AND LOW STRESSOR DIVERSITY ASSOCIATED WITH HIGHER INFLAMMATION ACROSS THE ADULT LIFE SPAN

Rachel E. Koffer, MS, Nilam Ram, PhD, Human Development and Family Studies, Penn State, University Park, PA, Stephanie J. Wilson, PhD, Institute for Behavioral Medicine Research, Ohio State, Columbus, OH, David M. Almeida, PhD, Human Development and Family Studies, Penn State, University Park, PA

Objective: Increased negative affect in response to daily stressors has been linked to higher inflammation, indicating a biological pathway between daily stressor experiences and longterm disease risk. Additionally, while greater stressor exposure is associated with lower subjective well-being, the effect is buffered by higher stressor diversity (i.e., it is better to have stressor experiences that are spread evenly across multiple stressor types, such as work, home overloads, arguments, and other stressors, as opposed to primarily concentrated in one type, such as work stressors). Older adults may be at risk, given tendency to have lower stressor diversity than younger adults. The present study examined how stressor exposure and lower stressor diversity are linked to inflammation and if those links are moderated by age. Method: A cross-sectional U.S. national sample of 811 adults aged 34-84 years provided eight consecutive days of semistructured interviews, reporting whether any of seven stressor types occurred each day. On a separate laboratory visit, participants provided blood samples, that were assayed for six inflammatory markers: C-reactive Protein (CRP), interleukin-6 (IL6), Soluble Receptors for IL6 (sIL6R), Human Soluble Intercellular Adhesion Molecule-1 (sICAM1), Soluble E-Selectin (sE-Selectin), and Fibrinogen. Linear regression models, with outcomes log-transformed to reduce skew, were used to test the associations among inflammation, stressor exposure (average number of stressors per day), stressor diversity (dispersion across stressor types), and age, after controlling for sex, BMI, comorbidities, education, and medications. Results: Higher stressor exposure combined with lower stressor diversity was associated with higher inflammation (sIL6R: β = -0.28, p = .009; sE-Selectin: β = -0.34, *p* = .09; and sICAM1: β = -0.35, *p* = .002;

see attached figure). These effects were consistent across age. **Conclusions:** Generally, for individuals with high stressor exposure, having stressor experiences that are spread evenly across many types, as opposed to concentrated in one or few types, may be protective for inflammation. Implications for inflammation as a pathway between daily stressors and health are discussed in the context of lifespan changes in psychosocial and biological stress.

VIEW PDF

Abstract 1123

POSTTRAUMATIC STRESS DISORDER IS ASSOCIATED WITH ENHANCED INTERLEUKIN-6 RESPONSE TO MENTAL STRESS IN SUBJECTS WITH A RECENT MYOCARDIAL INFARCTION

Bruno B. Lima, MD PhD, Cardiology, Emory University, Atlanta, GA, Muhammad Hammadah, MD, Cardiology, Samaah Sullivan, PhD, Epidemiology, Ibhar Al Mheid, MD, Medicine, Kobina Wilmot, MD, Cardiology, Brad D. Pearce, PhD, Epidemiology, Amit Shah, MD, Cardiology, Oleksiy Levantsevych, MD, Epidemiology, Jeong Hwan Kim, MD, Belal Kaseer, MD, Mohamad Gafeer, MD, Cardiology, Lei Weng, MS, Lisa Elon, MPH, Epidemiology, J Douglas Bremner, MD, Psychiatry, Arshed Quyyumi, MD, Cardiology, Viola Vaccarino, MD PhD, Epidemiology, Emory, Atlanta, GA

Background: PTSD is prevalent among patients who survived an acute coronary syndrome, and is associated with adverse outcomes, but the underlying mechanisms are unclear. Individuals with PTSD have enhanced sensitivity of the noradrenergic system to stress which may lead to immune activation. We hypothesize that survivors of a myocardial infarction (MI) who have PTSD will show enhanced inflammatory responses to acute psychological stress compared with those without PTSD.

Methods: We studied 246 individuals younger than 61 years who had a verified MI within 8 months. A clinical diagnosis of current PTSD (past month) was obtained using the Structured Clinical Interview (SCID) for DSM IV. Mental stress was induced with a speech task. Inflammatory biomarkers: were measured at rest and 90 minutes after mental stress. Our main biomarker of interest was interleukin 6 (IL-6) which is known to be responsive to acute stress, but we also examined other inflammatory biomarkers related to cardiovascular risk, including high sensitivity C-reactive protein (CRP), vascular cell adhesion molecule (VCAM)-1, intercellular adhesion molecule (ICAM)-1 and monocyte chemoattractant protein (MCP)-1. All biomarkers were log transformed. We used mixed models for repeated measures to compare changes in biomarker levels with stress by PTSD status, adjusting for demographics, cardiovascular risk factors, disease severity indicators, and depressive symptoms.

Results: The mean age was 50 ± 1 years, and 51% were men. The prevalence of current PTSD was 11%. IL-6 levels increased significantly with mental stress, but the increase was more marked in patients with PTSD (threefold increase) than those without (twofold increase) (Figure). After adjusting for the factors listed above, patients with PTSD showed 104% greater increase in log-transformed IL-6 post-stress than those without PTSD (p=0.02). MCP-1 showed a modest increase with stress which was similar in patients with PTSD (2% increase) and without PTSD (1.3% increase) (p=0.3). CRP, ICAM-1 and VCAM-1 did not increase with stress in either group.

Conclusion: Patients with current PTSD exhibit enhanced IL-6 response to psychosocial stress, suggesting a possible link

between PTSD and adverse cardiovascular outcomes as well as other diseases associated with inflammation.

VIEW PDF

Abstract 1254

APPLICATION OF THE CORTISOL-CRP RATIO TO A SURGICAL POPULATION: PREDICTING DEPRESSION, PAIN, AND STRESS REACTIVITY AMONG PATIENTS UNDERGOING TOTAL KNEE ARTHROPLASTY

Julie K. Cremeans-Smith, PhD, Psychological Sciences, Kent State University at Stark, N Canton, OH, Kenneth Greene, MD, Orthopedics, Cleveland Clinic, Medina, OH, Douglas L. Delahanty, PhD, Psychological Sciences, Kent State Univ., Kent, OH

The ratio of cortisol to C-reactive protein (CRP) is thought to provide insight into the homeostatic regulation between the hypothalamic-pituitary-adrenal (HPA) axis and the immune system. Although this index has been found to predict reactivity to a laboratory stressor, its utility in predicting responses to naturalistic stressors remains uncertain. The goal of the present inquiry was to fill this gap in the literature by applying the ratio to surgical stress. We examined whether the ratio of preoperative cortisol to CRP could predict emotional distress, stress reactivity, and functional recovery among patients scheduled for unilateral, total knee arthroplasty (TKA; n=110; Summa Health System). Urinary cortisol and plasma CRP levels were assessed 2-3 weeks prior to surgery (to coincide with pre-admission screening). Patients completed surveys of depressive symptoms (CESD) and knee pain/limitations (AIMS2, WOMAC) prior to, 1-month, and 3-months following surgery. Information was obtained from patients' medical records to assess stress reactivity (blood pressure, heart rate, pre- and post-surgery), as well as inhospital recovery (pain severity, range of motion). Regression analyses control for gender, baseline pain severity, and appropriate demographic variables (based on preliminary analyses). Results revealed that the pre-operative cortisol/CRP ratio was marginally related to cross-sectional depressive symptoms (β = -.279, p= .055), but could not predict the development of post-operative symptoms (p>.10). Patients with a lower cortisol/CRP ratio, characterizing a pro-inflammatory profile, displayed greater reactivity to surgical stress, as indicated by systolic blood pressure (β = -.278, p=.046) and heart rate (β = -.321, p= .022) during the first hour following the procedure. Additionally, a pre-operative cortisol/CRP ratio indicating a proinflammatory environment predicted more severe pain during short-term recovery (in-hospital). The pre-operative cortisol/CRP ratio did not predict range of motion achieved during in-hospital physical therapy sessions or longer-term functional outcomes (1 and 3-months following surgery). The current findings support and extend previous research by documenting relationships between the cortisol/CRP ratio, concurrent depressive symptoms, stress reactivity, and postoperative pain within a surgical population.

Abstract 1449

BEREAVEMENT EXACERBATES THE IMPACT OF SLEEP ON INFLAMMATION: RESULTS FROM PROJECT HEART

Diana A. Chirinos, Ph.D., Jason C. Ong, Ph.D., Neurology, Northwestern University, Chicago, IL, Luz Garcini, Ph.D., Christopher Fagundes, Ph.D., Psychology, Rice University, Houston, TX

Objective: Sleep is an important predictor of overall health. While the pathways linking sleep to health are not completely

understood, inflammation plays an important role, particularly following a stressful life event. In this study, we aimed to examine the association between sleep disturbances and inflammation after adjusting for important confounding factors, and explore how the stressful life event of bereavement impacts these associations.

Methods: Participants included 54 bereaved individuals and 47 controls with a mean age of 67.12 (SD=12.11). Inflammation was measured using C-reactive protein (CRP). Sleep disturbances were measured using the Pittsburgh Sleep Quality Index (PSQI). **Results:** Main effects for the association between sleep disturbances and inflammation were not significant for the PSQI Global Score, PSQI subscales or sleep duration (categorical). Results showed, however, that bereavement moderated the association between inflammation and increased scores in the PSQI Global Scale (B=0.104, 95% Confidence Intervals [CI]= 0.010 - 0.199, p=0.031), worse subjective sleep quality (B=0.590, 95% CI= 0.050 - 1.131, p=0.033) and shorter sleep duration (B=1.001, 95%CI=0.286 - 1.717, p=0.007). Analyses of simple slopes demonstrated that these association were significant among the bereaved individuals, only.

Conclusions: Our study is first to demonstrate that a stressful life-event in older age, such as bereavement, exacerbates the association between sleep disturbances and inflammation.

VIEW PDF

Abstract 1440

AN MBSR INTERVENTION FOR PARKINSON'S DISEASE PATIENTS AND CAREGIVING PARTNERS: EFFECTS ON DISTRESS, SOCIAL SUPPORT, CORTISOL, AND INFLAMMATION

Chelsea Siwik, B.A., Kala Phillips, M.S., Paul Salmon, Ph.D., Psychological and Brain Sciences, University of Louisville, Louisville, KY, Irine Litvan, M.D., Neurosciences, Vincent Filoteo, Ph.D., Psychiatry, University of California, San Diego, San Diego, CA, Whitney Rebholz, Ph.D., Elizabeth Cash, Ph.D., Otolaryngology-HNS and Communicative Disorders, Allison Hicks, B.A., Kathleen van der Gryp, B.A., Psychological and Brain Sciences, University of Louisville, Louisville, KY

Among Parkinson's disease (PD) patients and their partner/caregivers, stressors associated with the illness increase with disease progression, often impacting psychological and physical health. Mindfulness-based stress reduction (MBSR) programs have been widely used among clinical populations with benefits demonstrated for both psychological and physical wellbeing.

Eighteen dyads consisting of PD patients and their partner/caregivers were enrolled from a local movement disorders clinic and randomized in an 8-week trial of MBSR versus wait list control. Self-reports of distress (IES) and social support (ISEL), diurnal salivary cortisol profiles, and peripheral inflammatory cytokines were collected at baseline and immediately post-program. No participants were lost to followup. Repeated-measures ANOVAs compared PD patients across the MBSR versus wait-list condition. Similar analyses were conducted explore intervention effects to among partner/caregivers.

MBSR significantly increased distress (p=.032) and awareness of intrusive thoughts (p=.015), and decreased mean bedtime cortisol levels (p=.021) and IL-1beta (p=.004) among patients. MBSR significantly increased appraisal of social support (p=.005) and improved rhythmicity of diurnal cortisol slopes (p=.044) among

caregiving partners, reflecting post-program gains in HPA rhythmicity. No other significant relationships were observed. Results suggest that, among PD patients, elevated post-program distress may be driven by increased awareness of intrusive thoughts. MBSR appeared to ameliorate physiological stress measured by HPA function among both patients and caregiving partners. However, only the patients evidenced MBSR-related reductions of systemic inflammation, and only caregiving partners reported an increase in social support. These data support results of previous research suggesting promise for MBSR as a psychosocial intervention for PD patients. Given the paucity of support for caregiving partners of patients with chronic debilitating illness, it is notable that MBSR demonstrated social as well as physiological benefits. These findings suggest MBSR is feasible in the context of dyadic system experiencing chronic illness and warrant greater attention.

<u>Obesity, Weight Stigma and Eating Disorder</u> Saturday, March 10 from 3:35 to 4:50 pm

Abstract 1299

RISK FACTORS FOR REFEEDING SYNDROME IN UNDERWEIGHT JAPANESE PATIENTS WITH EATING DISORDERS: POSSIBLE INFLUENCE OF MOOD STATES.

Tadahiro Yamazaki, M.D., Seraki Miyamoto, M.D., Maiko Hiraide, M.D., Ryo Yoneda, M.D., Saki Harashima, M.D., Takeshi Horie, M.D., Shuji Inada, M.D., Ph.D., Makoto Otani, M.D., Ph.D., Kazuhiro Yoshiuchi, M.D., Ph.D., Stress Sciences and Psychosomatic Medicine, The University of Tokyo, Tokyo, Japan

Introduction: Refeeding syndrome (RFS) is a life-threatening complication during treatment of eating disorders (ED), caused by hyperinsulinemia after administering nutrition in malnourished state. NICE guideline is frequently used for assessing the risks for RFS. However, this may not be applicable to Japanese ED patients because Japanese women tend to have lower BMI than western women. In addition, β-adrenergic hypersensitivity has been reported to be associated with postprandial hyperinsulinemia and depressive mood. Therefore, the aim of the present study was to investigate biological and psychological risk factors for RFS in underweight Japanese ED patients. Materials and methods: The subjects were 158 patients with eating disorders with underweight. RFS was defined as when any of the following findings were observed by the 18th day of admission: hypokalemia, hypophosphatemia, elevated liver enzymes, and development of edema. Using logistic regression analyses, associations between development of RFS and the following variables were investigated: prealbumin, free triiodothyronine (T3) and depressive mood state (depressiondejection scores of Profile of Mood States) before refeeding. The analyses were controlled for BMI and age. Results: Average BMI (standard deviation) of the subjects was 13.25 (2.12) kg/m². Higher prealbumin was significantly associated with lower risk of hypophosphatemia (odds ratio (OR) 0.9, p=0.009). Higher free T3 was significantly associated with lower risk of edema (OR 0.411. p=0.036) while marginally associated with hypophosphatemia (OR 0.423, p=0.081). Higher score in POMS-D was significantly associated with higher risk of developing any RFS (OR 4.95, p=0.046). There were no interactions between POMS-D and prealbumin or free T3. Lower BMI was

significantly associated with higher risk of all of RFS. The association with higher risk of hypophosphatemia was not significant with the cut-off point of BMI of 16 kg/m² reported in NICE guideline 2017, but with the cut-off point of BMI of 14 kg/m² (OR 7.752, p<0.001). **Conclusion:** Depressive mood may contribute to the development of RFS as well as biological factors. In addition, the cut-off point of BMI for the risk of RFS could be lower than that for western patients.

Abstract 1229

GETTING TO THE HEART OF CHRONIC DISEASE: WEIGHT-STIGMA, CARDIOMETABOLIC RISK PROFILES, AND INCREASED LIKELIHOOD OF CARDIOMETABOLIC DIAGNOSES

Mary S. Himmelstein, PhD, Rebecca M. Puhl, PhD, Rudd Center for Food Policy & Obesity, University of Connecticut, Hartford, CT

Stigma is well-established as a barrier to effective treatment of numerous diseases, but has received limited attention as a risk factor for the development of chronic disease. Several decades of research have linked experiences of weight stigma with individual, modifiable risk factors for type-2 diabetes (TD2) and cardiovascular disease (CVD), yet studies have yet to link experienced weight stigma with a diagnosis of T2D or to examine the cumulative risk of weight stigma on multiple risk factors for these diseases simultaneously. Using data from a national survey panel, this study examined associations among weight stigma, discrimination (weight, gender, sexual orientation, race), risk factors for CVD and T2D, and diagnoses of CVD and T2D. A total of 1,051 participants were recruited for this study with approximately equal numbers of Black, Hispanic-White, and non-Hispanic White men and women. Participants answered questions about experiences of stigma and discrimination (weight, gender, race and sexual orientation), health behaviors, and personal medical history. Cumulative risk scores for CVD and T2D were calculated by summing the number of risk factors reported by participants from the following list: hypertension, presence of prediabetes, smoking behavior, BMI consistent with overweight or obesity, physical inactivity, age (45 plus for T2D, 55 plus and female for CVD), and race (Black and Hispanic for T2D, Black for CVD). Information on existing diagnoses of CVD and T2D were also collected. Experiences of weight stigma were associated with increased risk for both CVD and T2D by increasing the number of risk factors for each disease. Further, when other forms of discrimination were included in the model, weight based discrimination remained a unique contributor to cumulative risk for CVD and T2D. Experiences of weight stigma increased the likelihood of having a diagnosis of T2D diagnosis by 2.4 independent of other risk factors like race, SES, BMI, and gender. Experienced weight stigma did not increase the likelihood of a CVD diagnosis. Taken together, these results suggest that weight stigma is a unique contributor to cardiometabolic disease and should be considered in treatment protocols and prevention strategies for both T2D and CVD.

Abstract 1101

LONGITUDINAL CONSEQUENCES OF EXPERIENCING WEIGHT STIGMA DURING PREGNANCY FOR PSYCHOLOGICAL AND PHYSICAL HEALTH

Angela C. Incollingo Rodriguez, CPhil, Psychology, University of California, Los Angeles, Los Angeles, CA, Christine Dunkel Schetter, PhD, Psychology, UCLA, Los Angeles, CA, Christine M. Guardino, PhD, Psychology, Dickinson College, Carlisle, PA, A. Janet Tomiyama, PhD, Psychology, UCLA, Los Angeles, CA

Weight stigma is a pervasive form of social stigma that poses risks to psychological and physical health. However, no research to date has tested whether weight stigma undermines health in the context of pregnancy. This is a concerning issue considering that: (a) many women begin pregnancy already with an overweight or obese Body Mass Index; (b) virtually all women gain weight over the course of pregnancy; and (c) the consequences of experiencing weight stigma may be particularly detrimental for pregnant women and their children. The present study examined 214 participants from the Community Child Health Network, a multi-site longitudinal study of diverse postpartum women. The goal was to identify whether experiencing weight stigma during pregnancy related to postpartum depression, gestational weight gain and weight retention, and physiological measures of blood pressure and cortisol throughout the postpartum period. Hierarchical regression analyses revealed, that over and above demographic covariates, weight stigma experienced during pregnancy was associated with postpartum depressive symptomatology at one-month and one-year postpartum, excess gestational weight gain, and weight retention at one-year postpartum. Weight stigma was not, however, related to measures of blood pressure or cortisol activity in the postpartum period. These findings represent the first longitudinal evidence of adverse psychological and physical health consequences of experiencing weight stigma during pregnancy. This has implications for maternal-child health and healthcare policy and deserves further attention.

Abstract 1032

SOCIOECONOMIC STATUS AND INFLAMMATION DURING PREGNANCY: THE MEDIATING ROLE OF MATERNAL OBESITY

M. Sima Finy, Ph.D., Lisa M. Christian, Ph.D., Institute for Behavioral Medicine Research, The Ohio State University Wexner Medical Center, Columbus, OH

Background: Although it is widely recognized that inflammation during pregnancy contributes to adverse maternal and fetal outcomes, the factors and processes that contribute to immune dysregulation are poorly understood. Maternal obesity may play a mediating role in the relationship between environmental stressors like low socioeconomic status (SES) and inflammation during pregnancy. The present study examined the potential pathway of pre-pregnancy body mass index (BMI) in the relationship between low SES and serum inflammatory markers during pregnancy. Methods: Analyses utilized data from 214 pregnant women at a single assessment between 5-31 weeks gestation (mean = 17.7, SD = 7.0). Self-reported data on socioeconomic indicators, health behaviors, exposure to childhood trauma, and current depressive symptoms were collected. SES was operationalized as total annual household income. Pre-pregnancy BMI (kg/m²) was calculated based on self-reported weight prior to pregnancy and height measured at the study visit. Finally, serum levels of C-reactive protein (CRP), interleukin (IL)-6, IL-8, and tumor necrosis factor (TNF)-α were determined. Analyses focused on individual inflammatory markers, as well as a composite inflammatory score calculated by summing the standardized values of CRP, IL-6, IL-8, and TNFa. Results: Per PROCESS mediation analyses, a significant indirect effect of SES on CRP through BMI was observed, ab = -0.064, 95% BCa CI [-0.097, -0.036], with BMI accounting for 62.8% of the total effect. In addition, BMI accounted for 56.0% of the total effect of SES on IL-6 (ab = -0.027, 95% BCa CI [-

0.044, -0.014]), and 47.3% of the total effect of SES on the composite inflammatory score (ab = -0.214, 95% BCa CI [-0.359, -0.111]). Significant indirect effects remained for all three mediation models after adjusting for race, smoking status, depressive symptoms, childhood trauma, gestational age at sampling, maternal age, and maternal medical conditions. Conclusions: Pre-pregnancy BMI mediated the relationship between SES and CRP, IL-6, and a composite inflammatory score in a diverse sample of pregnant women. Results demonstrate that obesity is one mechanism through which low SES is associated with increased inflammation during pregnancy and suggest that women of low SES may be at particular risk for obesity and related immune dysregulation during pregnancy.

Abstract 1464

A RISKY FAMILY ENVIRONMENT, BUT NOT A GABAERGIC RECEPTOR SINGLE NUCLEOTIDE POLYMORPHISM, IS ASSOCIATED WITH METABOLIC DYSREGULATION.

Yazmine P. Huizar, B.S., Jenny M. Cundiff, Ph.D., Matthew R. Cribbet, Ph.D., Psychology, Texas Tech University, Lubbock, TX Previous research has shown an association between the GABAergic (gamma-aminobutyric acid) T1519C single nucleotide polymorphism (SNP) in the GABA(A)alpha6 receptor subunit gene (GABRA6) and a predisposition to a higher Body Mass Index (BMI) and a larger waist circumference. Likewise, an early risky family environment has been associated with obesity and adiposity in adulthood. Though research into geneenvironment interactions on metabolic health is still a developing field, allele frequency in a population's gene pool tends to remain stable across many generations, making it unlikely that single nucleotide polymorphisms (SNPs) are the primary cause of rising obesity rates in adulthood. Rather, environmental influences, including a risky early family environment characterized by neglectful parenting, overt conflict, and unsupportive relationships, may be a likelier explanation for obesity rates in adulthood. Participants (n=213, $M_{age} = 30.13$ years, SD= 10.85; 57.7% men) from the Pittsburgh Cold Study 3, completed a demographic questionnaire, the risky families questionnaire and had their height, weight and waist circumference measured during a physical exam. Participant DNA was recovered from buccal swabs, and extracted and genotyped for the T1519C SNP according to published protocols. In secondary data analyses, we tested the hypothesis that a risky early family environment, GABRA6 and their statistical interaction would be positively associated with BMI and waist circumference. In regression analyses controlling for age, sex, race and GABRA6 we found that a risky early family environment was positively associated with BMI, b = .080, t = 1.966, p = .05, $R^2 = .196$, and waist circumference, b = .188, t = 1.990, p < .05, $R^2 = .244$ and GABRA6 was unrelated to both BMI, b = -.876, t = -1.501, p =circumference, b = -1.184, t = -.868, p =.135 and waist .386.When an interaction term (GABRA6 x risky family) was added to the model it was not significantly associated with either BMI or waist circumference, ps = .895 and .923, respectively. Our findings provide evidence that an early risky family environment may exert more influence than genetic predisposition when determining indices of metabolic health. If within person changes show similar results, targeted family interventions could prove effective in promoting and improving metabolic health in adulthood.

Symposium 1102 Thursday, March 8 from 10:35 to 11:50 am

Autonomic Concomitants of the Resilient Brain

Cristina Ottaviani, PhD, Psychology, Sapienza University of Rome, Rome, , Italy, Stefanie Koehler, M.A., Psychiatry and Psychotherapy, University Hospital Jena, Jena, , Germany, Julian Thayer, PhD, Department of Psychology, The Ohio State University, Columbus, OH, Luca Carnevali, PhD, Chemistry, Life Sciences & Environmental Sustainability, University of Parma, Parma, , Italy, Richard D. Lane, M.D., Ph.D., Psychiatry, University of Arizona, Tucson, AZ, Karl J. Baer, MD, Psychiatry and Psychotherapy, University Hospital Jena, Jena, , Germany

Resilience has been defined as the process of positive adjustment to adverse events. Despite the growing interest in this construct, the implementation of resilience training programs has proven difficult, mainly because of the absence of accurate and rapid tools to assess resilience. In fact, while the dominating psychometric approaches have value, they are highly susceptible to self-report bias. An ideal solution to these challenges is the introduction of validated physiological and/or biological predictors of resilience, which are significantly less prone to subject manipulation and therefore offer the possibility of improved assessment accuracy. A promising candidate is represented by vagally-mediated heart rate variability (HRV), which reflects the dynamic modulation of vagal control of the heart in response to shifts in the environment and is therefore a particularly useful index for assessing the flexibility and contextappropriateness of individuals' responses. Moreover, emerging evidence suggests that HRV serves as an index of how strongly top-down appraisals, mediated by cortical-subcortical pathways, shape brainstem activity and autonomic responses in the body (Neurovisceral Integration Model). This symposium illustrates the view that only a multidisciplinary approach integrating neuroimaging techniques with peripheral physiology monitoring will lead to a better understanding of resilience in healthy and psychopathological individuals. In the case of non-pathological individuals, this is first applied to behavioral response inhibition, which has been linked to impulsivity, a transdiagnostic and prognostic risk factor for somatic and psychological health (Koehler). Second, individual differences in the heart-brain connections are taken into account as a function of age, ethnicity, and post-traumatic stress disorder with important implications for adaptivity (Thayer). Among psychiatric disorders, two conditions in which symptoms are so pervasive that they impair daily functioning have been chosen: Generalized Anxiety Disorder (Carnevali), Major Depressive Disorder (Lane). In these populations, identifying how resilient individuals differ from their non-resilient peers is a priority. Overall, the present symposium leads to novel predictions about brain-body pathways to resilience, ultimately informing how to implement effective training programs.

Individual Abstract Number: 1311

Towards Response Success Prediction: An Integrative Approach Using High-Resolution fMRI and Autonomic Indices

Stefanie Koehler, M.A., Andy Schumann, M.A., Feliberto de la Cruz, Dipl., Gerd Wagner, Dr., Karl J. Baer, M.D., Psychiatry and Psychotherapy, University Hospital Jena, Jena, Germany Brainstem and midbrain nuclei are closely linked to effective cognitive performance and autonomic function.

A total of 35 healthy controls were recruited from the local community and a typical task of behavioral response inhibition (Go/No-Go paradigm) was applied. We used high-resolution fMRI with advanced spatial resolution, sophisticated brainstem analyses and specifically corrected for respiratory signal and cardiac noise.

Our main results characterize specific neural activation patterns during successful and unsuccessful response inhibition especially comprising the anterior cingulate as well as the medial and lateral prefrontal cortex. A significant activation of the dopaminergic nuclei (VTA/SNc) was found during error processing, but not during response inhibition. Most remarkably, specific neural activation patterns (i.e., dorsal anterior cingulate cortex) as well as accompanying autonomic indices (i.e., heart rate and its variability (HRV)) were identified to hold predictive information on an individual's performance.

In summary, the importance of the VTA/SNc during error processing was shown. Furthermore, our findings suggest that characteristic activation patterns in the dACC might precede error commission. Moreover, autonomic modulation during the resting-state period prior to the applied task contains valuable information to predicted task performance.

Individual Abstract Number: 1443

Structural and Functional Cerebral Correlates of Heart Rate Variability: Implications for Resilience

Julian Thayer, PhD, Department of Psychology, The Ohio State University, Columbus, OH, Julian Koenig, Dr. sc. hum., Department of Child and Adolescent Psychiatry, University of Heidelberg, Heidelberg, Germany

In this talk we review several studies that sought to investigate individual differences in the structural and functional correlates of heart rate variability (HRV). One study examined the relationship between cortical thickness and HRV as a function of age (Yoo et al 2017). Significant differences were found as a function of age such that cortical thickness correlations with HRV showed an age invariant association with brain regions such as the ventromedial prefrontal cortex (VMPFC) that are associated with less age related decreases in cortical thickness and an age related association in more dorsal brain regions known to show decreased cortical thickness with age. Similarly, in another study of functional connectivity (Sakaki et al 2016) it was shown that prefrontal-amygdala connectivity showed an age invariant association with HRV in the VMPFC and an age related effect in more lateral brain regions. In another study of functional connectivity (Thome et al 2017) using three different seed regions, it was found that diffuse connectivity patterns were not associated with HRV in patients with post-traumatic stress disorder (PTSD) whereas circumscribed patterns of connectivity in all three seed regions were associated with greater HRV in healthy controls. In a final study examining ethnic differences (Allen et al 2016) it was found that total cerebral blood flow was positively associated with HRV in European Americans but not in African Americans. In addition, HRV was negatively associated with blood flow in emotion regulation regions such as the anterior cingulate in African Americans but not in European Americans. Collectively, these studies suggest that differences in associations between structural and functional correlates of HRV may be related to individual differences in age, psychopathology, and ethnicity with important implications for adaptivity and resilience. Future studies are need that investigate individual differences in brain-HRV associations.

Individual Abstract Number: 1247

Structural Integrity of Anterior Cingulate Cortex Predicts Resilience to Autonomic Dysfunction in Generalized Anxiety Disorder

Luca Carnevali, PhD, Chemistry, Life Sciences & Environmental Sustainability, University of Parma, Parma, Italy, Matteo Mancini, PhD, Centre for Medical Image Computing, University College London, London, United Kingdom, Julian Koenig, PhD, Child and Adolescents Psychiatry, Heidelberg University, Heidelberg, Germany, Elena Makovac, PhD, Centre for Neuroimaging Science, King's College London, London, United Kingdom, David R. Watson, PhD, Clinical Imaging Sciences Centre, University of Sussex, Falmer, United Kingdom, Frances Meeten, PhD, Institute of Psychiatry, Psychology and Neuroscience, King's College London, London, United Kingdom, Hugo D. Critchley, DPhil, Clinical Imaging Sciences Centre, University of Sussex, Falmer, United Kingdom, Cristina Ottaviani, PhD, Psychology, Sapienza University of Rome, Rome, Italy

Generalized anxiety disorder (GAD) is associated with autonomic dysfunction, particularly decreased vagally-mediated heart rate variability (HRV). Recently, efforts have been made to investigate brain structural correlates of GAD psychopathology. Nevertheless, our understanding of brain structural determinants of HRV in GAD is still elusive. In this study, we used both categorical and dimensional models of GAD pathology to test the hypothesis that specific focal abnormalities in cortical structure predict resilience to the expression of symptoms of GAD and associated autonomic dysfunction (decreased HRV). Adult female patients with GAD (n = 17) and matched healthy controls (HC) (n = 18) underwent structural magnetic resonance imaging (MRI) after detailed characterization of psychological symptoms and quantification of resting HRV derived from continuous pulse oximetry. Cortical reconstruction was applied to structural scans using the FreeSurfer image analysis suite. Compared to controls, patients with GAD showed cortical thinning of the (i) left rostral anterior cingulate and medial orbitofrontal cortices, (ii) right isthmus cingulate and parahippocampal gyri, and (iii) bilateral inferior temporal gyrus. Significant negative relationships were found between the severity of anxiety symptoms and cortical thickness of the left medial orbitofrontal cortex, right isthmus cingulate gyrus, and bilateral inferior temporal gyrus. These results provide evidence for structural alterations in cortical areas that have been involved in emotion regulation and cognition, thereby expanding the available knowledge on GAD neurobiology. Compared to controls, patients with GAD showed decreased vagally-mediated HRV at rest. Importantly, we found that cortical characteristics of the left caudal anterior cingulate cortex differed in their association with HRV as a function of GAD. More specifically, cortical thickness in this area was positively associated with resting HRV in HC, but not in patients with GAD. Together, our findings suggest that structural integrity of anterior cingulate cortex may represent an essential feature of resilience to autonomic dysregulation in GAD.

Individual Abstract Number: 1381

Changes in the Brain Regulation of Cardiac Vagal Control During Recovery from Depression

Richard D. Lane, M.D., Ph.D., Ryan Smith, Ph.D., Psychiatry, University of Arizona, Tucson, AZ

Cardiac vagal control as indexed by heart rate variability (HRV) counteracts the sympathetic stress response, promotes emotion regulation and contributes to resilience. Depression is a clinical condition associated with medical morbidity and mortality that

may in part be due to decreased HRV. Based on the hypothesis that recovery from depression is an indicator of improved resilience, we examined aspects of brain regulation of HRV at baseline and as patients recovered from depression. Ten healthy and ten depressed subjects were enrolled in a 12-week protocol in which functional magnetic resonance imaging (fMRI) brain oxygen level dependent activity (BOLD) was measured. At baseline rostral anterior cingulate cortex (rACC) had significantly stronger connectivity with a region of the inferior pons in controls than in depressed subjects. The more depressed the patients were, the more rACC-connectivity was reduced and the lower the HRV. We then examined covariation of fMRI BOLD and HRV using synchronized electrocardiographic recordings at four time points (weeks 0, 2, 6 and 12) as patients recovered from depression with sertraline treatment. At each of the four assessments, a moving window analysis was used to estimate HRV which was then regressed onto fMRI BOLD activity. Sertraline treatment led to a significant increase in brain-HRV covariation in multiple brain regions (including the subgenual ACC, dorsal ACC, periacqueductal grey, left insula, left amygdala and left putamen) in patients compared to controls despite a lack of improvement in mean HRV in the patients. These data indicate that in the depressed state there is functional disconnection within the medial visceromotor network that regulates cardiac vagal control and that a partial normalization of medial visceromotor dysfunction occurs in depression during sertraline treatment. These data reinforce previous conclusions that the medial visceromotor network, which connects the medial prefrontal cortex to the hypothalamus and brainstem, is the premier axis whereby cortical and limbic processes regulate autonomic, neuroendocrine and immune function, and that recovery from depression is associated with normalization of function within this system.

Symposium 1326 Thursday, March 8 from 10:35 to 11:50 am

Women, Stress and Cardiovascular Health

Viola Vaccarino, MD, PhD, Epidemiology, Emory University, Atlanta, GA, Shakira Suglia, ScD, Epidemiology, Emory University, Atlanta, GA, Tené T. Lewis, PhD, Epidemiology, Emory University, Atlanta, GA, Puja K. Mehta, MD, Medicine (Cardiology), Emory University, Atlanta, GA, Samaah Sullivan, PhD, Epidemiology, Emory University, Atlanta, GA, Susan Girdler, PhD, Psychiatry, University of North Carolina, Chapel Hill, NC

The science of cardiovascular disease (CVD) in women has evolved substantially in the past 75 years. Until recently, young and middle-aged women were almost absent in epidemiological and clinical studies of CVD. This group is now emerging as fundamental for the study of mechanisms of CVD in women and for optimizing prevention strategies. Young and middle-aged women tend to have more emotional stress exposures than men of similar age and more of a stress-related psychological profile that has been linked to CVD, including depression, anxiety, and PTSD. In addition to having a higher prevalence of these risk factors, emerging data suggest that young women may be disproportionally susceptible to the adverse effects of stress on the cardiovascular system and the risk of subsequent CVD, both in terms of initiating the disease, as well as worsening the prognosis in those who have already exhibited symptoms of the disease. These associations may be particularly pronounced for

African-American women. Mechanistic studies have pointed to altered physiology of neurobiological, immune and microvascular function pathways as being especially relevant for women's cardiovascular risk linked to psychosocial stress. This emerging area or research is placing psychosocial stress as an important determinant of risk for premature CVD in women. It also underlines the importance of examining women in earlier developmental epochs in order to better understand mechanisms of CVD, especially those linked to stress, and develop tailored prevention and intervention strategies to improve cardiovascular health in women.

This symposium will present novel findings in the emerging area of research of the impact of stress on women's cardiovascular health. It will include a brief introduction by the chair, four research presentations, and a discussant. The first two speakers will present novel empirical findings on the link between psychosocial stress exposures and cardiovascular disease in women, and sex and race differences. The last two speakers will present new data on two major mechanistic pathways that are especially relevant for women's stress-related cardiovascular risk: inflammatory and autonomic responses to stress.

The discussant will summarize the impact of these findings for women's health and psychosomatic medicine, putting them in the context of existing knowledge.

Individual Abstract Number: 1334

Sex Differences in the Association Between Child Maltreatment and Cardiometabolic Health Among Young Adults: A National Study

Shakira Suglia, ScD, Epidemiology, Emory University, Atlanta, GA, Danielle Crookes, MPH, Epidemiology, Columbia University, New York, NY, Alison Cammack, PhD, Viola Vaccarino, MD, PhD, Epidemiology, Emory University, Atlanta, GA

Background: Recent studies have noted a relationship between child maltreatment and cardiometabolic health outcomes, particularly documenting associations with hypertension and BMI. Few studies however have examined whether differential effects may exist by sex.

Methods: We examined the relation between child maltreatment and cardiometabolic health in young adulthood in the National Longitudinal Study of Adolescent to Adult Health, a nationally representative school-based sample of US adolescents followed through adulthood. Participants (n=8,740) retrospectively reported on their experiences of child maltreatment (physical or sexual abuse and neglect) prior to 6thgrade during follow-up Wave 3 (2001-2002, mean age 21). Blood pressure (BP), height and weight and a blood sample were obtained during Wave 4 follow-up visit (2007-2008, mean age 29). A composite measure of cardiometabolic health was created using four risk factors: hypertension (systolic BP ≥140 mmHg, diastolic BP ≥90 mmHg, or anti-hypertensive medication use), obesity (BMI ≥30 or greater), diabetes (hemoglobin A1C \geq 6.5%, fasting glucose >200 mg/dl, history of diabetes, or hypoglycemic medication use), and hyperlipidemia (history of hyperlipidemia or anti-hyperlipidemic medication use). Individual risk factors were also examined.

Results: Men and women reported similar experiences of physical abuse (28% vs 27%), neglect (14% vs 11%), and sexual abuse (4% vs 5%) in childhood. In models adjusted for sociodemographics and smoking status, among women, child sexual abuse (OR 1.8 (95%CI 1.1, 2.7) was significantly associated with 2 or more cardiometabolic risk factors; this association did not change upon further adjustment for diet and physical activity. No associations were noted between physical

abuse or neglect and cardiometabolic health. Furthermore, no associations were noted between any of the child maltreatment measures and cardiometabolic health among men.

Conclusions: Women who experienced sexual abuse in childhood, but not men, are at risk of worse cardiometabolic health in adulthood. Sexual abuse is a form of child maltreatment that could be especially deleterious for cardiovascular risk in women. Future studies should examine mechanisms for these sex differences.

Individual Abstract Number: 1335

Cumulative Midlife Loss and Carotid Atherosclerosis: A Novel Pathway of Risk for CVD in African-American Women?

Tené T. Lewis, PhD, Miriam Van Dyke, MPH, Epidemiology, Emory University, Atlanta, GA, Karen A. Matthews, PhD, Psychiatry, Emma Barinas-Mitchell, PhD, Epidemiology, University of Pittsburgh, Pittsburgh, PA

Introduction: African-American women have elevated rates of CVD relative to women from other racial backgrounds, and race-related stressors are hypothesized to play a role. To date, studies have primarily focused on stressors related to segregation or discrimination--with limited attention paid to other factors. Research suggests that African-Americans are more likely than other racial groups to experience premature mortality; thus midlife loss (of friends or family members) is one understudied race-related stressor that may contribute to excess CVD risk among African-American women. We examined the impact of midlife loss on CVD risk in women, and whether associations differed by race.

Methods: Participants were 483 African-American, 786 White and 195 Chinese women from the Study of Women's Health Across the Nation who were asked whether they experienced the "death of a close friend or family member" and how upsetting it was, each year for 12 years. Ultrasound scans were conducted in Year 12 to assess common carotid intima media thickness (IMT). Linear regression models were run to examine the impact of both overall and "very upsetting" cumulative loss on IMT, adjusting for relevant risk factors. A race X cumulative loss interaction term was included; models were stratified by race following significant interactions.

Results: Over the course of 12 years, African-American women reported more cumulative and very upsetting losses compared to White and Chinese women (p-values<.001). In models adjusted for age, race, education, menopausal status, BMI, SBP, smoking, and site, both total and very upsetting losses were associated with IMT, although associations were stronger for very upsetting losses (total p=.07; upsetting p=.02). There was also a race X upsetting loss interaction (p= .03). Among African-American women only, more upsetting losses were associated with greater IMT (p=.004). Findings persisted following adjustments for additional risk factors and depressive symptoms.

Conclusions: In a multi-racial cohort of women, upsetting losses of friends and/or family members during midlife was more common, and had a stronger impact on carotid atherosclerosis among African-American women, compared to women from other racial backgrounds. Midlife loss may be one pathway linking race to CVD risk among women.

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Individual Abstract Number: 1337

Autonomic and Microvascular Response to Mental Stress in Women with Coronary Microvascular Dysfunction

Puja K. Mehta, MD, Medicine (Cardiology), Emory University, Atlanta, GA, Elizabeth Martin, PhD, None, None, Los Angeles, CA, Galen Cook-Wiens, MS, Samuel Oschin Comprehensive Cancer Institute, Cedars-Sinai Heart Institute, Los Angeles, CA, Michael R. Irwin, MD, Psychoneuroimmunology, UCLA, Los Angeles, CA, David S. Krantz, PhD, Psychiatry, Uniformed Services University, Bethesda, MD, C. Noel Bairey Merz, MD, Heart Institute, Cedars-Sinai, Los Angeles, CA

Background: Women with persistent angina, myocardial ischemia, and no obstructive coronary artery disease often have coronary microvascular dysfunction (CMD). Peripheral vascular reactivity to mental stress may contribute mechanistic understanding of stress-induced ischemia in women with CMD.

Methods: 61 women (44 symptomatic women with CMD diagnosed by coronary reactivity testing, and 17 healthy women who were asymptomatic, with no cardiac risk factors, and normal exercise treadmill test) underwent mental stress testing with 4 minutes anger recall, 4 minutes mental arithmetic, and 3 minutes forehead cold pressor test. Peripheral vascular response was assessed by arterial tonometry (EndoPAT, Itamar®). Reactive hyperemia index (RHI), a measure of endothelial function, was calculated before and after mental stress. Stress PAT ratio, the ratio of pulse amplitude during stress to rest, was obtained to measure peripheral vasoconstriction. Wilcoxon rank sum test was used for analysis.

Results: Mean age in CMD and control group was 58 ± 9 and 54 \pm 9, respectively. There were no differences in baseline blood pressure or heart rates between the two groups. Baseline RHI correlated positively with coronary endothelial function (r=0.36, p=0.03) and inversely with RHI change post-mental stress (r=-0.51, p <0.001). There was no significant change in RHI post mental stress. CMD subjects had a significantly lower PAT ratio compared to controls during arithmetic (median with IQR: 0.59 [0.17, 1.7] vs. 0.85 [0.23, 2.0], p=0.01). The PAT ratio during anger recall was also lower in CMD patients but not statistically significant (0.64 [0.19, 1.23] vs. 0.85 [0.18, 1.07], p=0.23). In contrast, the PAT ratio with cold pressor test (0.63 [0.11, 1.22] vs. 0.69 [0.25, 1.07], p=0.61) was similar in the two groups. Peripheral vasoconstriction inversely correlated with anxiety (r=-3.4, p=0.03), frustration (r=-0.37, p=0.02), and feeling challenged (r=-0.37, p=0.02) in CMD but not controls.

Conclusions: Women with CMD demonstrate greater peripheral vasoreactivity to mental arithmetic compared to healthy women. Increased vasoreactivity may explain mental stress-related angina in women with CMD.

Individual Abstract Number: 1336

Young Women with Coronary Artery Disease Exhibit Greater Concentrations of Interleukin-6 in Response to Mental Stress

Samaah Sullivan, PhD, Epidemiology, Muhammad Hammadah, MD, Ibhar Al Mheid, MD, Kobina Wilmot, MD, Ronnie Ramadan, MD, Medicine, Brad D. Pearce, PhD, Amit Shah, MD, Epidemiology, Oleksiy Levantsevych, MD, Belal Kaseer, MD, Malik Obideen, MD, Mohamad M. Gafeer, MD, Medicine, Laura Ward, MSPH, Yi-An Ko, PhD, Biostatistics and Bioinformatics, Tene T. Lewis, PhD, Lei Weng, MS, Epidemiology, Lisa Elon, MPH, Biostatistics and Bioinformatics, J. Douglas Bremner, MD, Psychiatry and Behavioral Sciences, Arshed Quyyumi, MD, Medicine, Viola Vaccarino, MD, PhD, Epidemiology, Emory University, Atlanta, GA Background: Circulating inflammatory cytokines raise in response to an acute laboratory stressor, especially interleukin-6 (IL-6). Immune activation with stress may contribute to progression of coronary artery disease (CAD) and acute coronary syndromes. Young women with CAD, a group with high psychosocial burden, were previously shown to have higher levels of IL-6 compared with men of similar age. We sought to examine IL-6 response to acute stress in CAD patients across sex and age, and contrast results of other biomarkers with known relevance to CAD, but unknown relation with stress (monocyte chemoattractant protein-1, MCP-1 and matrix metallopeptidase-9. MMP-9) or known low stress reactivity (high-sensitivity Creactive protein, hsCRP). We hypothesized that younger women with CAD have higher baseline concentrations of IL-6 and higher IL-6 response to stress compared with men and older patients, and that similar results would be observed for other inflammatory biomarkers but not hsCRP.

Methods: We measured baseline values of IL-6, hsCRP, MCP-1, and MMP-9 and their changes at 90 min after a mental stress challenge (speech task) among 819 patients with stable CAD. Inflammatory response was measured as the difference between 90 min values and resting values. Repeated measures models were used to investigate age and sex differences across time testing for the interaction of age (continuous) and sex, before and after adjusting for demographics, cardiovascular risk factors, depressive symptoms, medication use, and CAD severity. Inflammatory markers were log-transformed and results presented as geometric means.

Results: Of 819 patients, 31% were women with mean age of 60 years (range: 25-79). In unadjusted and adjusted models, younger women, but not older women, had significantly higher concentrations of IL-6 at rest and 90 min after mental stress than men (p < .05) (figure). Younger women also had greater concentrations of IL-6 in response to stress with sex-by-age interactions of p < .10 in all models. Inflammatory response to stress for hsCRP, MCP-1, or MMP-9 was similar in women and men.

Conclusions: Young women with CAD have a higher inflammatory response to stress which is specific to IL-6, compared to similarly aged men. Higher IL-6 in response to stress may be an important mediating pathway linking stress with cardiometabolic outcomes among young women.

Symposium 1031 Thursday, March 8 from 2:25 to 3:25 pm

Chronobiology Meets Psychophysiology: Revisiting Circadian Rhythms Underlying 24-h Ambulatory Data

Jennifer J. McGrath, PhD MPH, Pediatric Public Health Psychology Lab, Concordia University, Montreal, QC, Canada, Marc N. Jarczok, Dr., Clinic for Psychosomatic Medicine and Psychotherapy, Ulm University, Ulm, Germany, Marc N. Jarczok, Dr., Clinic for Psychosomatic Medicine and Psychotherapy, Ulm University, Ulm, Germany, Nina Kupper, PhD, Medical and Clinical Psychology, Tillburg University, Tilburg, Netherlands

Circadian rhythms driven by clock genes are omnipresent in biosignals, from heart rate and blood pressure to body temperature and hormone production to sleep timing. Technological advances in wearable gadgets and ambulatory monitoring have made continuous recording of real-time data, in copious quantities, accessible for health researchers. These

advances may facilitate optimization of health and resilience in our changing world. Curiously, while sophisticated research methodology increasingly incorporates 24/7 monitoring of physiological signals, simplistic data reduction approaches often persist that yield only day and night measures. Unfortunately, these crude approaches commonly over-aggregate data, averaging across time and across days, thereby obscuring underlying chronobiological rhythms. Alternative methods for identifying and quantifying circadian rhythmicity preserve salient nuances of continuously recorded time-series data. This symposium features theoretical and practical applications of modeling circadian rhythms. The first presentation outlines foundational principles of circadian rhythms and chronobiology, including review of historical methodology. Accessible approaches to analyze, detect, and quantify circadian rhythms among ambulatory data will be highlighted, with focus on heart rate variability and actigraphy. The second presentation showcases recent epidemiological research investigating the diurnal pattern of 24-hour heart rate variability in the Mannheim Industrial Cohort Study, a large population-based sample of healthy workers. Circadian variation in relation to age and preliminary normative reference values of cosine function parameters will be discussed. The third presentation examines the alignment of daily perceived stress with circadian rhythmicity of heart rate variability among children and adolescents. Comparison of circadian measures versus traditionally derived day and night measures will be presented. Finally, the discussant summarizes advantages and challenges with analyzing circadian rhythms in ambulatory data, in light of historical research. A critique of the current state of knowledge and consideration of the re-uptake of chronobiology in the fields of psychosomatic medicine and psychophysiological research, combined with suggestions for future directions, concludes this symposium.

Individual Abstract Number: 1522

Circadian Pattern Analysis of Psychophysiological Data: History Repeats Itself

Jennifer J. McGrath, PhD MPH, Pediatric Public Health Psychology Lab, Muhammed Y. Idris, PhD, Data Scientifique, Amyna Kanji, BSc, Pediatric Public Health Psychology Lab, Concordia University, Montreal, QC, Canada

This year's Nobel Prize in Physiology & Medicine was awarded to Hall, Rosbash, and Young for their discoveries of the molecular mechanisms encoded by clock genes that control the endogenous circadian rhythm in fruit flies. Researchers have long been interested in circadian rhythmicity, periodicity, and biorhythms in humans. In the 1930s, Kleitman conducted his classic cave experiments to understand absence of environmental cues on sleep. By the late 1960s, Saltzberg recognized the "diagnostic importance of unexpected perturbations" in biorhythms essential for development. At the same time, Halberg (1964) and Walter Reed biomathematicians proposed methods for detecting circadian rhythms, including spectral convolution models, sinusoidal regression, and nonlinear approaches. The 1970s and 1980s witnessed renewed interest in sleep-wake cycles, shift work, and circadian patterns. Circadian research proliferated again in the 1990s, extending to blood pressure, cardiovascular reactivity, physical activity, event-related potentials, among others. Today, the role of circadian rhythmicity in health is being revisited, with intriguing questions raised about disruption and misalignment. Disrupted circadian rhythms have been shown to lead to myocardial infarctions, hypertension, diabetes, obesity, some cancers, and even mortality. Technology is developing at an exponential pace and has enabled greater

precision of continuous signal acquisition of ambulatory data. While researchers are well-versed in advanced statistical modeling, overly simplistic data reduction with 24-hour data is not uncommon. Over-aggregation of time-series repeated measurements, across time and days, masks underlying chronobiological rhythms. Wearable smart technology is considered the "hot new field" that will optimize health and revolutionize the health care industry. While the fundamental aspects of analyzing circadian rhythms are actually not new, their robust applications to burgeoning data generated from 24/7 wearable gadgets are. The objective of this comprehensive review is to outline foundational principles of circadian rhythms and chronobiology, including historical methodology. Accessible approaches to quantify circadian rhythms in heart rate variability and actigraphy data will be presented, including discussion of cosinor techniques, phase angles, and circular statistics.

Individual Abstract Number: 1359

Reference ranges of circadian variation parameters of cardiac autonomic modulation in healthy employees: The Mannheim Industrial Cohort Studies

Marc N. Jarczok, Dr., Clinic for Psychosomatic Medicine and Psychotherapy, Ulm University, Ulm, Germany, Ann-Katrin L. Rohr-Kräutle, MD, Medical School Mannheim, Heidelberg University, Mannheim, Germany, Julian F. Thayer, PhD, Psychology, Ohio State University, Columbus, OH, Joachim E. Fischer, Dr. med., Medical School Mannheim, Heidelberg University, Mannheim, Germany

Introduction: Heart rate variability (HRV) fluctuates in a pattern of diurnal variation, with a peak of parasympathetic dominance during night time. Blunted increases at night are associated with decreased vagal tone and unfavorable health outcomes. We aim to provide age and sex specific reference values of the circadian pattern of HRV in a healthy working population.

Methods: HRV parameters in over 5.000 healthy employees (mean age 41 ± 10 ; 79% males) 24-h HR-recordings were collected at multiple distinct study sites of the Mannheim Industrial Cohort Study (MICS). Healthy was defined rigorous as indicating explicitly "No" to any of the following diagnoses: high blood pressure, high lipids, high sugar, respiratory diseases (e.g. Asthma, COPD), angina pectoris, stroke, infarction, CHD, depression, burnout, other chronic diseases, cancer and taking beta blockers. To quantify the circadian variation 3 individual-level cosine function parameters were estimated: MESOR, amplitude and acrophase. In a second step, mean standard deviation (SD) or the 95% CI on group level (e.g. gender) were estimated. Third, ANOVA and t-test were used to quantify the impact of gender and nine quinquennium age groups on MESOR, amplitude, and acrophase.

Results: All examined parameters show a circadian rhythm and a clear day-night variation. MESOR of all parameters except RR and amplitude of all parameters were negatively associated with age. Also, gender-dependent differences in all measurement parameters in varying degrees depending on the parameter were apparent. The gender-dependent differences in all measurement parameters show lower values for women compared to men of the same age group. These gender-dependent differences decrease with increasing age group and even possibly reverse in the higher age (> 50-years).

Conclusion: Decreased circadian variation in physiology is associated with poorer health. Circadian variation patterns diminish by age, with a decreasing gender gap of women revealing lower variation patterns. Particularly, age declined in both the overall mean (M) and the oscillation (A) indicating a decrease of nocturnal parasympathetic activity.

Individual Abstract Number: 1491

Heart rate variability and perceived stress in children: Comparison of traditional versus circadian measures

Jennifer J. McGrath, PhD MPH, Andréanne Angehrn, BA, Pediatric Public Health Psychology Lab, Concordia University, Montreal, QC, Canada

Introduction: Heart rate variability (HRV) reflects beat-to-beat variation in timing of consecutive heart beats and provides an index of cardiac vagal tone. New technology has made continuous 24-hour recording of heart rate convenient and easily accessible. Heart rate follows a circadian rhythm; lower heart rate at night coincides with parasympathetic dominance during slow-wave sleep. Lower HRV, especially reduced high-frequency power, is linked to cardiovascular outcomes and psychological phenomena, including stress. Stress that is more frequent, intense, and chronic corresponds with lower HRV, among adults and children. Few studies consider circadian variation of HRV or its association with stress.

Method: Children (9-17 years) participated in the Healthy Heart Project in Montreal, Quebec. Perceived Stress Scale (Cohen, 1994) was completed at recording onset (10-item; past month) and daily for two weeks (4-item; past 24 hours). Ambulatory monitors (Grass, TREA) continuously recorded ECG for 30 hours. Kubios software was used to manually edit data and derive "traditional" high-frequency power (HF) for day and night. Cosinor analysis was used to yield circadian rhythmicity parameters (MESOR, acrophase, amplitude). Analyses controlled for age, sex, BMI; effect sizes (eta-squared η^2) are reported.

Results: Using traditional measures, perceived stress over past month was not associated with day or night HF (η^2 =.010, η^2 =.010, respectively). Greater variation in daily stress was significantly associated with higher day HF (η^2 =.059); no relation was observed for night HF (η^2 =.014). Using circadian measures, perceived stress over past month and daily stress variation were both significantly associated with acrophase anchored to sleep onset (η^2 =.071, η^2 =.060, respectively); no relation was observed for MESOR (η^2 =.015, η^2 =.022) or amplitude (η^2 =.001, η^2 =.001). Perceived stress on day of ambulatory recording was significantly associated with amplitude (η^2 =.055).

Conclusion: Comparison of traditional HRV derived indices versus circadian rhythm parameters suggest these measures provide distinct, but complementary information about cardiac vagal tone and its association to perceived stress in children. These findings have meaningful implications for better understanding the chronobiology underlying pathophysiological mechanisms by which stress affects health.

Symposium 1276 Thursday, March 8 from 2:25 to 3:25 pm

Troubled Marriages Take a Toll: Marital Conflict-Related Alterations in the Sympathetic and Parasympathetic Nervous Systems, Inflammatory Responses, and the Gut Microbiome

Janice K. Kiecolt-Glaser, PhD, Institute for Behavioral Medicine Research, The Ohio State College of Medicine, COLUMBUS, OH, Timothy W. Smith, PhD, Psychology, University of Utah, Salt Lake City, UT, Stephanie J. Wilson, PhD, Institute for

Unhappy marriages exact a cost on mental and physical health, elevating the risk for many disorders including depression, cardiovascular disease, metabolic syndrome, and diabetes. This symposium of three papers will illustrate how marital distress impacts key physiological systems implicated in each of these disorders, including the sympathetic and parasympathetic branches of the autonomic nervous system, the immune system's inflammatory response, and the gut microbiota. The studies consider three unique facets of couples' dynamics during marital conflict in association with diverse physiological sequelae across three different timescales. The first presentation provides a novel look at both actor and partner associations with cardiovascular reactivity during marital conflict in two populations: healthy, middle-aged couples, as well as military veteran couples with and without PTSD. The research addresses the extent to which the individual's own behavior and/or the behavior of the partner during conflict discussions predicts concurrent cardiovascular reactivity (systolic and diastolic blood pressure, as well as cardiac sympathetic reactivity, as indexed by pre-ejection period shortening). The second speaker uses synchrony in heart rate variability (HRV) during conflict to predict inflammation throughout the day; this investigation of partners' conflict-related HRV linkage highlights a novel, health-relevant social-biological pathway. Building on these two presentations, the third speaker will address how the bidirectional microbiota-gut-brain communication involves multiple depression- and stressresponsive pathways including both the sympathetic and parasympathetic nervous systems as well as inflammatory responses. To investigate increased gut permeability (a "leaky gut") as a mechanistic pathway from marital distress and depression to heightened inflammation, the speaker evaluates associations of endotoxin biomarkers with marital distress, mood disorder history, and inflammation. The discussant, a distinguished marital researcher. brings his notable interdisciplinary expertise to highlight the clinical and health relevance of the findings.

Individual Abstract Number: 1424

Is It Me or You? Associations of Actor and Partner Behavior with Cardiovascular Reactivity during Marital Conflict

Timothy W. Smith, PhD, Carolynne E. Baron, M.S., Bert N. Uchino, PhD, Psychology, University of Utah, Salt Lake City, UT Low marital quality confers risk of cardiovascular disease (CVD), perhaps through physiological reactivity to conflict. To further explore this mechanism, two studies evaluated the extent to which the individual's own behavior and/or the behavior of the partner predicted cardiovascular reactivity (CVR) during conflict. Both studies utilized the Structural Analysis of Social Behavior, coding combinations of affiliation (warmth vs hostility) and control (dominance vs deference) during problem discussions. In Study 1, with 146 healthy middle-aged couples, actor-partner analyses indicated that actor's conflictual behavior (i.e., high hostility and dominance, low warmth) predicted blood pressure responses (SBP: est = 1.56, SE = .52, t = 3.05, p = .003; DBP: est = 1.16, SE = .31, t = 3.73, p<.001). Partner effects were not significant. In Study 2, 32 male Iraq/Afghanistan Veterans with PTSD and female partners, and 32 Veteran couples without PTSD, underwent a conflict discussion. Behaviorally coded actor warmth predicted lower SBP reactivity (est = -1.54, SE = .73, t =

2.12, p = .037), and mediated the association of PTSD with SBP (est = 1.004, CI = .036, 2.30, p = .028). Actor hostile control predicted greater pre-ejection period (PEP) shortening (est = -1.10, SE = .47, t = 2.33, p = .022), and mediated the association of PTSD with this indicator of cardiac sympathetic reactivity (est = -.765, CI = -1.70, -.085, p = .016). The only partner effect to approach significance was the association of hostile control with PEP (est. = -.87, SE = .49, t = 1.79, p = .077), which also had a marginal effect in mediating the association of PTSD with PEP (est = -.605, CI = -1.50, .06, p = .057). Overall, the individual's own behavior was a better predictor of CVR than partner's behavior, perhaps contributing to effects of marital strain on CVD, as well as associations of chronic emotional distress (e.g., PTSD) with CVD. As a research framework, effects of actor and partner behavior in intimate relationships on other sources of cardiovascular activation beyond reactivity (e.g., stress exposure, recovery, and restoration) should be examined. Actor and partner effects on these four sources of other aspects of overall physiological burden (e.g., inflammation, neuroendocrine responses) should also be examined, to clarify modifiable mechanisms linking marital quality with CVD.

Individual Abstract Number: 1319

When couples' hearts beat together: Synchrony in heart rate variability during conflict predicts heightened inflammation throughout the day

Stephanie J. Wilson, PhD, Institute for Behavioral Medicine Research, The Ohio State University College of Medicine, Columbus, OH, Brittney E. Bailey, MS, Public Health, The Ohio State University, Columbus, OH, Lisa M. Jaremka, PhD, Psychological and Brain Sciences, University of Delaware, Newark, DE, Christopher P. Fagundes, PhD, Psychology, Rice University, Houston, TX, Rebecca Andridge, PhD, Public Health, The Ohio State University, Columbus, OH, William B. Malarkey, MD, Internal Medicine, The Ohio State University College of Medicine, Columbus, OH, Kathleen M. Gates, PhD, Psychology and Neuroscience, UNC Chapel Hill, Chapel Hill, NC, Janice K. Kiecolt-Glaser, PhD, Institute for Behavioral Medicine Research, The Ohio State University College of Medicine, Columbus, OH

An unhappy marriage increases disease and mortality risks. During negative interactions, unhappy couples show greater autonomic synchrony compared to satisfied couples, in that their autonomic fluctuations track more closely together. Prior work has not examined the association between synchrony and physical health indicators, but this physiological signature may play a unique role in marriage's health effects. To examine associations between couples' heart rate variability (HRV) synchrony during conflict and their inflammation levels, 43 married couples engaged in a marital problem discussion while wearing heart rate monitors and provided blood samples throughout the day; they repeated this protocol at a second visit. Multilevel models treated log-transformed interleukin-6 (IL-6) and tumor necrosis factor-alpha (TNF-alpha), lipopolysaccharide (LPS) stimulated IL-6 and TNF-alpha, as well as soluble intercellular adhesion molecule-1 (sICAM-1), and vascular adhesion molecule-1 (sVCAM-1) as outcomes, accounting for a wide range of confounds: age, gender, education, trunk fat, marital satisfaction, both partners' morning baseline HRV levels, and negative affect. The associations between synchrony and negative affect throughout the day, as well as negative affect reactivity to conflict, were also examined. When couples' moment-to-moment HRV changes tracked more closely together during conflict, couples also had higher serum IL-6, Estimate 95% CI [0.08, 2.51], LPS-stimulated TNF-alpha, Estimate 95%

CI [0.28, 1.95], and sVCAM-1, Estimate 95% CI [0.07, 0.47], across the day—both at baseline and after the problem discussion. Stronger HRV synchrony during conflict also predicted greater negative affect reactivity to the disagreement, Estimate 95% CI [0.61, 6.56]. Stronger HRV synchrony between disagreeing partners predicted a heightened inflammatory profile, beyond the effects of marital satisfaction, negative affect, and other factors known to increase inflammation. When partners synchronized more closely, they also had more pronounced negative affect reactivity; however, negative emotion did not account for synchrony's links to inflammation. These data highlight partners' conflict-related HRV linkage as a novel social-biological pathway to inflammation-related disease.

Individual Abstract Number: 1345

Marital Distress, Depression, and a Leaky Gut: Translocation of Bacterial Endotoxin as a Pathway to Inflammation

Janice K. Kiecolt-Glaser, PhD, Stephanie J. Wilson, PhD, Institute for Behavioral Medicine Research, The Ohio State College of Medicine, Columbus, OH, Michael Bailey, PhD, Institute for Behavioral Medicine Research, Ohio State College of Medicine/Nationwide Children's Hospital, Columbus, OH, Rebecca Andridge, PhD, Division of Biostatistics/College of Public Health, Juan Peng, MS, Center for Biostatistics, The Ohio State University, Columbus, OH, Lisa Jaremka, PhD, Psychology, University of Delaward, Newark, DE, Christopher P. Fagundes, PhD, Psychology, Rice University, Houston, TX, William B. Malarkey, MD, Internal Medicine, Bryon Laskowski, BS, Institute for Behavioral Medicine Research, The Ohio State College of Medicine, Columbus, OH, Martha A. Belury, PhD, Human Sciences, The Ohio State University, Columbus, OH Microbial translocation of endotoxin (lipopolysaccharide, LPS) from the gut microbiota to blood circulation stimulates systemic inflammatory responses. To investigate increased gut permeability(a "leaky gut") as one potential mechanistic pathway for the heightened inflammation associated with marital distress and depression, this secondary analysis of a double-blind, randomized crossover study included serial assessments of two endotoxin biomarkers, LPS-binding protein (LBP) and soluble CD14 (sCD14), as well as C-reactive protein (CRP), interleukin 6 (IL-6), and tumor necrosis factor alpha (TNF- α) before and after high-fat meals during two separate 9.5 hour visits. The 43 healthy married couples, ages 24 to 61 (mean=38.22), discussed a marital disagreement during both visits; behavioral coding of these interactions provided data on hostile marital behaviors, a hallmark of marital distress. The Structured Diagnostic Interview for DSM-IV assessed participants' mood disorder history. Participants with more hostile marital interactions had higher LBP (p < 0.0001) than those who were less hostile (p = 0.001). Additionally, the combination of more hostile marital interactions with a mood disorder history was associated with higher LBP/sCD14 ratios and poorer diet quality. Higher LBP (p=0.008) and LBP/sCD14 ratios (p=0.03) were associated with greater CRP production, with a marginal association between LBP and IL-6 (p=0.07). LBP has been described as a clinical marker of effective endotoxemia, and atherosclerosis, cardiovascular disease, and diabetes have all been associated with chronic bacterial endotoxin exposure. These bacterial translocation data show how marital distress and depression can fuel inflammationrelated disorders.

Harnessing technology to advance behavioral medicine research

Carissa A. Low, PhD, Medicine, University of Pittsburgh, Pittsburgh, PA, Carissa A. Low, PhD, Medicine, University of Pittsburgh, Pittsburgh, PA, Matthew F. Muldoon, MD, Heart and Vascular Institute, University of Pittsburgh School of Medicine, Pittsburgh, PA, Judith T. Moskowitz, PhD, Medical Social Sciences, Northwestern University, Chicago, IL, John F. Hunter, MA, Psychology and Social Behavior, University of California -Irvine, Irvine, CA, Bruce L. Rollman, MD, Medicine, University of Pittsburgh, Pittsburgh, PA

Emerging mobile and online technologies offers unprecedented opportunities to measure and intervene on symptoms, health behaviors, and affective states in real-time and real-world contexts, optimize patient engagement, and tailor interventions based on dynamic patient needs and responses. The presentations in this symposium will highlight novel ways to apply online and mobile health (mHealth) research methods to the study of psychosocial and behavioral factors in health and disease. The first presenter will discuss results of a pilot study using passive smartphone and wearable sensors to estimate symptoms and stress during cancer treatment. The second presenter will describe feasibility and short-term effects of an automated mobile messaging system for hypertension control. The third talk will report results from a recent trial refining and testing an online positive affect skills intervention for individuals with elevated depressive symptoms. Finally, the fourth talk will describe usability and efficacy of an electronic tool to help children manage cancer pain and symptoms. Together these papers highlight potential applications of technology to biobehavioral science and interventions. The discussant will bring his expertise in behavioral health and smart technology to a critical and integrative discussion of the four presentations as well as future directions in mHealth research.

Individual Abstract Number: 1131

Using Passive Smartphone and Wearable Sensors to Estimation Patient-Reported Stress and Symptoms During Chemotherapy

Carissa A. Low, PhD, Medicine, University of Pittsburgh, Pittsburgh, PA, Anind K. Dey, PhD, Human-Computer Interaction Institute, Carnegie Mellon University, Pittsburgh, PA, Denzil Ferreira, PhD, Mobile Computing, University of Oulu, Oulu, Finland, Thomas Kamarck, PhD, Psychology, University of Pittsburgh, Weijing Pittsburgh, PA, Sun, MD. Hematology/Oncology, University of Kansas, Lawrence, KS, Sangwon Bae, PhD, Afsaneh Doryab, PhD, Human-Computer Interaction Institute, Carnegie Mellon University, Pittsburgh, PA Background: Both psychological stress and physical and psychological symptoms are common during chemotherapy for cancer and can impair quality of life, adherence, and clinical outcomes. Real-time monitoring of fluctuations in stress and symptoms could guide the delivery of just-in-time adaptive interventions to improve patient outcomes. Sensors embedded in smartphones and wearable activity trackers could be potentially useful in monitoring stress and symptoms passively, with minimal patient burden.

Methods: A total of 24 patients undergoing chemotherapy for gastrointestinal cancer participated in the 4-week study; to date, data from 14 patients have been analyzed (M = 60 years old, 43%

female). Participants carried an Android phone and wore a Fitbit Charge HR device for the duration of the study and also completed daily stress ratings (ranging from not at all (1) to extremely (4) stressful) and severity ratings of 12 common symptoms. Day-level features were extracted from raw smartphone sensor and Fitbit data and included features reflecting mobility and activity (e.g., from the phone GPS and phone and Fitbit accelerometer), phone usage (e.g., duration of interaction with phone and apps), and communication (e.g., number of incoming and outgoing calls and message). We used a Rotation Forests classifier with cross-validation and resampling with replacement to evaluate model performance.

Results: Using a classifier to estimate stress burden, we achieved an accuracy of 90.4% for our population model. For symptom burden, the accuracy of the population model was 88.1%. Features with the best accuracy for stress included phone usage features. For symptoms, sedentary behavior as the most frequent activity, fewer minutes in light physical activity, less variable and average acceleration of the phone, and longer screen-on time/interactions with apps on the phone yielded the best accuracy.

Conclusions: Passive sensor data, including smartphone accelerometer and usage and Fitbit-assessed activity, were significantly related to daily stress and symptom burden during chemotherapy. These findings highlight opportunities for long-term monitoring of cancer patients during chemotherapy with minimal patient burden as well as real-time adaptive interventions aimed at earlier management of stress and symptoms.

Individual Abstract Number: 1132

Short-term feasibility and impact assessments of an automated messaging system for hypertension self-management

Matthew F. Muldoon, MD, Heart and Vascular Institute, Matthew Allen, BA, Medicine, University of Pittsburgh School of Medicine, Pittsburgh, PA, Julian Einhorn, BA, Psychology, University of Pittsburgh, Pittsburgh, PA, Taya Irizarry, PhD, Psychiatry, Bruce Rollman, MD, Medicine, University of Pittsburgh School of Medicine, Pittsburgh, PA, Burke Lora, PhD, Nursing, University of Pittsburgh School of Nursing, Pittsburgh, PA, Brian Suffoletto, MD, Emergency Medicine, University of Pittsburgh School of Medicine, Pittsburgh, PA, Kamarck Thomas, PhD, Psychology, University of Pittsburgh, Pittsburgh, PA

Background: Control of blood pressure (BP) is often poor and represents a challenge for patients with hypertension and their providers. Optimal hypertension self-management requires adequate health literacy and may be supported by ongoing feedback. The *MyBP* program provides access to online educational videos and text-based prompts to report BP readings four times weekly, plus instant recurring feedback of the rolling BP average with an additional bi-weekly summary report.

Aims: To assess the short-term feasibility of *MyBP* and examine changes in perceptions and behaviors regarding self-management among adult patients with hypertension.

Methods: Recruitment cites included: a specialty service (SS) referral hypertension center (n=11), a primary care (PC) clinic (n=10) and an urban emergency department (ED) (n=22). Primary inclusion criteria included community-dwelling adults with a prior diagnosis of hypertension and, for PC and ED patients, a current BP >140/90 mm Hg. After viewing the online videos, patients used the program for six weeks. Semi-structured exit-interviews assessed patients' perceptions of the program,

shifts in the importance of measuring and understanding blood pressure, and changes in beliefs regarding health behaviors.

Results: The 43 participants (age 34-70, 58% female, 61% black) had an average baseline BP of 157/94 mm Hg. Patients submitted a BP reading in response to 76% of reminder messages. Three participants completed only 4 of the 6 week monitoring period. In the exit interview, 80% and 73% of patients reported that the program increased importance of, and their confidence in, BP self-monitoring, respectively. About 50% of participants reported an increase in importance and confidence regarding healthy diet habits and stress reduction, as well as changes in both behaviors as a result of the program. One in 3 reported such changes in exercise. Across all these outcomes, PC and ED patients reported change more frequently than did SS patients. Among PC and ED patients, 30% reported improved medication adherence. Finally, 73% of all participants reported an increase in their confidence in controlling their BP, and 88% indicated willingness to use the program long-term.

Conclusion: The *MyBP* program has favorable feasibility, utilization, and short-term effects on patient's perceptions and health behaviors.

Individual Abstract Number: 1133

Development and Enhancement of an Online Positive Affect Skills Intervention for Those Living with Elevated Depressive Symptoms

Judith T. Moskowitz, PhD, Medical Social Sciences, Northwestern University, Chicago, IL, Sarah M. Bassett, MA, Elizabeth L. Addington, PhD, Elaine O. Cheung, PhD, Medical Social Sciences, Northwestern University Feinberg School of Medicine, Chicago, IL

Background: Online interventions to reduce negative affect in those with depression have been developed, but they have not capitalized on the unique benefits of increasing positive affect, and frequently suffer from poor adherence and retention. To address these gaps, we developed an online positive affect intervention for those with symptoms of depression.

Methods: We conducted two sequential pilot studies. In study 1, we tailored an existing in-person positive affect intervention (MARIGOLD) teaching 8 skills (noticing and capitalizing on positive events, gratitude, behavioral activation, mindfulness, positive reappraisal, personal strengths, acts of kindness) for online delivery to those with elevated depressive symptoms. We then conducted an RCT of the intervention (n=33) vs. active control (daily emotion reporting; n=17) and waitlist control (n=15). In study 2, we developed and examined 3 enhancements aimed at increasing adherence and retention to the online intervention: facilitator contact (FC; n=27), discussion board (DB; n=26), and virtual badges (VB; n=26). In both studies, we examined feasibility and acceptability via mixed methods and evaluated preliminary efficacy using self-reported outcomes from baseline, post-intervention, and 1- and 3-month follow-up assessments.

Results: Across studies, retention in the intervention ranged from 54% to 70%. Adherence as measured by number of skills accessed was high (study 1: M=6.91, SD=1.86; study 2: M=5.90, SD=2.85) (out of 8 total skills). Participants deemed the intervention acceptable, as demonstrated by willingness (0-10 scale) to recommend the skills to someone else with depression (study 1: M=9.40, SD=1.12; study 2: M=8.12, SD=1.74). The intervention significantly increased positive affect in study 1, and in study 2 DB and VB conditions; and decreased negative affect in all intervention groups. Moreover, all 3 groups in study 2

demonstrated a significant reduction in depressive symptoms (CES-D and PHQ-8).

Conclusion: Retention and adherence to MARIGOLD surpassed prior online interventions. After updating the online platform and enhancements according to participant feedback, we are now conducting a larger RCT (N=600) using a factorial design to optimize this online positive affect skills intervention for those with elevated depressive symptoms.

Individual Abstract Number: 1134

Pain Buddy: An mHealth tool that delivers pain and symptom management interventions for children with cancer John F. Hunter, MA, Psychology and Social Behavior, University of California - Irvine, Irvine, CA, Michelle A. Fortier, PhD, Haydee G. Cortes, BA, Anesthesiology & Perioperative Care, University of California, Irvine, Orange, CA, Sergio Gago-Masague, PhD, California Institute of Telecommunications and Information Technology (Calit2), University of California, Irvine, irvine, CA

Objectives: The current study describes the preliminary efficacy testing of a mobile health intervention that aims to manage cancer pain and symptoms in children. The web-based application, Pain Buddy, includes a validated pain and symptom diary, cognitive and behavioral coping skills training, an electronic tool for communicating with healthcare providers, and a three-dimensional avatar to guide the child through the program.

Methods: Following a successful pilot feasibility study, we are currently collecting preliminary efficacy data in a randomized controlled trial in which 19 children have completed the study, 21 are in progress, and another 20 will be recruited. Children are randomly assigned to the Pain Buddy intervention or attention control group. Both groups complete symptom diaries twice daily for 8 weeks. For each diary, children rate their current pain severity, average pain since last entry, and worst pain since last entry, using a 100-mm visual analog scale. The intervention group additionally receives cognitive and behavioral skills training and remote symptom monitoring by healthcare providers. Data presented here include results from the 19 children (74% male, ages 8-18 years) who have completed the trial. Data collection is ongoing and results from the final sample (n=60) will be presented at the symposium.

Results: The 19 children who concluded the trial completed an average of 96.79 ± 19.34 diaries over the study period. Mann-Whitney tests of pain severity revealed that children randomized to the intervention group (*n*=8) experienced lower overall pain severity (*U*=976.00, *p*=0.281, *d*=0.42), average pain since last diary entry (*U*=607.50, *p*<0.001, *d*=0.97) and worst pain since last diary entry (*U*=472.50, *p*<0.001, *d*=1.10) compared to those in the control condition (*n*=11). Pain (31%), trouble sleeping (24%), and vomiting (23%) were the three most common symptoms reported. Future analyses will examine which specific intervention strategies were most effective in managing pain and symptoms.

Conclusions: Preliminary efficacy data support the effectiveness of the intervention. Pain Buddy is an innovative and interactive mobile health application that promises to improve pain and symptom management among children with cancer.

Symposium 1505 Thursday, March 8 from 3:40 to 4:55 pm

Resilience in the face of loss: A biobehavioral approach

Christopher Fagundes, Ph.D., Psychology, Rice University, Houston, TX, Christopher Fagundes, Ph.D., Psychology, Rice University, Houston, TX, David Sbarra, Ph.D., Psychology, University of Arizona, Tuscon, AZ, George Bonanno, Ph.D., Psychology, Columbia University, New York, NY, George Bonanno, Ph.D., Psychology, Columbia, New York, NY

Loss events are consistently ranked as the most stressful life events one can experience. Since the inception of APS 75 years ago, there has been human and animal work demonstrating that the loss of spouse due to divorce or death has negative psychological and physiological consequences. Over this span of time, grief has been conceptualized in a variety of ways. Most notably, some academics within the American Psychosomatic Society entertained the idea that grief should be conceptualized as a "disease." We are beginning to understand that not everyone experiences extreme psychological and physiological dysregulation after a loss experience. In fact, most people are remarkably resilient. In this symposium, we first report new empirical data from three separate laboratories showing how loss experiences impact the autonomic, endocrine, and immune systems. We then call for a paradigm shift in our understanding of the biobehavioral mechanisms that underlie loss. We highlight the need for biobehavioral studies to focus on normal resilience processes rather than psychopathology. By taking this approach, we argue that biobehavioral researchers will gain a deeper understanding of how and when resilience processes go awry.

Individual Abstract Number: 1512

Bereavement promotes inflammation and reduces heart rate variability

Christopher Fagundes, Ph.D., Psychology, Rice University, Houston, TX, Cobi Heijnen, Ph.D., Symptoms Research, MD Anderson Cancer Center, Houston, TX

The loss of a spouse is a highly stressful event that puts people at increased risk for morbidity and mortality. Cardiovascular disease (CVD) accounts for 20% to 53% of excess deaths during spousal bereavement. Stress, depression, and anxiety enhance the production of proinflammatory cytokines. Indeed. psychological stress and depression promote transcription factor nuclear factor kappa B (NF-kB) activation, a prime pathway for upregulating proinflammatory cytokine production. Importantly, inflammation is central to all stages of cardiovascular disease from initial lesion to end-stage thrombotic complications. Inflammation may be a key mechanism underlying CVD among the bereaved. Cardiac vagal tone (as reflected by High Frequency Heart Rate Variability or HF-HRV) is associated with selfregulation, and is a risk factor for CVD, partly due to elevations in inflammation. Methods: N= 33 spousally bereaved older adults and 32 age-matched controls were evaluated. Blood was taken and an EKG was administered along with questionnaires. LPS stimulated culture supernatants were assayed for IL-1b, IL-6, and TNF-a. LPS Results: Bereaved individuals had lower levels of HF-HRV as indexed by RMSSD (B=-.36, p < .05) compared with their non-bereaved counterparts. Bereaved individuals also reported high levels of depressive symptoms (B=.31, p<.05) and exhibited higher levels of pro-inflammatory cytokines (IL-1b, IL-6, TNF- α) produced by activated whole blood cultures (B=.47, p<.01). These data replicate previous findings demonstrating that bereavement is related to lower HF-HRV. Although previous work has demonstrated that bereavement is associated with

elevated inflammation in serum, these data are the first to demonstrate that bereavement is associated with the expression of LPS stimulated pro-inflammatory cytokines suggesting that bereavement may produce a pro-inflammatory phenotype.

Individual Abstract Number: 1516

Biobehavioral processses underlying complicated grief

Mary-Frances O'Connor, Ph.D., Psychology, University of Arizona, Tuscon, AZ

Introduction: Complicated grief, also termed Persistent Complex Bereavement Disorder in the DSM-5, is a syndrome marked by persistent emotional distress and functional impairment, which has been associated with increased morbidity and mortality. Behavior theorists long recognized that both approach and avoidance motivation systems are involved in maintenance of this syndrome. Evidence from a separate, but related, neurobiological literature has implicated the neuropeptide oxytocin (OT) as playing an integral role in these motivation systems and may shed light on the interplay between approach and avoidance. The purpose of this study is to study the effects of exogenous oxytocin administration in complicated grief (CG) and noncomplicated grief (NCG). Methods: N= 37 spousally bereaved older adults (CG n = 17, NCG n=20) completed an idiographic Approach Avoidance Task, pushing and pulling a joystick in response to images of their deceased spouse, a living loved one an age- and sex-matched stranger. Participants completed this task following placebo and OT (24IU oxytocin administered intranasally). Results: A 2(group) x 2(response direction) x 2(stimulus) mixed factorial repeated measures ANOVA yielded a main effect of CG (p < .01). Those with CG responded more slowly in the OT condition (p < .01) regardless of stimulus, compared to those with NCG. Discussion: These data replicate previous findings in support of a relative approach bias in those with CG. Furthermore, these data suggest that the neuropeptide oxytocin may play a significant role in motivation systems in those with CG. Implications for these findings as they relate to onset and maintenance of CG symptoms will be discussed.

Individual Abstract Number: 1519

Bio-psycho-social mechanisms underlying marital separation David Sbarra, PhD, Psychology, University of Arizona, Tuscon, AZ

Although the epidemiological link between marital separation and risk for poor health outcomes is strong, the precise biopsycho-social mechanisms that explain this association remain largely unexplored. This talk reports data from a recently completed pilot study examining the association between objectively-measured daily social behaviors (assessed via the Electronically Activated Recorder; EAR) and immunological risk profile (IRP; quantified as a summary index combining viral antibody titers and markers of inflammation) in a sample (N =49) of adults who experienced a recent marital separation. We find that objectively-measured social behaviors-including time spent alone, time spent socializing, and time receiving positive emotional support-- are associated with concurrent IRP scores over and above the effects of psychological distress, and that psychological distress may be linked to biomarkers of immune health through these measures social integration. Consistent with the role of sickness behavior in acute grief responses, a key point for discussion in this session is the extent to which indicators of social withdrawal may lead or follow from changes in daily social behaviors, and the ways in which both constructs are associated with subjective separation-related distress.

Individual Abstract Number: 1521 Resilience in the face of loss

George Bonanno, Ph.D., Psychology, Columbia University, New York, NY

The death of a loved one is an inevitable but highly stressful part of life. Not surprisingly, research has consistently shown that some bereaved individuals will experience lasting grief symptoms for many years. Yet, more positively, for most bereaved individuals the outcome is dramatically different. Over two decades prospective and longitudinal research from my lab has consistently shown that while some bereaved individuals struggle with enduring symptoms, the clear majority of bereaved individuals experience only minimal symptoms and exhibit stable trajectories of health even in the early months after a major loss. The prevalence of resilience suggests that rather than focusing exclusively on psychopathology, biobehavioral studies grief and trauma should attempt to understand the normal resilience processes, and by extension how these processes might sometimes go awry. One implication for example is that prevalence of resilience is driven by the efficacy of the human stress response system. But the human stress response is also complex and requires a lengthy developmental period to mature and, as recent epigenetic research has shown, can become either hyper- or hypo-reactive as a result of early life adversity or deprivation. Another implication is that resilience to adversity is multiply determined, i.e., there is no one way to be resilient. The effect size for most predictors is small, for example, and different combinations of resilient factors, including genetic and biological variables, seem to be operative in different individuals.

Symposium 1054 Friday, March 9 from 11:20 am to 12:35 pm

Bringing Psychological Interventions into the Digital Era

Henriët van Middendorp, PhD, Health, Medical and Neuropsychology, Leiden University, Leiden, , Netherlands, Lemmy Schakel, MSc, Health, Medical and Neuropsychology, Leiden University, Leiden, , Netherlands, Henriët van Middendorp, PhD, Health, Medical and Neuropsychology, Leiden University, Leiden, , Netherlands, Zina Trost, PhD, Psychology, University of Alabama at Birmingham, Birmingham, AL, Adam T. Hirsh, PhD, Psychology, Indiana University -Purdue University Indianapolis, Indianapolis, IN, Andrea W. Evers, PhD, Health, Medical and Neuropsychology, Leiden University, Leiden, , Netherlands

Currently, almost half of all adults are at some point in their lives confronted with one or more chronic somatic condition(s), which has many consequences for both patients and their environment. Many psychological treatments have shown to be effective in improving health behaviors, decreasing disease burden, and improving adjustment. However, on average, they are only modestly effective, and the effects are not, or only partly, maintained at follow-up. Also, high dropout rates and low treatment adherence are often reported. Our quickly changing world has, however, provided us with promising digital developments that enable us to optimize treatment strategies that can be applied for a broad range of health issues. In the current digital era, most patients, including minority, low-income and older patients, also consider digital treatment options viable.

In this symposium, the speakers will present a number of innovative possibilities to optimally combine or translate 'traditional' treatment methods, such as expectancy learning,

cognitive-behavioral treatment, graded exposure, and patientprovider interactions to the new digital era by adding, for instance, serious gaming and virtual reality elements. Examples of interventions for the general population and of specific patient samples will be discussed, showing the strengths of combining current knowledge on relevant biopsychosocial mechanisms related to health and health behaviors with knowledge on the interactive, implicit, and motivational characteristics of digital developments. It will be demonstrated that digitalizing treatments has a high potential, as it 1) provides promising and easily clinically implementable opportunities to improve prevention of a wide variety of health problems, 2) broadens treatment efficiency and scope in terms of decreased treatment burden for both patients and clinicians and increased patient outreach and treatment uptake, 3) increases the potential for individuallytailored or personalized health care, and 4) improves patient selfmanagement strategies and empowerment.

Individual Abstract Number: 1220

Verbal Suggestions to Optimize the Effects of Serious Gaming on Food Outcomes

Lemmy Schakel, MSc, Dieuwke S. Veldhuijzen, PhD, Henriët van Middendorp, PhD, Health, Medical and Neuropsychology, Leiden University, Leiden, Netherlands, Jan De Houwer, PhD, Pieter Van Dessel, PhD, Experimental-Clinical and Health Psychology, Ghent University, Ghent, Belgium, Andrea W. Evers, PhD, Health, Medical and Neuropsychology, Leiden University, Leiden, Netherlands

There is initial support for the effectiveness of evaluative conditioning based interventions in altering food-related health behaviors. Those interventions are, however, often characterized by a lack of excitement and perceived credibility concerning the working mechanisms. To optimize the efficacy, serious gaming can possibly be used to present interventions in an entertaining manner. Furthermore, outcome expectancies induced by verbal suggestions might optimize the effectiveness of these serious games given that outcome expectancies are known to influence many health outcomes. The present study investigated the effectiveness of serious gaming and verbal suggestions on foodrelated health outcomes. A total of 120 participants were randomly assigned to 1 of 4 conditions: serious gaming only, verbal suggestion only, serious gaming combined with verbal suggestion or a gaming control condition. Self-reported food preference and food choice were assessed with a food choice task, with pairs differing solely in healthiness or in healthiness and attractiveness. Implicit food preference was assessed with an implicit association task and food intake with a bogus taste test. Participants in both serious gaming conditions made healthier food choices for pairs differing in healthiness and attractiveness and had healthier implicit food preferences compared to control. We observed trends for stronger effects when serious gaming was combined with verbal suggestion. No effects were found on food intake. These findings provide preliminary support for the effects of serious gaming on self-reported food choice and implicit food preference, as well as cautious indications for the add-on effects of verbal suggestions. This is the first study investigating the addon effectiveness of verbal suggestions on serious gaming. Future studies should further elucidate these effects, also in other health domains such as physical activity.

Individual Abstract Number: 1225

Empowering expectations for health and disease: Combining eHealth cognitive behavioral treatment with serious gaming

Henriët van Middendorp, PhD, Sylvia van Beugen, PhD, Yvette Ciere, MSc, Lemmy Schakel, MSc, Health, Medical and Neuropsychology, Leiden University, Leiden, Netherlands, Valentijn Visch, PhD, Industrial Design, TU Delft, Delft, Netherlands, Margreet Kloppenburg, Phd, MD, Rheumatology, Sjan P. Lavrijsen, PhD, MD, Dermatology, Leiden University Medical Center, Leiden, Netherlands, Andrea W. Evers, PhD, Health, Medical and Neuropsychology, Leiden University, Leiden, Netherlands

Chronic inflammation is seen in many chronic somatic conditions, including rheumatoid arthritis and psoriasis. Next to pharmacological interventions. non-pharmacological interventions have been shown effective in improving health and treatment outcomes. As expectations about health and disease are known to directly affect health and treatment outcomes, for example by inducing anti-inflammatory effects, effects of nonpharmacological interventions may be further optimized by combining automatic (e.g., conditioning) and conscious (e.g., verbal suggestions) expectation learning processes within a personalized environment. An innovative intervention was developed that makes use of several new technologies, including (1) an online (eHealth) environment in which cognitivebehavioral treatment (CBT) is combined with conditioning and suggestion procedures, in order to target health and disease expectations, and (2) a serious game designed to indirectly influence health expectancies, in which participants are immersed in an optimal personal health environment and complete achievements by making beneficial health and lifestyle choices. First, data will be presented of the effectivity of the separate elements, by showing positive effects of two randomized controlled trials on eHealth CBT in patients with rheumatoid arthritis and psoriasis, as well as the effects of a brief serious gaming session on optimizing food preferences in healthy adults. Additionally, the functionality, usability, and feasibility of the combined application in a small group of healthy participants and chronic pain and itch patients will be presented. Preliminary results show a generally positive evaluation of both the eHealth and serious gaming environment. Also, next to suggestions to further improve both the training and the game to optimize their combined strength, participants indicated that adding the game raises consciousness and activation of the topics discussed in the eHealth environment. The innovative non-pharmacological intervention combining eHealth CBT with serious gaming elements could be useful as an addition, or ultimately replacement of, current drug treatments in chronic somatic conditions and may serve to strengthen immunity in healthy subjects.

Individual Abstract Number: 1223

Using Virtual Reality to Treat Chronic Pain: Virtual Graded Exposure for Chronic Low Back Pain and Virtual Walking for Persistent Neuropathic Pain in Spinal Cord Injury

Zina Trost, PhD, Psychology, University of Alabama at Birmingham, Birmingham, AL

Despite medical advances, the burden of chronic pain within the US continues to rise, suggesting a need for novel empirical and clinical paradigms to complement traditional options. There is growing evidence that Virtual Reality (VR) technologies can facilitate new and promising approaches for pain and disability management. These approaches capitalize on advances in our current understanding of the biopsychosocial etiology and

maintenance of chronic pain as well as the multisensory, interactive, and motivational properties of virtual interfaces. To date, VR technologies have primarily been utilized to facilitate acute pain relief and distraction during uncomfortable/painful procedures. Technological developments have increasingly allowed researchers/clinicians to target persistent (non-acute) pain conditions. First, a brief overview will be provided of the current state of research regarding VR-mediated pain intervention, evolving conceptualizations of Virtual Reality, and the theoretical background for VR-mediated pain therapies. Subsequently, data will be discussed from a recently completed study examining the safety and feasibility of an interactive VR prototype delivering cognitive-behavioral intervention designed to challenge fearful pain beliefs and gradually promote completion of avoided physical activity among individuals with chronic low back pain. The prototype will be incorporated into a flexible interactive platform across clinical and home settings and aims to address several limitations of existing treatments, including access, dissemination, and patient engagement. Likewise, an ongoing project will be discussed to develop an immersive virtual walking intervention for individuals with complete paraplegia and spinal cord injury (SCI) - related neuropathic pain. Given the debilitating and refractory nature of neuropathic pain in SCI, illusory walking shows promise to be among the only effective non-pharmacological treatments for this condition. Data on a completed phase of the study will be presented along with discussion of potential supraspinal cortical mechanisms of action.

Individual Abstract Number: 1224

Using Virtual Humans to Reduce Pain Treatment Disparities: Patient- and Provider-focused Interventions

Adam T. Hirsh, PhD, Psychology, Indiana University - Purdue University Indianapolis, Indianapolis, IN

Chronic pain is a significant worldwide health problem and a leading contributor to disability and rising healthcare costs. Safe and effective chronic pain care remains a challenge for both patients and providers, and this burden disproportionately affects racial/ethnic minority and low-income patients. Multiple factors contribute to these disparities. Providers contribute to them when their pain assessment and treatment decisions systematically and inappropriately vary across patient groups. At the patient level, minority and low-income patients are less active participants in their pain care and are less effective communicators with their providers, both of which lead to less collaborative care and poorer patient self-management. Interventions to address these provider and patient factors have proven largely ineffective and/or impractical. It is in this context that two interventions have been developed using virtual humans to improve provider decision-making and patient self-management for chronic pain. Preliminary results will be presented of a RCT testing a perspective-taking intervention that uses virtual patients to increase providers' knowledge of their pain treatment biases, enhance providers' empathy toward diverse patients, and reduce providers' anxiety/threat when interacting with diverse patients. Also a newly developed intervention to increase patient activation and communication self-efficacy will be discussed. This patient-focused intervention includes brief individual coaching sessions to help minority patients clarify/prioritize their treatment goals, determine treatment preferences, and develop communication skills to effectively collaborate with their pain care providers. Outside of these individual coaching sessions, patients will practice their new skills with virtual providers who engage in real-time dynamic interactions that are individuallytailored and responsive to differences in patient skill level. The presentation will be concluded with a discussion of ongoing challenges and future directions for this line of work.

Symposium 1145 Friday, March 9 from 11:20 am to 12:35 pm

Behavioral Neuroscience of Respiratory Disease: Cognition, Affect, and Symptom Perception

Thomas Ritz, PhD, Psychology, Southern Methodist University, Dallas, TX, Juliet L. Kroll, MA, Psychology, Southern Methodist University, Dallas, TX, Juliet Kroll, M.A., Psychology, Southern Methodist University, Dallas, TX, Thomas Ritz, Ph.D., Psychology, SMU, Dallas, TX, Melissa A. Rosenkranz, PhD, Center for Healthy Minds, University of Wisconsin-Madison, Madison, WI, Andreas von Leupoldt, PhD, Health Psychology, University of Leuven, Leuven, Belgium, J. Richard Jennings, PhD, Psychiatry, University of Pittsburgh, PA

Clinical experience and the scientific literature provide ample evidence for the importance of affective, cognitive and behavioral factors for the course of respiratory diseases such as asthma and chronic obstructive pulmonary disease (COPD). Yet, the exploration of central nervous system pathways mediating such effects is only in its infancy. We will present recent research that has begun to address such pathways using a range of CNS assessment techniques, including proton magnetic resonance spectroscopy (HMRS), functional magnetic resonance imaging (fMRI), positron emission tomography (PET), and electroencephalography (EEG). Emerging research indicates that patients with respiratory disease are at greater risk for cognitive impairments. One study presented in this symposium will examine metabolites of the hippocampus using HMRS in patients with asthma. The hippocampus is a brain structure critical in memory and is regarded as a bellwether of stress effects on the brain. Stress and affect have also been shown to impact pathophysiological processes in asthma and two presentations using fMRI and PET will demonstrate linkages between the activation of cortical or limbic structures and stress-induced airway constriction or inflammatory processes. Finally, CNS circuits involved in dyspnea sensations have been explored in three studies with COPD patients using fMRI and EEG. Symptom perception is a key to self-management and well-being in patients with respiratory disease and a better understanding of its relationship with affect and management behaviors will inform interventions and improve patients' quality of life.

Individual Abstract Number: 1150

Hippocampal metabolites in asthma and health: associations with medication use and sleep behavior

Juliet Kroll, M.A., Ashton Steele, PhD, Psychology, Southern Methodist University, Dallas, TX, Amy Pinkham, PhD, School of Behavioral and Brain Sciences, University of Texas Dallas, Dallas, TX, David A. Khan, MD, Justin Chen, MD, Sheenal Patel, MD, Internal Medicine, Changho Choi, PhD, Radiology, E S. Brown, MD, PhD, Psychiatry, University of Texas Southwestern Medical Center, Dallas, TX, Thomas Ritz, PhD, Psychology, Southern Methodist University, Dallas, TX

Emerging research indicates an increased rate of cognitive impairment in asthma; however, central nervous system correlates remain largely unknown. As the hippocampus is the primary neural structure involved in memory and its gray matter volume deficits have been observed in asthma and respiratory disease states, we examined hippocampal chemistry and cognitive function in both asthma and health. We further explored their associations with asthma medication use, disease duration, asthma control, age, and sleep behaviors.

Forty participants underwent a 3-Tesla ¹HMRS scan of the left hippocampus to measure metabolites including: N-Acetyl Aspartate (NAA), myo-inositol (MI), creatine (Cr), and glutamate (Glu). Self-report measures captured emotional state, sleep behaviors, disease duration, and medication use. The Montreal Cognitive Assessment (MoCA) assessed cognitive function.

Compared to age and gender matched healthy controls, a younger sample of individuals with asthma had reductions in both hippocampal NAA, a marker of neuronal integrity and Cr, a marker of cellular energetics. Frequency of short-acting bronchodilator use in asthma was associated with lower levels of Cr, NAA, and Glu, while inhaled corticosteroid use was associated with higher levels of Cr and NAA. More frequent asthma-related sleep interruptions were related to elevated levels of MI, a marker of glial inflammation, and poorer cognitive function. Associations of older age with higher MI and lower cognitive scores were observed in the asthma group only.

The present findings indicate that in younger individuals with asthma, there are already significant changes in hippocampal metabolites, which may precede changes in cognitive function. Chronic inflammatory disease process, medication use, and behavioral variables may all influence the observed reductions in hippocampal NAA and Cr.

Funding was provided by the National Institute of Aging (NIA) R24AG048024.

Individual Abstract Number: 1487

Central nervous system processing of affective stimuli in asthma: Associations with affect-induced airway responses, asthma control, and airway inflammation

Thomas Ritz, Ph.D., Juliet L. Kroll, MA, Psychology, SMU, Dallas, TX, Sheenal V. Patel, MD, Justin R. Chen, MD, David A. Khan, MD, Internal Medicine, UT Southwestern Medical Center, Dallas, TX, Amy E. Pinkham, PhD, Psychology, University of Texas at Dallas, Dallas, TX, Uma Yezhuvath, PhD, AdvanceMRI LLC, Sina Aslan, PhD, Advance MRI LLC, E. Sherwood Brown, MD, PhD, Psychiatry, UT Southwestern Medical Center, Dallas, TX

Background: Affective processes are thought to be relevant to all stages in the course of asthma, but CNS pathways associated with affect in patients have received little attention. We therefore examined the blood oxygen level dependent (BOLD) brain activation during processing of distressing and neutral films in asthma patients. Associations of BOLD with airway constriction elicited by these stimuli, asthma control, and exhaled nitric oxide (a proxy of airway inflammation) were examined.

Methods: Functional MRI (fMRI) scans were performed on 15 asthma patients while passively viewing blocks of 45-second distressing and neutral films, interleaved with crosshair as a baseline condition. Standard fMRI analysis was performed to generate beta maps for the 'negative-baseline' and 'neutral-baseline' contrasts. The Asthma Control Questionnaire (ACQ) was administered and fractional exhaled nitric oxide (FE_{NO}) was obtained before the MRI session. In an initial session, patients viewed the same film clips while respiratory resistance (Rrs) was measured continuously with impulse oscillometry. Patients also rated their experience of anxiety, disgust, and dyspnea. Whole brain voxel-based regression analysis of beta maps was performed against Rrs increases during negative (or neutral) films

relative to baseline, ACQ, and FE_{NO} . Analysis was controlled for age, gender and corticosteroid use. Results were corrected for multiple comparisons p[Family Wise Error Corrected]<0.05.

Results: Peak Rrs increase to distressing, but not neutral films, was related to stronger activation in dorsal anterior and middle cingulate gyrus. For distressing films, higher ACQ was associated with reduced activity within superior frontal gyrus, middle cingulate gyrus, and supplementary motor area. FE_{NO} showed a similar negative correlation to BOLD within middle cingulate gyrus and medial superior frontal gyrus. Ratings of anxiety, disgust, and dyspnea did not reflect these associations. *Conclusion:* Stronger airway obstruction triggered by distressing stimuli is associated with greater activation of cingulate cortex areas that have previously been related to error processing, threat evaluation, pain, and dyspnea. Deficits in asthma control and stronger airway inflammation are associated with reduced activity in frontal and limbic regions during negative affect processing.

Individual Abstract Number: 1187

Regional cerebral glucose metabolism in the amygdala and hippocampus during acute stress is associated with stress responsiveness and airway inflammation in asthma.

Melissa A. Rosenkranz, PhD, Center for Healthy Minds, William W. Busse, MD, Allergy, Pulmonary and Critical Care Medicine, Stephane Esnault, PhD, Medicine, Bradley T. Christian, PhD, Medical Physics, Richard J. Davidson, PhD, Psychology and Psychiatry, University of Wisconsin-Madison, Madison, WI

It is clear that stress and emotion contribute to the frequency, severity, and burden of asthma symptoms, yet the role of the brain in the expression of asthma is largely unknown. In order to examine the neural mechanisms through which psychological stress influences airway inflammation in asthma, we used [¹⁸F]fluoro-deoxyglucose positron emission tomography (FDG-PET) to label brain regions with increased activation during performance of a social stress task, relative to a matched control condition. Fractional exhaled nitric oxide (FeNO) provided a measure of airway inflammation. These data reveal that hippocampal and amygdala activation during the stress task is associated with a greater cortisol response to the stressor, as well as greater airway inflammation. These regions have been heavily implicated in regulating the stress response, but their association with inflammation is less well appreciated. These data point to an important relationship that may shed light on the increased risk for depression and anxiety in individuals with chronic inflammatory disease and may lead to novel treatment targets.

Individual Abstract Number: 1184

Neural processing of breathlessness in chronic obstructive pulmonary disease

Andreas von Leupoldt, PhD, Health Psychology, University of Leuven, Leuven, Belgium

Chronic obstructive pulmonary disease is a worldwide leading cause of morbidity and mortality. The aversive cardinal symptom is breathlessness, but several other comorbidities are commonly present. Among these, comorbid fear and anxiety are very prevalent in COPD and related to a worse course of the disease including increased breathlessness. However, little is known about the neural processes underlying the experience of breathlessness in COPD, their interactions with fear and anxiety and potential associations with clinical characteristics.

Therefore, we examined in three different studies potential brain mechanisms, which are related to the experience of

breathlessness in patients with COPD and their associations with fear, anxiety and clinical characteristics. Structural and functional magnetic resonance imaging (MRI) as well as respiratory-related evoked potentials (RREPs) in the electroencephalogram were used.

Using structural MRI, study one revealed reduced gray matter volume in COPD patients compared to controls in the anterior, mid and posterior cingulate cortex, amygdala and hippocampus. These reductions were partly related to longer disease duration and higher levels of fear-of-breathlessness and fear-of-physicalactivities. Using functional MRI, study two demonstrated that COPD patients showed higher activation in amygdala and hippocampus than controls during the anticipation, but not during the perception of increased breathlessness. These activations were associated with reduced exercise capacity, reduced healthrelated quality of life, and higher levels of dyspnea and anxiety. Study three observed that COPD patients with high compared to levels of symptom-specific fear (breathlessness low catastrophizing) showed higher amplitudes in the centro-parietal RREP component P3, which reflects increased motivated attention to respiratory sensations.

Taken together, our results demonstrate specific alterations in the brain processing related to breathlessness in COPD, which might underlie the associations between fear and anxiety, breathlessness and less favorable course of the disease in these patients.

Symposium 1315 Friday, March 9 from 2:00 to 3:00 pm

New perspectives on fatigue: Clinical, experimental, and neuroimaging approaches to understanding cancer-related fatigue

Julienne Bower, PhD, Psychology, UCLA, Los Angeles, CA, Julienne Bower, PhD, Psychology, UCLA, Los Angeles, CA, Joel Dimsdale, MD, Psychiatry, UCSD, San Diego, CA

Fatigue has long been of interest in psychosomatic medicine, from early work on fatigue in heart disease to research on chronic fatigue syndrome. Advances in psychoneuroimmunology have elucidated new pathways for fatigue, with a focus on inflammation. Cancer-related fatigue has emerged as a compelling model for interrogating the pathophysiology of fatigue. Fatigue is a common symptom in cancer patients and survivors and appears to be associated with elevated inflammatory activity. Here, we highlight new approaches to understanding cancer-related fatigue, including clinical, experimental, and neuroimaging perspectives. Presenters will highlight new findings on inflammation, cellular aging, mitochondrial dysfunction, corticostriatal activity, and psychosocial risk factors for cancer-related fatigue. Our discussant will offer a historical perspective on fatigue and highlight advances in our understanding or this symptom.

Individual Abstract Number: 1317

Biobehavioral risk factors for fatigue in breast cancer: Early life stress, depression, and cellular aging

Julienne Bower, PhD, Psychology, Patricia Ganz, MD, Medicine and Public Health, Judith Carroll, PhD, Psychiatry, UCLA, Los Angeles, CA, Joshua Wiley, PhD, Psychological Sciences, Monash University, Melbourne, Australia, Mary Sehl, MD,

Hematology Oncology, Catherine Crespi, PhD, Biostatistics, UCLA, Los Angeles, CA

Fatigue is one of the most common and distressing side effects of cancer treatment and may persist for months or years after treatment completion, causing significant impairment in quality of life. Inflammation associated with cancer and its treatment is thought to induce fatigue, and we and others have demonstrated elevated inflammatory activity in fatigued patients and survivors. However, risk factors for persistent fatigue and associated inflammatory processes have not been identified. Drawing from a biobehavioral model of cancer-related fatigue, we have examined psychosocial, genetic, and cellular processes that may underlie fatigue and inflammation. Here, we highlight recent findings from two observational longitudinal studies of women with early-stage breast cancer. The Mind-Body Study (MBS) evaluated 191 women at treatment completion and at multiple assessments over a 3-6 year follow-up. The RISE study evaluated 270 patients before treatment, at treatment completion, and at 6, 12, and 18 month follow-ups. Multivariate models have identified psychosocial risk factors for fatigue before treatment onset in the RISE study, including childhood trauma and history of depression. Further, childhood trauma and depression predicted elevated post-treatment fatigue trajectories in the MBS dataset. On the cellular side, we have examined effects of cancer treatments on markers of cellular aging, which may contribute to persistent inflammation, fatigue, and other behavioral symptoms. Initial findings demonstrate effects of cancer treatment on DNA damage, telomerase activity, and DNA methylation profiles. These results shed new light on risk factors for fatigue in the context of cancer and its treatment, and identify potential targets for intervention.

Individual Abstract Number: 1393

What Have We Learned About Cancer-Related Fatigue From Experimental Approaches?

Robert Dantzer, PhD, Symptom Research, Elisabeth Vichaya, PhD, Symptom Reserarch, Aaron Goldberg, MD PhD, Radiation Oncology, MD Anderson Cancer Center, Houston, TX

The exact nature and pathophysiology of fatigue remain largely elusive despite its high prevalence in the general population. Like for fatigue associated with other chronic diseases, a role for inflammation in the pathophysiology of cancer-related fatigue has been proposed based on the clinical association between symptoms of fatigue and elevated serum or plasma levels of biomarkers of inflammation. The possibility of a causal role of inflammation in fatigue has been supported by some preclinical experiments showing that inflammation associated with tumor growth induces behavioral signs of fatigue in animal models of cancer. However, even if inflammation is sufficient to induce fatigue, it is not always necessary as behavioral signs of fatigue can occur well before inflammation develops. In addition, cancer therapy can abrogate inflammation while at the same time exacerbating behavioral fatigue. These findings have led to a search for alternative mechanisms. Competition between the energy requirements of proliferating cancer cells and those of skeletal muscles may account for the development of behavioral fatigue in tumor-bearing mice. Mitochondrial dysfunction affecting organs with high energy metabolism (such as the skeletal muscles, liver and brain) is another possible mechanism. Mitochondrial dysfunction develops concomitantly to inflammation and/or oxidative stress and can occur as a direct consequence of the cellular toxicity of chemotherapeutic agents such as cisplatin and paclitaxel. The perpetuation of fatigue for months or years after cessation of cancer therapy is usually

explained by residual toxicities. However, behavioral and cognitive factors can also play a role as recent preclinical evidence indicates that experiencing behavioral fatigue during cancer therapy contributes to persistent behavioral fatigue. These data can be interpreted to suggest that fatigue is not a single entity. Progress in the understanding and treatment of cancerrelated fatigue will require a better characterization of its nature.

Individual Abstract Number: 1379

Inflammation-associated Alterations in Corticostriatal Circuit Function in Breast Cancer: Relationship with Motivational and Motor Deficits and Fatigue

Jennifer Felger, PhD, Psychiatry and Behavioral Sciences, Michael T. Treadway, PhD, Psychology, Emory University, Atlanta, GA, Zhihao Li, PhD, Institute of Affective and Social Neuroscience, Shenzhen University, Shenzhen, China, Ebrahim Haroon, MD, Psychiatry and Behavioral Sciences, Mylin A. Torres, MD, Radiation Oncology, Andrew H. Miller, MD, Psychiatry and Behavioral Sciences, Emory University, Atlanta, GA

Up to 40% of breast cancer patients experience debilitating and persistent cancer-related fatigue (CRF). Efficacious treatment options for CRF are limited due in part to lack of understanding of the underlying pathophysiology. One promising avenue for therapeutic discovery is investigation of the effects of inflammation on CNS pathways involved in motivation and motor activity that may contribute to fatigue. Previous work shows that fatigue both during and after breast cancer treatment is associated with increased inflammation. Nevertheless, CNS mechanisms by which inflammation influences behavior in breast cancer patients are currently unknown. Our group and others have found that administration of inflammatory stimuli can alter neural activation of and functional connectivity between brain regions involved in motivation and motor activity such as basal ganglia and prefrontal cortex (PFC). Accordingly, our recent findings indicate that increased inflammation (as measured by plasma C-reactive protein and inflammatory cytokines) is associated with decreased functional connectivity in corticostriatal circuitry that correlated with anhedonia (r=-0.47, p<0.01) and psychomotor speed (r=0.45, p<0.05) in patients with major depressive disorder (n=48), who also experience high levels of fatigue. To determine whether similar inflammationrelated alterations in CNS motivational and motor pathways contribute to CRF, stage I-III breast cancer patients who had completed surgery with or without chemotherapy (~70% of patients) underwent resting state functional magnetic resonance imaging (fMRI) and objective measures of motivation and motor activity. Preliminary data (n=16) suggest that patients with increased inflammation exhibit decreased connectivity between ventral and dorsal striatum and PFC (r=-0.55, p<0.05). Alterations in corticostriatal connectivity were associated with reduced motivation, as assessed by Effort Expenditure for Rewards Task (EEfRT; r=0.67, p<0.05), as well as a trend for correlation with psychomotor performance (r=0.48, p=0.06). EEfRT was in turn negatively correlated with CRF measured by the Patient-Reported Outcomes Measurement Information System (r=-0.52, p<0.05). Our data support that inflammation effects CNS corticostriatal pathways relevant to motivation and motor function that may contribute to CRF in breast cancer patients during treatment.

Symposium 1111 Friday, March 9 from 2:00 to 3:00 pm

Current directions in social support, resilience and health: A lifespan perspective

Kharah M. Ross, PhD, Psychology, University of California: Los Angeles, Los Angeles, CA, Kharah M. Ross, PhD, Psychology, University of California: Los Angeles, Los Angeles, CA, Jonah Price, MA, Psychology, University of California: Los Angeles, Los Angeles, CA, Jessica Chiang, PhD, Psychology, Northwestern University, Evanston, IL, Theodore F. Robles, PhD, Psychology, University of California: Los Angeles, Los Angeles, CA

Social determinants of health were acknowledged in Psychosomatic Medicine as early as the 1930s, with social support emerging as a specific source of resilience, i.e. the capacity to weather or recover from adverse events or experiences, in the 1970s [Cobb (1976) Social support as a moderator of life stress]. Since then, more than 1200 articles have been published in Psychosomatic Medicine alone on social support, acknowledging the important role that social support plays in health. The objective of this symposium is to further this literature by highlighting novel ways to approach the study of social support, resilience and health in diverse samples that cross the lifespan, from infancy to adulthood. One study highlights how effectiveness of social support during pregnancy may "spillover" to predict inflammation in infants. In a sample of women and infants followed over pregnancy and the postpartum period, mothers with partners who provided both highly effective and highly ineffective social support over pregnancy had infants with greater viral- and allergy-related inflammatory cytokine at 3 months of age. A second study discusses the role of interpersonal processes in moderating the impact of social support on immune cell age. In a sample of mothers with young children, those who reported both high social support and more disclosure with their partner had longest telomeres, indicating lower biological age. And a third study centers on social support as a source of resilience across the lifespan. Using data from the MIDUS study, social support received mid-life conferred resilience against childhood abuse, reducing the impact of childhood abuse on mortality. These three studies shed light on the diverse ways to approach social support across the lifespan, and point researchers in novel directions that may help us better understand the role of social support in resilience and health.

Individual Abstract Number: 1116

Partner Effective and Ineffective Social Support during Pregnancy and Inflammation in 3-month-old Infants

Kharah M. Ross, PhD, Psychology, University of California: Los Angeles, Los Angeles, CA, Jenna Thomas, MSc, Psychology, Nicole Letourneau, PhD, Nursing, Tavis S. Campbell, PhD, Psychology, Gerald F. Giesbrecht, PhD, Pediatrics, University of Calgary, Calgary, AB, Canada

Social support during pregnancy has been associated with better maternal outcomes, such as lower pregnancy inflammation, especially in the presence of stress. Not all social support is effective, however. Studies of non-pregnant samples suggest that receiving both highly effective and highly ineffective social support ("ambivalent") may be associated with higher inflammation. The maternal inflammatory milieu during pregnancy may "spillover" to predict inflammatory/immune function in offspring, which is a potential pathway to developmental origins of inflammatory-based diseases. As such, factors that affect inflammation during pregnancy (e.g., social support) may also extend to predict inflammation in infants. This, however, has not been tested.

Purpose: To determine whether effective and ineffective partner support, and the ineffective by effective partner support interaction, during pregnancy was associated with inflammatory markers in 3-month-old infants, independent of postpartum partner social support effectiveness.

A sample of 118 women from Alberta, Canada (APrON cohort) were followed from the 2^{nd} trimester of pregnancy to 3 months postpartum. Pregnancy and postpartum partner effective and ineffective support was measured using the Social Support Effectiveness (SSE) scale. Blood samples from their 3-month-old infants was assayed for inflammatory markers, (e.g. viral-immunity cytokines IFN γ and IL12p70, and anti-inflammatory IL10). Covariates were maternal demographics, gestational age at birth, and maternal pre-pregnancy body mass index.

In linear regression models, the interaction between ineffective and effective partner support over pregnancy predicted infant IFN γ , IL12p70, and IL10, p's < .025. When ineffective partner support was high, higher effective partner support was associated with the highest infant IFN γ , IL12p70, and IL10. This is consistent with an "ambivalent" pattern of partner relationship quality.

In sum, "ambivalent" (highly ineffective, highly effective social support) partner relationships during pregnancy predicted greater viral immunity-related inflammation in 3-month-old infants, independent of covariates and postpartum SSE. These results suggest that partner relationship quality over pregnancy may "spillover" to predict offspring inflammation, in a manner that may affect viral immunity or risk for allergies.

Individual Abstract Number: 1115

Self-Disclosure Interacts with Positive and Negative Features of Romantic Social Relationships on Telomere Length

Jonah Price, MA, Psychology, University of California: Los Angeles, Los Angeles, CA, Rena Repetti, PhD, Ted Robles, PhD, Psychology, University of California Los Angeles, Los Angeles, CA, Judith E. Carroll, PhD, Psychiatry, Cousins Center for Psychoneuroimmunolgy, Los Angeles, CA

Close relationships predict disease and mortality risk. Selfdisclosure in a relationship, defined as how much a person reveals about their thoughts and feelings, is a determinant of health and relationship outcomes. Shorter telomere length, which indicates expedited cellular aging, serves as a marker of aging and disease. Research has investigated the role of social relationships in cellular aging. However, no research looks at the role of self-disclosure in cellular aging. We examined disclosure, positive couple interactions, and negative couple interactions as they relate to telomere length in parents using multiple-instance diary measures.

Parents (n=78) with a child between ages 8-13 were recruited. Measures were collected using a 56-day daily diary which included multi-item scales of positive (i.e., good conversations, physical intimacy) and negative interactions with the partner (i.e., overt conflict, neglect), and self-disclosing thoughts and feelings to one's partner. Leukocyte telomere length was collected using whole-blood from willing parents in a lab visit following completion of the study and was measured using standard realtime quantitative polymerase chain reaction.

Scores for disclosure, positive and negative interactions were averaged across the 56 days. Age-adjusted regressions found that the level to which positive interactions were associated with telomere length was dependent upon the level of disclosure (t=3.13, p<0.01). This indicates that more self-disclosure and

positive interactions are linked to shorter telomere length. The effect of negative interactions on telomere length was also dependent on the level of disclosure (t=2.15, p=0.04). This suggests less disclosure and more negative interactions are associated with shorter telomere length. A statistical interaction between positive and negative interactions on telomere length was found (t=-2.36, p=0.02), implying that the relationship between positive interactions and telomere length is dependent on the level of negative interactions.

Level of self-disclosure was associated with positive and negative interactions and their effect on cellular aging. These findings suggest communicative factors such as self-disclosure play a role in how social interactions affect health. These findings are the first to suggest that self-disclosure in close relationships can affect cellular aging.

Individual Abstract Number: 1114

Childhood Abuse, Midlife Social Support, and Mortality Risk Jessica Chiang, PhD, Psychology, Edith Chen, PhD, Greg Miller, PhD, Psychology; Institute of Policy Research, Northwestern University, Evanston, IL

Early adversity (e.g., childhood abuse) is linked to numerous physical health problems in adulthood (e.g., heart disease), making it critical to identify processes that can compensate or reverse these negative health effects. Positive relationships characterized by warmth and support have been shown to play a protective role; however, most of these studies have focused on intermediate biological makers as outcomes, which do not reflect actual disease and thus raise concerns about clinical relevance. Furthermore, past studies have focused on support concurrent with early adversity exposure. Yet, an "incubation" period between childhood exposure to adversity and clinical manifestation of disease exists. This raises the question of whether positive social experiences occurring much after termination of the early life stressor can similarly protect against the associated negative health effects. The current study addresses these gaps by examining whether midlife supportive relationships moderate the relation between different types of childhood abuse and mortality risk in a national study of midlife adults.

Participants (n = 6.071; $M_{age} = 46.9$ years, SD = 12.9; 57.5% female) completed measures of childhood abuse (yes/no) and current social support. Mortality data was collected over the next 20 years using several methods, including National Death Index reports, mortality closeout interviews, and longitudinal sample maintenance.

regression analyses controlling for demographic Cox characteristics, medical conditions, and health behaviors revealed significant interactions between each type of abuse and social support (Table 1). Follow-up analyses revealed a stronger relation between greater support levels and reduced mortality risk among those reporting severe physical abuse (HR = .52; 95% CI: .39-.70; p < .001), moderate physical abuse (HR = .63; 95% CI: .51-.78; p < .001), and/or emotional abuse (HR = .62; 95% CI: .51-.76; p < .001) compared with those reporting no abuse (severe physical: HR = .84; 95% CI: .73-.97; p = .016; moderate physical: HR = .84; 95% CI: .72-.98; p = .031; emotional: HR =.85; 95% CI: .72-1.00; p = .051). These results suggest that positive experiences, such as having supportive relationships, during later stages in life much after exposure to adversity during childhood can help offset the health risks associated with early adversity.

Symposium 1112 Friday, March 9 from 3:05 to 4:20 pm

How Cultural Factors Can Alter Psychophysiological Processes in Different Health Contexts

Amanda M. Acevedo, M.A., Psychology and Social Behavior, University of California, Irvine, Irvine, CA, Qian Lu, PhD, Psychology, University of Houston, Houston, TX, Anna M. Strahm, M.S., Psychology, North Dakota State University, Fargo, ND, Kimberly D'Anna-Hernandez, PhD, Psychology, California State University, San Marcos, San Marcos, CA, John Ruiz, PhD, Psychology, University of Arizona, Tucson, AZ

Psychophysiological science stands to benefit from considering cultural factors in the study of physiological processes and health. The first three talks present studies of women in the context of (1) cancer survivorship and (2) pregnancy that have generated novel findings about the role of sociocultural factors in intergroup relations, stress, emotion, and physiological functioning. The first speaker will present research that examines the role of emotional suppression in the quality of life among Chinese American breast cancer survivors. The second speaker will present research indicating that acculturation and social support interact to influence birth outcomes and maternal diastolic blood pressure trajectories during pregnancy in two large samples of Latinas. The third speaker will highlight how challenges that arise from the social environment for individuals from cultures that are stigmatized can have an impact on health. More specifically, this talk will present research showing how acculturative stress and discrimination can influence birth outcomes and maternal cortisol trajectories during pregnancy in Mexican-American women. To conclude this symposium, the final speaker will take a step back from specific health contexts in order to understand the Hispanic Health Paradox more broadly. They will present a review that emphasizes how sociocultural factors can impact stress appraisals and physiological responses to stress. Together, these talks highlight the value of incorporating sociocultural diversity in order to bolster our understanding of the differing pathways to optimal health.

Individual Abstract Number: 1502

Is Expressive Suppression Harmful for Chinese American Breast Cancer Survivors?

Qian Lu, PhD, Psychology, University of Houston, Houston, TX, William Tsai, PhD, Psychology, California State University, San Marcos, San Marcos, CA, Qiao Chu, PhD, Psychology, University of Houston, Houston, TX

Emotion regulation strategies are important for cancer survivors' adjustment. A growing literature has found it maladaptive to use expressive suppression (ES), defined as the active effort of inhibiting the expressive component of an emotional response. These studies, however, have been limited to cross-sectional designs and primarily European American samples, without considering other theoretically relevant constructs. Chinese culture encourages emotion suppression to preserve interpersonal harmony and therefore it is important to understand what type of emotion suppression would be maladaptive and for whom. This study aimed to examine the unique longitudinal effects of ES, ambivalence over emotional expression (i.e., AEE; inner conflict over emotional expression), and cognitive reappraisal on quality of life (QOL) among Chinese breast cancer survivors. We hypothesized that AEE would predict QOL above beyond ES and cognitive reappraisal would buffer potentially harmful effect of ES on OOL. A total of 103 participants completed a questionnaire assessing ES, AEE, cognitive reappraisal, and QOL at baseline and a questionnaire assessing QOL eight weeks later. It was found that baseline AEE predicted follow-up QOL above beyond ES but not vice versa; baseline ES predicted follow-up QOL only among those with low cognitive reappraisal. These findings suggest that expressive suppression may not be maladaptive for Chinese breast cancer survivors. Interventions should be developed to help Chinese breast cancer survivors to reduce AEE and increase cognitive reappraisal. Understanding the moderators and other theoretically important variables provide beneficial implications for improving the quality of life of Chinese breast cancer survivors.

Individual Abstract Number: 1504

Latina Acculturation and Pregnancy from a Biopsychosocial Perspective: Anxiety, Social Support, and Blood Pressure

Anna M. Strahm, M.S., Clayton J. Hilmert, PhD, Psychology, North Dakota State University, Fargo, ND, Belinda Campos, PhD, Chicano/Latino Studies & PRIME LC, University of California, Berkeley, Berkeley, CA, Robert D. Dvorak, PhD, Psychology, University of Central Florida, Orange, FL, Curt A. Sandman, PhD, School of Medicine, University of California, Irvine, Irvine, CA, Calvin J. Hobel, MD, Maternal Fetal Medicine, Cedars-Sinai, Los Angeles, CA, Laura M. Glynn, PhD, Psychology, Chapman University, Orange, CA, Julia Walsh, MD, Maternal and Child Health & International Health, University of California, Berkeley, Berkeley, CA, Brenda Elvine-Kreis, MS, (none), Breast & GYN Health Project, Arcata, CA, Marc B. Schenker, MD, Public Health Sciences and Medicine, University of California, Davis, Davis, CA, Christine Dunkel Schetter, PhD, Psychology, University of California, Los Angeles, Los Angeles, CA

Research suggests acculturation or assimilation to U.S. culture is bad for immigrants' health. Accordingly, greater Latina-American acculturation has been associated with giving birth to lower birth weight babies (Campos et al., 2007). Lower birth weight increases the risk of infant mortality and morbidity (Thompson et al., 1997). Therefore, it is important to identify the pathways linking Latina acculturation to pregnancy outcomes. Here we consider how stress, anxiety, social support, and blood pressure (BP) during pregnancy can help us understand the association between Latina-American acculturation and birth weight.

In two studies, involving 1,120 Latina-American women (Study 1 N=108; Study 2 N = 1,011), multiple stress and BP measures were collected over the course of pregnancy. Using multilevel Bayesian structural equation models, we were able to examine average BP and stress, and the slopes of changes in these variables over the course of pregnancy. Foreign born (less acculturated) women without social support reported high pregnancy anxiety, which decreased over the course of pregnancy. When social support was high, foreign-born women had lower pregnancy anxiety throughout pregnancy. In US-born (more acculturated) women social support had no effect on pregnancy anxiety. Furthermore, in US-born women and those reporting greater acculturation on the ARSMA-II measure, pregnancy anxiety was associated with higher average diastolic BP (DBP) and a steeper increase in DBP, which in turn were associated with lower adjusted birth weight. Thus, social support appeared to buffer pregnancy anxiety in foreign-born Latina women only. Also, these less acculturated women did not show the associations among pregnancy anxiety, DBP, and birth weight found in more acculturated Latina women.

The effect of social support depended on Latina-American acculturation and was consistent with current theories regarding the benefits of Latino cultural values (Sabogal et al., 1987). Our findings suggest that for more acculturated Latinas the lack of this social support benefit is associated with higher DBP during pregnancy, which increases the risk of low birth weight (Hilmert et al., 2014). Research should continue to explore the biopsychosocial nature of cultural advantages and how acculturation puts Latina pregnancies at risk.

Individual Abstract Number: 1465

Sociocultural stressors are associated with alterations in cortisol and adverse birth outcomes in pregnant Mexican-American women

Kimberly D'Anna-Hernandez, PhD, Psychology, California State University, San Marcos, San Marcos, CA

Experiencing stress during pregnancy is associated with alterations to the maternal hypothalamic pituitary adrenal axis (HPA) and its end product cortisol. Such changes in HPA activity have been related to maternal mental health risk and adverse long-term infant outcomes. Some populations, such as the Mexican-Americans, may experience more stressors than the general population, including stress associated with cultural adaptation. These stressors including acculturative stress, the stress associated with the acculturative process, and discrimination, the unjust treatment, beliefs and attitudes towards a specific group. Yet, whether levels of sociocultural stressors contribute to maternal trajectory of cortisol across pregnancy and birth outcomes unclear. Hair and salivary cortisol and birth outcomes (preterm birth and low birthweight) were collected and compared to general stress, acculturative stress, discrimination in 150 pregnant women of Mexican descent. Saliva collection occurred 4 times/day over 3 days to obtain an average daily cortisol decline during pregnancy and hair collected at every trimester. Maternal exposure to acculturative stress and discrimination were associated with both changes in the daily patterns of saliva cortisol and long-term trajectory of hair cortisol during pregnancy while controlling for general perceived stress. In addition, maternal exposure to acculturative stress, but not discrimination, was associated with increased odds of preterm birth and low birthweight. Maternal cultural adaptation stressors during pregnancy may pose a unique risk for changes in perinatal physiology and birth outcomes in Mexican-American mother/child dyads.

Individual Abstract Number: 1517

Stress Exposure, and the Hispanic Health Paradox: Sociocultural Resilience Pathways and a Call for Research

John Ruiz, PhD, David Sbarra, PhD, Psychology, University of Arizona, Tucson, AZ, Patrick R. Steffen, PhD, Psychology, Brigham Young University, Provo, UT

Hispanics/Latinos experience better physical health including lower incidence of most diseases and greater longevity than non-Hispanics (NH), including NH Whites. This epidemiological phenomenon is commonly referred to as the Hispanic or Latino health paradox given the discrepancy between relative risk burden and outcomes. One poorly understood risk pathway within the paradox concerns the role of stress. Like other racial/ethnic minorities. Hispanics experience а disproportionately high stress exposure burden. The challenges of generally lower socioeconomic status (e.g., economic, education, resource disparities) coupled with pervasive social marginalization/ discrimination likely present chronic sources of

stress. Survey data show that Hispanics, like other racial/ethnic minorities and lower SES populations, endorse *exposure* to a greater number of stressors in general and in numerous life domains relative to NH whites. Despite these high exposure levels, Hispanics exhibit relatively low levels of stress biomarkers and stress-related illnesses. This discrepancy between stress exposure and physiological indices of stress may reflect culturally-driven, socially moderated differences in the experience of stress.

This talk proposes a socioculturally moderated model of stress appraisals with implications for physiological reactivity and stress-related disease resilience. The model integrates Hispanic cultural values, social baseline theory, and Lazarus and Folkman's classic model of cognitive appraisal theory to understand differences in stress exposure vs. stress perception/experience. Ethnic differences in social networks may facilitate availability of relational partners which may fundamentally alter primary appraisals of stimuli as stressful. Ethnic differences in collectivism may also alter the coping perspective in secondary appraisals from the individual to the network, further diffusing the experience with implications for degree of physiological responsivity. Evidence supporting for each of the key pathways will be reviewed with gaps highlighted for future research.

Symposium 1097 Friday, March 9 from 3:05 to 4:20 pm

Placebo effects across conditions and symptoms: The role of learning and neurobiological mechanisms

Andrea W. Evers, PhD, Health, Medical and Neuropsychology, Leiden University, Leiden, , Netherlands, Ben Colagiuri, PhD, School of Psychology, University of Sydney, Sidney, , Australia, Andrea Evers, Phd, Health, Medical and Neuropsychology, Leiden University, Leiden, , Netherlands, Luana Colloca, PhD, Anesthesiology, Maryland University, Baltimore, MD, Aleksandrina Skvortsova, Msc, Health, Medical and Neuropsychology, Leiden University, Leiden, , Netherlands, Dana Bovbjerg, PhD, Biobehavioral Oncology Program, University of Pittsburgh Medical Center, Pittsburgh, PA

Increasing evidence demonstrates the neurobiological underpinnings and relevance of placebo effects for a broad variety of physical symptoms. For example, physical complaints, such as pain, itch or nausea, can be effectively altered by placebo effects, due to induction of expectations of a possible beneficial treatment outcome. The same is true for nocebo effects which are induced by expectations of a possible unfavorable treatment outcome or side effects. The core learning mechanism of the placebo and nocebo responses is learning, that can induce, maintain and strengthen placebo and nocebo effects, e.g. by conditioning procedures. Recent evidence further suggests that specific neurobiological pathways, such as hormones of oxytocin or vasopressin, facilitate or inhibit specific placebo or nocebo responses.

In this symposium, the speakers will demonstrate recent evidence for the role of learning in placebo and nocebo effects in various physical symptoms, including pain, itch, or nausea, and give insight into possible neurobiological pathways. Specific attention will be directed to learning mechanisms of conditioning, e.g. the role of pharmacological conditioning or counterconditioning, for maintaining or reversing placebo and nocebo effects. In addition, results are presented about specific physiological pathways, such as regulatory hormones of oxytocin or vasopressin, exploring the possible role of these neurobiological pathways in the area of placebo and nocebo effects. Insight into learning and neurobiological mechanisms across symptoms and conditions can deliver important insight into the basic common and distinct mechanisms of placebo and nocebo effects.

Individual Abstract Number: 1155

The role of conditioning in nocebo-induced nausea

Ben Colagiuri, PhD, Veronica Quinn, PhD, School of Psychology, University of Sydney, Sidney, Australia

Nausea is a prevalent and debilitating side effect of many medical treatments. While pharmacological factors undoubtedly contribute to nausea, there is increasing evidence that the nocebo effect also plays a critical role in the development of nausea. In particular, the formation of associations between the treatment context and a nauseogenic agent can lead the treatment context to exacerbate or even induce nausea via learning mechanisms. To explore this and test possible preventive strategies, we conducted a series of studies using a new experimental model of nausea involving Galvanic Vestibular Stimulation (GVS). In all of these studies, healthy volunteers underwent nocebo nausea conditioning with Galvanic Vestibular Stimulation (GVS). Critically, however, some of the participants were randomized to receive pre-exposure to placebo GVS prior to their conditioning in either a deceptive or open manner to attempt to block nocebo nausea via latent inhibition. In all studies there was clear evidence of conditioned nocebo nausea, confirming the contribution of learning to nausea. Most interestingly, however, this nocebo nausea was entirely blocked by both deceptive and open pre-exposure to placebo GVS, demonstrating a latent inhibition effect. As such, pre-exposure may be an effective method of reducing the development of nocebo nausea and other nocebo effects, which should reduce the overall burden that side effects cause patients. To this end, the fact that open pre-exposure is as effective as deceptive pre-exposure indicates that this technique can be deployed ethically in clinical practice without violating informed consent.

Individual Abstract Number: 1157 Minimizing nocebo effects on itch by conditioning

Andrea Evers, Phd, Bartels Danielle, Msc, Antoinette I. Laarhoven, PhD, Health, Medical and Neuropsychology, Leiden University, Leiden, Netherlands

Nocebo effects are known to contribute to the experience of physical symptoms such as pain and itch. However, little is known about how to reduce nocebo effects in itch or other physical symptoms. We tested whether nocebo effects can be minimized by positive expectation induction with respect to electrical and histaminic itch stimuli. After inducing negative expectations about electrical itch stimuli were induced by conditioning, participants were randomized to either the experimental group or one of the control groups. In the experimental group, positive expectations were induced by conditioning, while in the control groups either the negative expectation induction was continued or an extinction procedure was applied. Afterwards, a histamine application test was conducted. Scratching behavior was videotaped during the whole session. Results demonstrated that positive expectation induction resulted in a significantly smaller nocebo effect in comparison with both control groups and even changed into a placebo effect.

Comparable effects were also found for histamine application, while there were no effects on behavioral outcomes of scratching. This study for the first time demonstrate that nocebo effects for physical symptoms, such as itch, can be minimized and even reversed by conditioning procedures. The results of the current study indicate that learning via counterconditioning represents a promising strategy for diminishing nocebo responses.

Individual Abstract Number: 1098 Vasopressin enhances placebo analgesic effects

Luana Colloca, PhD, Anesthesiology, Maryland University, Baltimore, MD

Based on prior research in the area of vasopressin and neuroscience, we anticipated to observe dimorphic influences with vasopressin facilitating placebo effects in women and oxytocin inducing small effects as previously observed. To disentangle our hypothesis, we designed a randomized, placebocontrolled, double-blind, and parallel trial. Participants were first stratified for sex and then randomized to no-treatment, intranasal oxytocin (24 IU), saline (0.4 mL) or vasopressin (40 IU) group, respectively. We administered oxytocin at a dose of 24 IU, the standard dose used in cognitive studies that should have no intrinsic analgesic effects. Placebo analgesic effects observed after drug administration or no-treatment was compared. Pain analgesic effects were measured with a conventional scale for pain perception (e.g. VAS). Self-reported pain represents the primary outcome in this study. To test for modulatory effects of vasopressin on placebo effects, we adopted a model of expectancy-induced analgesia, which by producing small changes as previously observed, would permit a better determination of any increase due to the action of the active drugs. In addition, we used verbal suggestions rather than a conditioning paradigm to avoid ceiling effects related to learning mechanisms. The expectancy manipulation induced pain changes in the notreatment and placebo groups. Using a repeated measures ANOVA approach, we found that there was a significant effect of the manipulation in the no-treatment group as well as in the placebo group, indicating that the expectancy manipulation was effective in producing as anticipated small, still significant placebo effects. We found a significant main effect of treatment, and sex was not significant. Importantly, the interaction between treatment and sex effects was significant. Accordingly, we performed separate analyses for men and women. There was a significant main effect of treatment in women, but not in men. In women, post-hoc group comparisons indicated that vasopressin enhanced placebo effects significantly, relative to the no treatment, oxytocin and saline groups. In women, the effect size of vasopressin-induced analgesic responses was medium versus a small and non-significant effect in men. This is the first evidence that vasopressin agonists can enhance placebo effects in a sex dependent way.

Individual Abstract Number: 1151

Placebo effects and conditioning of hormonal responses of oxytocin

Aleksandrina Skvortsova, Msc, Judy Veldhuijzen, PhD, Henriet van Middendorp, PhD, Health, Medical and Neuropsychology, Leiden University, Leiden, Netherlands, Omer van den Bergh, PhD, Health Psychology, Leuven University, Leuven, Belgium, Andrea Evers, PhD, Health, Medical and Neuropsychology, Leiden University, Leiden, Netherlands

Conditioned hormonal responses are proposed to be one of the underlying mechanisms of the placebo effect. Preliminary

evidence suggests that endogenous hormone secretion, such as cortisol or insulin, might be behaviourally conditionable in humans. Whether other neuroendocrine hormones such as oxytocin can be conditioned as well is currently unclear. This is the first randomized controlled trial that investigated the effect of conditioning with oxytocin on endogenous oxytocin release. Secondly, we studied the effects of oxytocin conditioning on pain sensitivity and trust, two parameters that were previously demonstrated to be affected by oxytocin administration. . Ninetynine female participants were randomly allocated to one of three groups: 1) conditioned group, 2) placebo group, or 3) a drugcontrol group. A validated two-phase randomized placebocontrolled conditioning paradigm was applied. In the acquisition phase, a distinctive odor (conditioned stimulus, CS) was associated with the administration of exogenous oxytocin (unconditioned stimulus, US) in the experimental and drugcontrol groups or placebo in the placebo group on three consecutive days. During the evocation phase, participants in the conditioned and placebo groups were given a placebo in combination with the CS during three consecutive days, whereas the drug-control group received oxytocin without the CS. Salivary oxytocin levels, pain sensitivity and responses to a facial trustworthiness task were measured during the evocation sessions. Preliminary data of 45 participants demonstrated a statistical trend towards significance for increased oxytocin levels in the conditioned group in comparison to the placebo group (F(1, 27) = 3,25, p = .08) but only during the first evocation session. No effects of conditioning or oxytocin administration on pain sensitivity or trust were found. The final results of the full sample will be presented at the conference. Current findings demonstrate preliminary evidence that it might be possible to condition endogenous oxytocin release by pairing exogenous oxytocin administration with a distinctive odor. Conditioned hormonal responses might be used in clinical practice for reducing medication side effects and costs of hormone based treatments.

Symposium 1113 Friday, March 9 from 4:35 to 5:50 pm

Sleep disturbances and health: Inflammation and cellular aging

Judith E. Carroll, Ph.D., Psychiatry and Biobehavioral Sciences, UCLA, Los Angeles, CA, Judith E. Carroll, Ph.D., Psychiatry and Biobehavioral Sciences, UCLA, Los Angeles, CA, Lisa M. Christian, Ph.D., Psychiatry & Behavioral Health, The Ohio State University, Columbus, OH, Hyong Jin Cho, M.D., Psychiatry and Biobehavioral Sciences, UCLA, Los Angeles, CA, Heidi Kane, Ph.D., School of Behavioral & Brain Sciences, University of Texas at Dallas, Richardson, TX, Martica Hall, Ph.D., Psychiatry, University of Pittsburgh, Pittsburgh, CA

Sleep is a time of physical relaxation. Undisturbed, sleep can be particularly rejuvenating and serve as a time of recovery from the daytime demands. Insufficient quantity and quality of sleep, on the other hand, may be detrimental for long term health. In this series of talks, we discuss recent findings that connect sleep with biological processes related to health across varying racial/ethnic groups and ages.

Individual Abstract Number: 1117

Leukocyte telomere length, polysomnographic sleep fragmentation and sleep apnea: The Multi-Ethnic Study of Atherosclerosis

Judith E. Carroll, Ph.D., Michael R. Irwin, M.D., Psychiatry and Biobehavioral Sciences, Teresa E. Seeman, Ph.D., Geriatrics, UCLA, Los Angeles, CA, Ana V. Diez Roux, M.D., Epidemiology, Drexel University, Philidelphia, PA, Aric Prather, Ph.D., Psychiatry, UCSF, San Francisco, CA, Richard Olmstead, Ph.D., Psychiatry and Biobehavioral Sciences, UCLA, Los Angeles, CA, Elissa Epel, Ph.D., Psychiatry, Jue Lin, Ph.D., Biochemistry & Biophysics, UCSF, San Francisco, CA, Susan Redline, M.D., Sleep Medicine, Harvard Medical School, Cambridge, MA

Background: Chronic sleep disturbances and sleep apnea increase vulnerability to age-related disease. Our previous work, and others, has linked sleep disturbances with alterations in molecular pathways related to inflammation and biological aging. Telomere length, a hallmark of aging, captures one component of the biological aging process. Current analyses test whether objectively assessed sleep and sleep apnea relate to leukocyte telomere length attrition over 10 years in the Multi-Ethnic Study of Atherosclerosis (MESA).

Methods: Men and women aged 44-84 (n=672) from the MESA Stress and MESA Sleep studies underwent objective measurements of sleep and leukocyte telomere length (LTL). LTL was assessed at baseline (Exam 1) and an average of 10 years later (Exam 5), using real time quantitative polymerase chain reaction (qPCR) methodologies. At exam 5, at home polysomnography (PSG) assessed sleep architecture, sleep fragmentation (arousal index) and sleep apnea (Arousal Hypopnea Index; AHI); 7-day wrist actigraphy determined sleep duration and sleep efficiency.

Results: In mixed linear effect models adjusting for age, sex, race, baseline LTL, physical activity, smoking, obesity, and sleep apnea, there was an interaction of time with PSG sleep fragmentation ($p_{interaction} = .06$), with individuals in the highest quartile of nocturnal arousal showing the greatest decline in LTL over 10 years (p=.004). Other measures of sleep architecture were not related to LTL. Severe sleep apnea (AHI>30) was also associated with shorter LTL at Exam 5, adjusting for Exam 1 LTL (p=.04), while the interaction with time was not significant. No significant associations were found for actigraphy assessed sleep duration or sleep efficiency.

Conclusions: A higher arousal index was associated with greater leukocyte telomere attrition over a decade suggesting that sleep fragmentation, assessed as nocturnal neural arousals, is associated with accelerated biological aging, independent of sleep apnea. Sleep apnea was also associated with shorter LTL at Exam 5. These findings support the hypothesis that sleep disturbances and sleep apnea are linked to an older biological aging.

Individual Abstract Number: 1118

Short Sleep and Proinflammatory Gene Expression in Pregnant African Americans

Lisa M. Christian, Ph.D., Psychiatry & Behavioral Health, The Ohio State University, Columbus, OH, Octavio Ramilo, MD, Infectious Diseases, Nationwide Children's Hospital, Colubmus, OH, Bennett Smith, BS, Center for Vaccines and Immunity, Asuncion Mejias, MD, PhD, Division of Infectious Diseases, Nationwide Children's Hospital, Columbus, OH, Judith E. Carroll, PhD, Psychiatry and Behavioral Sciences, UCLA, Los Angeles, CA

Background: It has been proposed that sleep-induced inflammatory dysregulation during pregnancy may contribute to

shortened gestation. Of importance, despite marked racial disparities observed in both early delivery and short sleep, African American women lack representation in this literature. Moreover, available data to date is sparse and focused on serum proinflammatory cytokines.

Methods: We conducted whole-genome transcriptional profiling on whole blood from 50 pregnant African American women using Illumina HT-12 BeadKits. Among this cohort, 9 reported short sleep (\leq 7 hours/night) per the Pittsburgh Sleep Quality Index (PSQI). The same number of control cases with healthy sleep duration (8-8.5 hours/night) were selected who were matched for maternal age, pre-pregnancy BMI, and gestational age at sampling.

Results: Promoter-based bioinformatics analyses (TELiS) identified functional commonalities among genes with $\geq 20\%$ differential expression and p 300 down-regulated and >700 upregulated genes among short sleepers. Women with short sleep exhibited over representation of transcription factor binding motifs (TFBMs) in gene promoter sequences regulating key proinflammatory pathways (CREB, CREB/c-JUN, NF:B, AP-2; p's<.05). In parallel, these women showed suppression of TFBM of cellular genesis/cell cycle activators (JUN/AP-1, MEF2, OCT) indicating greater cellular arrest/pro-aging as well as TFBM including IFN response factors (IRFs) involved in antiviral immune responses (ISRE, EVI1).

Conclusions: These data support the hypothesis that short sleep promotes immune dysregulation, including inflammation and related pathways, among African American women during pregnancy. Consequences for birth outcomes remain to be delineated. In addition, the extent to which these are paralleled among women of other races/ethnicities warrants attention.

Individual Abstract Number: 1120

Gene Expression Profiles of Sleep Disturbance

Hyong Jin Cho, M.D., Psychiatry and Biobehavioral Sciences, UCLA, Los Angeles, CA, Steve Cole, PhD, Psychiatry, Naomi Eisenberger, PhD, Psychology, Michael R. Irwin, MD, Psychiatry, University of California, Los Angeles, Los Angeles, CA

Background: Sleep disturbance is associated with increased risk of several medical and mental illnesses. Transcriptome analysis would further the understanding of pathophysiological mechanisms underlying this association. We aimed to identify gene expression profiles associated with sleep disturbance. In particular, as sleep disturbance could be a manifestation of physiological threat, we focused on a pattern of transcriptome named the Conserved Transcriptional Response to Adversity (CTRA), which favors proinflammatory antibacterial responses at the expense of antiviral responses in threatening situations. We hypothesized that sleep disturbance would be associated with upregulation of proinflammatory and beta-adrenergic transcription control pathways and down-regulation of antiviral and glucocorticoid pathways (the latter due to chronic stress-induced glucocorticoid insensitivity).

Methods: We evaluated the differences in gene expression profiles between otherwise healthy adults aged 18-48 years with sleep disturbance assessed by the Pittsburgh Sleep Quality Index (PSQI>5; n=8) and those without sleep disturbance (PSQI<3; n=58). Blood was drawn at 8:30 am. Employing genome-wide transcriptional profiling and promoter-based bioinformatic strategies, we examined the activity of the CTRA-related transcription control pathways in peripheral blood mononuclear cells: nuclear factor κ B (NF κ B), cAMP response element binding
protein (CREB), interferon response factor (IRF), and glucocorticoid receptor (GR).

Results: In analyses of differential gene expression (controlling for age, sex, body-mass index, race), sleep disturbance was associated with increased activities of proinflammatory NF κ B and beta-adrenergic CREB and decreased activity of antiviral IRF. However, inconsistent with glucocorticoid insensitivity, sleep disturbance was associated with increased activity of GR.

Conclusion: Sleep disturbance assessed using the PSQI (thus present in the past month) was associated with a distinct pattern of transcriptional activities in proinflammatory, antiviral, and stress-related neuroendocrine signaling, named CTRA: increased proinflammatory and beta-adrenergic activities and decreased antiviral activity. However, perhaps due to non-chronic nature of sleep disturbance assessed in this study, sleep disturbance was associated with increased rather than decreased GR activity.

Individual Abstract Number: 1121

The mediating role of sleep on the link between negative affect and biological health risk: A U.S.-Japan comparison

Heidi Kane, Ph.D., School of Behavioral & Brain Sciences, University of Texas at Dallas, Richardson, TX, Jiyoung Park, PhD, The School of Behavioral and Brain Sciences, The University of Texas at Dallas, Richardson, TX

Background: Sleep quality is one possible behavioral mechanism linking negative affect and health. However, cultural variation may exist in the strength of this link due to culturally specific perceptions of negative affect. In European American cultural contexts negative emotions are typically perceived as harmful, problematic, and in need of regulation, whereas in East Asian cultural contexts they are generally accepted as transient and inevitable parts of a natural cycle. This analysis examined cultural differences in the link between negative affect and subjective sleep quality, and tested sleep quality as a potential mediator of the link between negative affect and biological health risk.

Method: The present analysis included European Americans (n = 976, aged 35-86) from the Midlife in the United States (MIDUS II) survey and Japanese (n = 382, aged 31-80) from a companion survey conducted in Japan, Midlife in Japan (MIDJA). Participants reported how often over the past 30 days they experienced various negative emotions and also completed the Pittsburgh Sleep Quality Index to assess sleep. Following prior work, a composite index of biological health risk was created based on biomarkers of inflammation (interleukin-6 and c-reactive protein) and cardiovascular risk (systolic blood pressure and total-to-HDL cholesterol ratio).

Results: Culture moderated the relations between negative affect and both sleep quality and biological health risk. Greater negative affect was related to worse sleep quality for both cultural groups, but the strength of this association was significantly larger for Americans than for Japanese. Similarly, negative affect was related to increased biological health risk for Americans, but there was no relationship for Japanese. Finally, culture moderated the indirect effect of sleep on the relation between negative affect and biological risk. The indirect effect was significantly stronger for Americans than for Japanese. This analysis adjusted for age, gender, education, and health behaviors. Testing BMI as an additional mediator did not change the results.

Conclusion: These results support the hypothesis that the degree to which negative affect influences health via sleep quality varies by culture and underscore the importance of socio-cultural consideration in understanding the mechanisms through which emotions impact health.

Symposium 1083 Friday, March 9 from 4:35 to 5:50 pm

Psychological and immunological pathways to health among informal family caregivers

Stephen F. Smagula, PhD, Psychiatry, University of Pittsburgh, School of Medicine, Pittsburgh, PA, Stephen Smagula, PhD, Psychiatry and Epidemiology, University of Pittsburgh, Health Sciences, Pittsburgh, PA, Lynn Martire, PhD, Human Development and Family Studies, Penn State, University Park, PA, Brent Mausbach, PhD, Psychiatry, University of California, San Diego, San Diego, CA, Tim Sannes, PhD, Division of Hematology, University of Colorado Denver Anschutz Medical Campus, Aurora, CO, Michael Irwin, MD, Psychiatry and Biobehavioral Sciences, David Geffen School of Medicine at UCLA, Los Angeles, CA

There are over 14 million family caregivers in the United States alone. The formal heath care system is simply not equipped to provide the services that family caregivers must deliver; and the importance of family caregivers' role will continue to grow with the continued onset of aging-related chronic diseases as the next generation enters late-life. As such, keeping caregivers healthy is a high public health priority, to maintain quality of life for themselves, and their care recipients. Considerable research has documented that stressful caregiving has negative health effects. But there remains a need to understand the specific social, psychological, and biological pathways by which chronic diseases are exacerbated among many, but not all, caregivers. This symposium brings together experts from across disciplines to share new, late-breaking, findings that advance our knowledge of the precise mechanistic targets by which caregiving affects health. Four presentations are provided crossing two main levels of analysis: (1) the specific psychosocial factors related to caregiver's mental health, and (2) the specific biological pathways affecting caregivers' well-being. To identify novel targets for interventions, two separate analyses investigated the specific factors that affect caregiver's mood: first, we investigate why some, but not all, caregivers are able to maintain mental health despite the stressful exposure of being woken at night to deliver care; second, we learn how pain catastrophizing in people with knee osteoarthritis affects their caregiver's mood over periods of days and months. Next, we present two separate analyses that unpack the specific biological pathways which affect caregiver health: we examine how pro-inflammatory cytokines predict elevated medical testing and emergency department visits; next, we identify which common mental health symptoms relate to shorter telomere length in caregivers of cancer patients. Our symposium concludes with a discussion of future directions for intervening on the specific pathways that put caregiver's health, and the quality of their care recipients' lives, at risk.

Individual Abstract Number: 1328

Factors modifying the association between being woken at night to deliver care and mental health in a sample representative of the United States

Stephen Smagula, PhD, Psychiatry and Epidemiology, University of Pittsburgh, Health Sciences, Pittsburgh, PA

Background: Why do some, but not all, caregivers maintain their mental health despite stress exposure? The answer is needed to target new indicated prevention approaches for mental health. Being woken-up at night to deliver care is a commonly reported stressor, and we investigated how it relates to psychopathology symptom severity. **Methods:** The National Study of Caregiving

is representative of United State family caregivers and included caregivers (average age=73.4, 350 spousal standard deviation=8.9; 57.4% female). All analysis accounted for sampling weights. We examined the relationship between selfreported night-time awakenings to deliver care with common psychopathology symptom severity (an aggregate index of depression, affect, and anxiety symptoms). Step-wise regressions evaluated which caregiving and caregiver characteristics uniquely attenuated and moderated this association. Results: There was a graded, small-to-moderate sized, association between night-time awakenings for care and symptom severity. Compared with participants who reported "never" being woken for care at night, people with care-related sleep interruptions had higher standard symptom units: $\beta=0.35$ (0.11 standard error (SE)) for people woken "rarely"; β =0.58 (0.15 SE) for people being woken "some nights", β =0.73 (0.19 SE) for people being woken "most" or "every night." This association retained statistical significance after adjustments but was notably attenuated by: more caregiving demands, financial strain related to caregiving, and the restriction of a valued activity. In a model accounting for these variables, the association between caregiving-related sleep interruptions and psychopathology symptoms was absent in caregivers that had a high growth orientation (interaction p<0.0001). The above-listed factors explained 42% of the variance in psychopathology symptom severity. Conclusions: Symptoms associated with caregiving-related awakenings are partially attributable to a context of high caregiving stress. As interventions to modify caregiving demands and financial strain are less likely costeffective, our findings highlight the importance mitigating activity restriction's impact. A positive growth orientation appears critical to preserved mental health despite care-related awakenings, and this suggests interventions should target the skills caregivers need to adapt.

Individual Abstract Number: 1084

Daily Pain Catastrophizing in Knee Arthritis Patients: Effects on Spousal Caregivers' Well-Being

Lynn Martire, PhD, Human Development and Family Studies, Penn State, University Park, PA, Ruixue Zhaoyang, PhD, Human Development and Family Studies, Christina M. Marini, PhD, Center for Healthy Aging, the Pennsylvania State University, State College, PA

Chronic or persistent pain affects approximately one-third of adults in the Unites States and the prevalence is twice as high in those 60 years and older. Previous research shows that pain catastrophizing (PC; i.e., negative cognitive-emotional responses to real or anticipated pain) predicts increased pain and varies from day to day. In addition, greater PC is associated with both negative and positive spousal caregiver responses to the patient. One important but unexamined research question is whether PC takes a toll on the short- and long-term well-being of the spousal caregiver. The current study utilized data from 145 knee osteoarthritis patients and their spouses who completed electronic daily diaries for 22 days and were interviewed at 3 time points (baseline, 6 months, and 18 months). At the beginning of each day, patients reported their PC regarding the day ahead; spouses reported their affect 3 times per day (beginning of day, afternoon, and end of day). We examined associations between PC and spouses' affect at the daily level, and between PC and spouses' depressive symptoms at follow-up. Consistent with our predictions, on days when patients catastrophized more than usual about their pain in the day ahead, spouses experienced more negative affect (p = .01) and less positive affect (p = .04)throughout the day. These analyses controlled for patients' daily

negative affect. In addition, there was a positive trend-level association between higher average patient PC across the 22 days and spouses' greater depressive symptoms 18 months later (p = .07), controlling for spouses' level of depressive symptoms at baseline. These findings highlight the potential for specific cognitive-emotional responses to pain that unfold on a daily level to compromise spousal caregivers' well-being in both the short and long term. Interventions that reduce pain catastrophizing may benefit not only patients but also spousal caregivers.

Individual Abstract Number: 1327

Inflammation markers predict future healthcare service use in dementia caregivers

Brent Mausbach, PhD, Psychiatry, University of California, San Diego, San Diego, CA

Background: Pro-inflammatory cytokines are released in response to physiological and psychological perturbations. While these cytokines play a role in immune response, chronic elevations have been implicated in downstream health consequences including hypertension, subclinical atherosclerosis, and coronary heart disease risk. However, the role of cytokines in acute physical symptoms is less known, and no studies have linked inflammatory cytokines to healthcare service use, an important variable of interest when determining interventions need and healthcare system costs reductions. Alzheimer's caregivers experience physical and psychological stress as part of the caregiving process. The current analysis determined if caregivers with elevated IL-6 and TNF-alpha were at an increased risk for being referred for specialized medical testing (e.g., x-rays, MRI, additional laboratory tests), an emergency department (ED) visit, or hospitalization over the study period (approximately 15 months). Method: The sample consisted of 77 spousal Alzheimer caregivers. As part of a larger study, participants underwent a baseline blood draw, and assays were conducted to determine IL-6 and TNF-alpha levels. At three additional times post-baseline (3, 9, and 15 months), they were asked if they had been referred for specialized medical tests, or experienced an ED visit or hospitalization since last assessment. Cox regression analyses were performed to determine whether cytokines predicted specialized medical testing or ED visits. Age and BMI were examined as independent predictors as they might be potential confounds. Results: IL-6 was a significant predictor of increased risk of specialized medical testing (HR = 1.15, p = 0.034) and emergency department visits (HR = 1.24, p = 0.002). For every pg/ml increase in circulating IL-6 levels, participants were at a 15% increased risk of referral for specialized medical testing and a 24% increased risk of ED visits at any point over the course of TNF-alpha significantly the study period. predicted hospitalization (HR = 5.77, p = 0.012). Conclusion: The proinflammatory cytokines IL-6 and TNF-alpha may be independent predictors of healthcare service utilization in dementia caregivers. Further research should examine if reduction in psychological distress results in reduced inflammation, thereby reducing risk for healthcare service use.

Individual Abstract Number: 1467 Telomere Length and Anxiety in Caregivers of Hematopoietic Stem Cell Transplant Patients

Tim Sannes, PhD, Division of Hematology, University of Colorado Denver Anschutz Medical Campus, Aurora, CO, Crystal Natvig, MS, Department of Psychiatry, University of Colorado Anschutz Medical Campus, Auroa, CO, Jue Lin, PhD, Department of Biochemistry and Biophysics, University of California San Francisco, San Francisco, CA, lissa Epel, PhD, Department of Psychiatry, UCSF School of Medicine, San Francisco, CA, Mark L. Laudenslager, PhD, Department of Psychiatry, University of Colorado Anschutz Medical Campus, Aurora, CO

Background: Caregivers (CGs) of hematopoietic stem cell transplant (HSCT) patients are at risk for significant anxiety and depression. Although prior research has linked caregiving with a cellular marker of aging - telomeres – the specific psychological domains that are related to telomeres in CGs are less clear.

Methods: We analyzed cross-sectional data prior to the initiation of a stress management for CGs of HSCT patients. Anxiety was measured with the Spielberger State-Trait Anxiety Inventory. Depression was measured with the Center for Epidemiological Studies-Depression scale. Relationships between psychological factors and telomeres were examined with linear regression and planned analyses will apply robust bootstrapping methods to examine potential mediators. Telomeres were quantified by the Blackburn laboratory via telomere length (TL) and telomerase activity (TA). We hypothesized that higher anxiety and depression would be significantly related to shorter TL and reduced TA in this sample.

Results: The 140 CGs providing full data were predominantly middle-aged (*Mage*=54.4; *SD*=13.3), Caucasian (86.7%) females (78.3%). After controlling for sex, age, TL batch and patient's duration of illness (all significantly and independently related to TL), results indicate that higher anxiety was related lower to shorter telomeres (*B*=-.17; *p*<.05), consistent with our original hypothesis. TL was unrelated to depression (*B*=-.09; *p*=.27) and neither anxiety nor depression were related to TA. Subsequent analyses will explore potential mediators and moderators of this relationship (patient/caregiver characteristics and aspects of CG burden).

Discussion: These preliminary data suggest that anxiety may be a particularly relevant psychological factor related to cellular aging in CGs. Targeting specific psychological domains prior to transplant, such as anxiety, may have important effects on caregiver well-being. Forthcoming analyses will target important contributors to this reported relationship.

Symposium 1096 Friday, March 9 from 4:35 to 5:50 pm

Implicit Affect in Psychosomatic Medicine: The Emergence and Relevance of Empirically Tractable Unconscious Processes

Richard D. Lane, M.D., Ph.D., Psychiatry, University of Arizona, Tucson, AZ, Jos F. Brosschot, PhD, Institute of Psychology, Leiden University, Leiden, , Netherlands, David A. Sbarra, Ph.D., Department of Psychology, University of Arizona, Tucson, AZ, Meanne Chan, PhD, Psychology, University of Hong Kong, Hong Kong, , Taiwan, Province Of China, Marie P. Cross, M.A., Psychology and Social Behavior, University of California, Irvine, Irvine, CA, Richard D. Lane, M.D., Ph.D., Psychiatry, University of Arizona, Tucson, AZ

The revolution in cognitive and affective neuroscience has demonstrated that most if not all conscious mental events are supported and shaped by unconscious processes, and that consciously reportable mental states are the exception rather than

the rule. Yet, for many decades the standard approach to measuring psychological and social variables in psychosomatic medicine has been through self-report measures. The first speaker will address the rationale and the implications of a new stress theory called the Generalized Unsafety Theory of Stress. In contrast to the assumption that the stress response occurs following identifiable triggers, this perspective holds that the stress response is available at all times except when it is inhibited by the - largely unconscious - perception of safety. The second speaker will address the rationale and implications of a new Social Baseline Theory. In contrast to the assumption that social support is a moderator in the stress-disease link, this perspective holds that evolution has prepared us to expect social support by default and that its absence is an abnormal condition. The third speaker will show that implicit, but not commonly used explicit, measures of the quality of family affect in childhood interact with early-life SES to predict cardiovascular disease (CVD) risk in both adolescents and adults. Those who hold negative implicit affect about one's family have heightened CVD risk, despite their higher SES and independent of current SES. The fourth speaker will present an overview of different methodological approaches to the study of facial expressions in health and physiological research, the strengths and weaknesses of these approaches and some of the pathways by which facial expressions of emotion may connect to health. The discussant will review the neuroscientific basis for these theories and observations (Psychosomatic Medicine 2008; 70: 213-230) and discuss implications for future research.

Individual Abstract Number: 1241

The Generalized Unsafety Theory of Stress (GUTS) and why the stress response is fundamentally unconscious

Jos F. Brosschot, PhD, Bart Verkuil, PhD, Institute of Psychology, Leiden University, Leiden, Netherlands, Julian Thayer, PhD, Department, The Ohio State University, Columbus, OH

Conventional stress theories cannot account for many instances of prolonged stress-related physiological activity. According to the novel Generalized Unsafety Theory of Stress (GUTS; Brosschot, Verkuil & Thayer, 2016) the stress response is a default response that is normally suppressed via prefrontal inhibition of subcortical activity. When no safety is perceived, *even if there is no threat (stressor)*, it is left disinhibited, in which case generalized unsafety is assumed *by default*. From birth on we slowly learn the conditions of safety if everything goes well.

In evolution-theoretical accounts, the principle of a default response to threat has been demonstrated across a large range of species and is often referred to as 'erring on the side of caution'. It is assumed to be a phylogenetically old psychobiological property that developed far before consciousness emerged in our

human ancestors, which explains why it occurs mostly out of awareness.

In social animals such as humans, belonging to a social network is a major source of (mostly implicitly perceived) safety, which is why e.g. loneliness is linked to a disinhibited default stress response. However, a disinhibited default stress response may be the result of several other conditions that may prevent safety perceptions without us being aware of it, and without necessary involving stressors. These include conditions that can impede learning the conditions of safety (e.g. early life adversity, low SES), or those containing insufficient information about safety (e.g. urban vs. natural, or any ambiguous context in contemporary society), or even just a 'compromised' body (e.g. obese, low fit, old, fatigued etc.), which would have impaired the fight -flight response during most of our evolutionary history and in which it had survival value to assume unsafety and maintain the default stress response, which it still does today.

GUTS implies that stress research should focus away from measuring stressors and consciously experienced threats and focus instead on implicit measures of safety and conditions that thwart safety perception. We will discuss empirical support for several aspects of GUTS.

Individual Abstract Number: 1127 Social Baseline Theory: On the Automaticity of Emotional Responding in Relational Contexts

David A. Sbarra, Ph.D., Department of Psychology, University of Arizona, Tucson, AZ

This talk provides a brief review of Coan's (Beckes & Coan, 2011) Social Baseline Theory (SBT), which presents an ecological view of how relationships contribute to health and wellbeing. I elaborate on the affective components of SBT, which can be understood largely from an embodied cognition perspective in which information processing is shaped largely by interactions with our environment. It is in this sense that our bodies are primed by natural selection to "think" and "perceive" in bottom-up fashion, without necessitating complex and timeconsuming information processing by the central nervous system. Both historical and immediate interactions with close others shape automatic, primary processes that help organize emotional experience in the model. I discuss the many ways this perspective may help shed light on the connection between close relationships and health (through affective experience) and raise the intriguing (but still unexplored) possibility that culture plays a role in shaping the automaticity of these processes as well.

Individual Abstract Number: 1302

Childhood socioeconomic status and metabolic outcomes: The role of implicit family affect

Meanne Chan, PhD, Psychology, University of Hong Kong, Hong Kong, Taiwan, Province Of China, Greg Miller, PhD, Edith Chen, PhD, Psychology, Northwestern University, Evanston, IL

Objectives: Previous research suggests that the quality of early family relationships may moderate the association between lower socioeconomic status (SES) and cardiovascular health outcomes. However, the majority of studies have relied on retrospective self-report measures of childhood family characteristics. The current studies adopted a new behavioral paradigm to tap into underlying emotions and examined how implicit family affect interacted with childhood SES to predict metabolic outcomes.

Methods: Study 1 consisted of 122 healthy adults and Study 2 included 259 healthy adolescents aged 13 to 16 who participated with 1 parent. Implicit family affect was measured with a computer-based behavioral assessment tool that captured underlying emotions. Commonly used self-report and interview measures of childhood family relationships were also included. Childhood SES was indexed by household crowding (e.g., number of people per bedroom) during the first 5 years of life. Metabolic indicators included resting blood pressure, total cholesterol, glycosylated hemoglobin, and waist circumference.

Results: Age, gender, and ethnicity were included as covariates. Across two samples, childhood SES significantly interacted with implicit negative family affect in resting systolic blood pressure and diastolic blood pressure levels, such that among those participants with higher childhood SES, as implicit negative family affect increased, resting blood pressure also increased. These patterns were not observed with current SES or with explicit measures of family relationships.

Conclusions: These findings provide evidence that implicit family affect moderates the association between early life SES and adolescent metabolic outcomes in a way that suggests that implicit family affect may be more relevant among higher SES individuals. Incorporating implicit measures together with explicit measures when assessing childhood factors can be advantageous as it can circumvent social desirability pressures and can unmask patterns not observed by explicit measures alone.

Individual Abstract Number: 1139

The Case for Including Facial Expressions in Affect and Health Research

Marie P. Cross, M.A., Sarah D. Pressman, Ph.D., Psychology and Social Behavior, University of California, Irvine, Irvine, CA The past decade of research in psychosomatic medicine has seen a drastic increase in the investigation of emotional affect and physical health. However, almost all of these studies rely exclusively on self-reported affect, which may be influenced by social desirability, response styles, and other non-affect variables. One solution to this dilemma is for researchers to investigate implicit measures of affect, such as facial expressions like smiling. Smiling is a universal indicator of positive affect and can be investigated both by coding smiles in photographs or coding videos of participants smiling during real-time studies. Smile intensity has already been connected with important outcomes like marriage stability, psychological well-being, stress physiology, and mortality. In this talk, we present an overview of different methodological approaches to the study of facial expressions in health and physiological research and the strengths and weaknesses of these approaches. These include techniques like computerized facial expression analyses, facial electromyography, and hand-coding. We also explore the differences in utilizing archival sources of facial expressions in photographs versus real-time coding, and plausible contextual factors that may alter the interpretation of these facial expressions. Finally, we discuss some of the pathways by which facial expressions of emotion may connect to health, including their possible overlap with experienced affect, social relationships, and direct physiological effects. As examples of these approaches, we will outline past and ongoing work in our laboratory examining the connections between positive facial expressions, stress physiology, pain, and health behaviors. We also discuss more broadly how other laboratories have tested connections between facial expressions and health-relevant variables depression, conjugal (e.g., bereavement, neuroendocrine responses). Facial expressions are an important complement to self-reported affect in work on emotion and health, and we hope that this talk will enable and convince researchers to use both of these measures in their future work.

Symposium 1287 Saturday, March 10 from 11:45 am to 1:00 pm

Emotion Regulation as a Mechanism of Health Resilience

Sara J. Sagui-Henson, MA, Health Psychology PhD Program, University of North Carolina at Charlotte, Charlotte, NC, Brooke N. Jenkins, PhD, Psychology, Chapman University, Orange, CA, Claudia Trudel-Fitzgerald, Ph.D., Social and Behavioral Science, Harvard T.H. Chan School of Public Health, Boston, MA, Brooke N. Jenkins, PhD, Psychology, Chapman University, Orange, CA, Sara J. Sagui-Henson, MA, Health Psychology PhD Program, University of North Carolina at Charlotte, Charlotte, NC, Christian E. Waugh, PhD, Psychology, Wake Forest University, Winston Salem, NC

The ability to control one's affective experiences (i.e., emotion regulation) has a multitude of health resilience benefits. Although emotion regulation has been linked with healthy patterns of physiological stress responding and biobehavioral markers of resilience, such as lower body mass index and reduced cravings for appetitive foods, less is known about the effectiveness of different types of emotion regulation under different contexts. In this symposium, speakers will present empirical data utilizing physiological, neural, and behavioral methodologies addressing questions surrounding this topic, such as: How do different types of emotion regulation impact physical health? Under what types of stress is emotion regulation useful for increasing resilience? What are the underlying brain mechanisms involved in emotion regulation? When might it be useful to upregulate negative emotions? The first two speakers discuss how different types of emotion regulation operate to influence physiological systems. The first speaker uses a unique sample of postmenopausal women from the Nurses' Health Study cohort to explore the prospective associations of reappraisal and suppression on markers of HPA axis functioning (cortisol, DHEA), which are relevant biological processes of health outcomes. The second speaker explores the counterintuitive negative impacts of empathy (as compared to distraction and reappraisal) in the context of pain in pediatric oncology populations. This talk includes experimental evidence that empathy may heighten sympathetic nervous system activity during recovery from a pain stimulus. The third speaker investigates the personal and situational conditions under which up- and down-regulating negative emotions are associated with beneficial biobehavioral health outcomes. Specifically, this talk examines how individual differences in perceived stress reactivity, socioeconomic backgrounds, and parent-child relationships affect the adaptiveness of emotion regulation in an obesity and weightrelated health context. The final speaker investigates the brain networks that support the beneficial mental and physical health effects of positive emotions on stress regulation. The discussion will emphasize how emotion regulation can function as a mechanism of resilience with important implications for a variety of biobehavioral markers of health.

Individual Abstract Number: 1391

Does Emotion Regulation Get Under the Skin? Exploring the Association of Reappraisal and Suppression with Cortisol and DHEA

Claudia Trudel-Fitzgerald, Ph.D., Social and Behavioral Science, Harvard T.H. Chan School of Public Health, Boston, MA, Tianyi Huang, MSc, ScD, Epidemiology / Medicine, Harvard T.H. Chan School of Public Health / Channing Division of Network Medicine, Boston, MA, Shelley S. Tworoger, Ph.D., Epidemiology / Cancer Epidemiology, Harvard T.H. Chan School of Public Health / Moffitt Cancer Center, Tampa, FL, Laura D. Kubzansky, Ph.D., Social and Behavioral Science, Harvard T.H. Chan School of Public Health, Boston, MA

Methods: Postmenopausal women from the Nurses' Health Study with 2 cortisol/DHEA assays from toenail sampling collected 1-year apart were included (n=39, mean age 58.9 years at baseline). Reappraisal and suppression were queried with the Emotion Regulation Questionnaire at baseline. Self-reported covariates (i.e., age, body mass index) were time-updated. Spearman correlations evaluated relations of emotion regulation factors with HPA axis marker values at baseline. Using Cohen's *d* (where small: ~0.20, moderate: ~0.50, large: ~0.80 effect sizes), we determined the magnitude of change in biomarkers across the 2 time points in all women (main effect of time). Then, we compared changes in biomarkers exhibited by women with higher vs. lower suppression/reappraisal levels with effect sizes.

Results: At baseline, cortisol and DHEA were weakly correlated with reappraisal (r's: 0.07, -0.19; p's>.05) or suppression (r's: -0.03, 0.28; p's>.05). Reappraisal and suppression were uncorrelated (r=0.03). From baseline to 1-year follow-up, in the overall sample there was an increase of small-to-moderate magnitude in cortisol levels (d=0.36) while DHEA levels slightly decreased (d=-0.13), after adjusting for covariates. Differences of small-to-moderate magnitude were evident across emotion regulation levels. Women with higher vs. lower reappraisal levels had a *greater* increase in cortisol (d=0.26) and a smaller decrease in DHEA (d=0.34). Women with lower vs. higher suppression levels had a smaller decrease in DHEA (d=0.32) but did not differ in rate of change in cortisol.

Conclusions: Reappraisal and suppression had different impacts on biomarkers in this sample. While women with higher reappraisal and lower suppression levels exhibited healthier DHEA patterns over 1 year, contrary to expectations, higher reappraisal was related to a steeper rise in cortisol. Reappraisal is frequently considered an approach-focused strategy. A recent study examined another approach-focused strategy, greater daily use of problem-solving, and found it was also linked to higher cortisol levels. Some scholars have speculated a rise in cortisol when coping adaptively with a challenge may reflect a temporary "boost" of energetic resources. Whether elevated cortisol levels related to the use of reappraisal persist over time must be examined in future work with larger samples and longer followup.

Individual Abstract Number: 1374

Emotion Regulation and Positive Affect in the Context of the Salivary Alpha-Amylase Response to Pain: Resiliency for Pediatric Patients with Cancer

Brooke N. Jenkins, PhD, Psychology, Chapman University, Orange, CA, Douglas A. Granger, PhD, Psychology and Social Behavior, Michelle A. Fortier, PhD, Anesthesiology and Perioperative Care, University of California, Irvine, Irvine, CA Pediatric patients with cancer routinely undergo painful medical procedures invoking strong physiological stress responses. Resilience to this pain may be conferred through resources such as emotion regulation strategies and positive affect. This study measured trait positive affect in children with cancer and randomly assigned participants to one of three emotion regulation conditions (distraction, empathy, or reappraisal). Children used their assigned strategy during an experimental pain procedure (the cold pressor task [CPT]) and provided saliva samples before (Pre-Task), immediately after (Post-Task1), and 15 minutes after (Post-Task2) the CPT. Salivary alpha amylase (sAA) was used to assess sympathetic nervous system (SNS) reactivity and recovery in response to the CPT. Spline growth curve modeling was used to test the SNS trajectories over time. Results demonstrated that children in the empathy group had sAA levels that continued to rise after completion of the CPT compared to children in the distraction (b = -1.68, SE = 0.73, z = -2.30, p = .021, 95% CI [-3.10, -0.25]) and reappraisal groups (b = -1.24, SE = 0.72, z = -1.24)1.73, p = .084, 95% CI [-2.65, 0.17]). Further, trait positive affect moderated the group effect such that individuals in the empathy group with lower positive affect had sAA levels that continued to rise after completion of the CPT (dy/dx = 1.56, SE = 0.71, z =2.21, p = .027, 95% CI [0.18, 2.94]) whereas children in the empathy condition with higher levels of positive affect did not have this rise (dy/dx = -0.56, SE = 0.74, z = -0.75, p = .451, 95%CI [-2.02, 0.90]; see Figure 1). Distraction and reappraisal may benefit the physiological stress response in pediatric patients with cancer and positive affect may confer physiological resiliency in response to pain even with use of less effective coping strategies such as empathy.

Individual Abstract Number: 1289

Up- and Down-Regulating Negative Emotions: When do Personal and Situational Characteristics Matter for Emotion Regulation and Biobehavioral Health?

Sara J. Sagui-Henson, MA, Health Psychology PhD Program, Sara M. Levens, PhD, Psychological Science, University of North Carolina at Charlotte, Charlotte, NC

Emotion regulation is part of a larger self-regulatory system that generates flexible responses to events to support the pursuit of health-related goals. In some situations, reducing ("downregulating") negative emotions may be helpful, while in others, increasing ("up-regulating") negative emotions may be advantageous. Contextually appropriate emotion regulation is considered adaptive, yet it is unclear which strategies support biobehavioral health in which contexts. We explored this in a series of studies examining the utility of reappraisal (reinterpreting the meaning of an event) for up- or downregulating negative emotions across personal and situational contexts. First, we explored how the association between one's health and their ability to down-regulate negative emotions was dependent on individual differences in perceived stress reactivity (n = 150). We found that those reporting higher reactivity benefited from the ability to down-regulate, as indicated by lower body mass index (BMI) and Type 2 diabetes incidence. In contrast, for those reporting lower reactivity, the ability to downregulate negative emotions was associated with maladaptive health. To further explore emotion regulation in a health-context, we created a novel task that assesses up- and down-regulation of negative emotions toward health stimuli. Utilizing this task, we explored the association between one's health and up-regulation ability as a function of socioeconomic status (SES; n = 152). Findings revealed that a greater ability to up-regulate negative emotions was only associated with lower BMI for individuals with higher SES, implicating this type of regulatory ability as maladaptive for health in those with a lower SES background. In a final study, we adapted our task to explore how emotion regulation in parents of school-age children (n = 156) was related to child health behaviors. Results revealed that a greater parental ability to up-regulate negative emotions was related to healthier child diet, while the ability the down-regulate was related to unhealthier child diet. Taken together, our findings highlight the importance of emotion regulation in biobehavioral health and suggest that the adaptive value of regulation for supporting motivation and self-efficacy is influenced by personal and

situational characteristics that should be considered in intervention efforts.

Individual Abstract Number: 1397

The ventromedial prefrontal cortex as a hub in the network supporting positive emotion's impact on stress regulation

Christian E. Waugh, PhD, Psychology, Wake Forest University, Winston Salem, NC, Xi Yang, M.A., Psychology, University of Oregon, Eugene, OR, Michael J. Tobia, PhD, Physics and Psychology, Florida International University, Miami, FL, Kateri McRae, PhD, Psychology, University of Denver, Denver, CO Positive emotions are critical for good mental and physical health, in part because of their role in helping people recover from and adapt to stressors. In two studies we investigated the brain networks that support these beneficial effects that positive emotions have on stress regulation. In the first study, participants underwent an anagram stressor and reported on their emotional experiences while their BOLD signal was being measured using fMRI. We used change-point analyses to show that ventromedial prefrontal cortex (vMPFC) activity during the stressor predicted positive emotions during recovery (controlling for positive emotions during the stressor), which in turn predicted decreased negative emotions during recovery. In the second study, participants underwent a social stressor in fMRI and reported on their emotional experience retrospectively. We used novel dynamic functional connectivity analyses to show that the vMPFC was the hub of a network whose functional connectivity during the stressor was predicted by retrospective positive emotions about that stressor. These studies highlight the vMPFC as a common participant of networks associated with positive emotions and emotion regulation such that it may serve as the hub through which positive emotions impact stress regulation. Also, these analyses highlight the utility of dynamically assessing neural activity throughout a stressor given that it was vMPFC activity and connectivity during the stressor and not during recovery that predicted positive emotional outcomes.

Symposium 1055 Saturday, March 10 from 11:45 am to 1:00 pm

The Impact of Parent-Child Relationships on Child Inflammation

Jacqueline O'Brien, M.S., Psychology, University of Oregon, Eugene, OR, Jacqueline O'Brien, M.S., Psychology, University of Oregon, Eugene, OR, Michael W. Harvey, B.A., Psychology, Wayne State University, Detroit, MI, Katherine B. Ehrlich, Ph.D., Psychology, University of Georgia, Athens, GA, Thomas G. O'Connor, Ph.D., Psychiatry, University of Rochester Medical Center, Rochester, NY, Hannah Schreier, PhD, Biobehavioral Health, The Pennsylvania State University, University Park, PA Extensive research exists on the impact of parent-child relationships on child development. However, despite inflammation being increasingly examined as a vital health outcome due to its association with a broad range of medical outcomes, the field has only recently begun examining the link between parent-child relationships as a central component of early life experience and child inflammation as a chief indicator of child development. The extensive research on inflammation as

an important indicator of health outcomes speaks to the need to fill this knowledge gap.

This symposium will provide historical context on the use of inflammatory markers as a measure of child development, and review recent research that has examined parent-child relationships in relation to child inflammation. This symposium will provide insight on the advantages of examining child inflammation as an indicator of child development, and provide concrete examples for effectively executing this in experimental research using a variety of innovative methodologies. The presentations will occur in the following order:

Jacqueline O'Brien will discuss a systematic review on the link between parenting and child immune response, and provide historical context on when the field began to use inflammatory markers as a measure of child development.

Michael Harvey will present prospective research examining parental responsiveness and family conflict in relation to children's inflammation levels. The advantages of using EAR to assess family environments will be discussed.

Katherine Ehrlich will present on children's secure base perceptions in relation to children's inflammatory processes and health outcomes in a sample of youth with asthma. She will address the challenges of conducting this type of research, and provide examples of how to overcome these challenges.

Thomas O'Connor will discuss the link between caregiving quality and child immune health, using data from a prospective longitudinal study that used an ethnically diverse, high risk sample. The implications of this research that caregiving quality may provide a protective influence on child health outcomes will be discussed.

The symposium will conclude with the discussant, Hannah Schreier, leading a dialogue on the advantages of using inflammatory markers as an indicator of child development, as well as future directions in this field.

Individual Abstract Number: 1208

The Effect of Positive and Negative Parenting on Child Immune Response: A Systematic Review

Jacqueline O'Brien, M.S., Melynda Casement, Ph.D., Michelle Byrne, Ph.D., Maureen Zalewski, Ph.D., Psychology, University of Oregon, Eugene, OR

The objective of this work was to synthesize current research examining the association between positive and negative parenting on child immune response, with a focus on the advantages of immune response as an outcome measure and potential future directions in this field. Prior research has shown that positive and negative parenting are associated with a variety of child mental and physical health outcomes, but the emerging literature on the link between parenting and child immune response in particular has yet to be synthesized in a manner that provides insight for future work. A systematic review was conducted where 2401 records were identified through PsycNet and PubMed and 48 articles were assessed for eligibility. Eligible studies included a measure of positive or negative parenting, as well as a marker of child immune response. Studies were excluded if they examined related constructs such as attachment style, childhood trauma history, or family functioning, as well as studies that used inflammatory disease diagnosis as the outcome measure. Meta-analyses were not conducted due to the range of methods used to measure parenting and child immune response. Results from each study in relation to the corresponding parenting construct are discussed, as well as recommendations for the field to facilitate more direct comparisons of research findings.

Individual Abstract Number: 1205

The effect of parental responsiveness and family conflict on inflammatory markers in a sample of youth with asthma

Michael W. Harvey, B.A., Sabrina J. Bierstetel, BA, Allison K. Farrell, Ph.D, Ledina Imami, BA, Samuele Zilioli, Ph.D, Psychology, Wayne State University, Detroit, MI, Erin T. Tobin, Ph.D, Psychology/Health, Henry Ford Hospital, Detroit, MI, Richard B. Slatcher, Ph.D, Psychology, Wayne State University, Detroit, MI

Prior evidence suggests that both parental responsiveness and family conflict are linked to the health and health-related biology of children. The current study examined how parental responsiveness and family conflict prospectively relate to children's circulating levels of inflammatory immune markers. In a sample of 140 youth with asthma and their primary caregivers, youth wore the Electronically Activated Recorder (EAR) over four days to assess conflict and responsiveness in their family environments. At the end of the four-day period and one year later, peripheral blood mononuclear cells were isolated, cultured, and assayed to determine stimulated levels of interleukin (IL)-5, interleukin (IL)-13, and interferon- γ (IFN- γ). Regression analyses revealed that parental responsiveness-but not conflictpredicted lower circulating levels of IL-5 (but not IL-13 or IFN- γ) at the one-year follow-up. The results held when controlling for EAR-observed family conflict, demographic markers, and baseline levels of IL-5.

Individual Abstract Number: 1206

Secure Base Representations in Children with Asthma: Links with Symptoms, Family Asthma Management, and Cytokine Regulation

Katherine B. Ehrlich, Ph.D., Psychology, University of Georgia, Athens, GA, Gregory E. Miller, PhD, Psychology, Northwestern University, Evanston, IL, Madeleine Shalowitz, MD, MBA, Rachel Story, MD, Pediatrics, NorthShore University Health System, Evanston, IL, Cynthia Levine, PhD, Phoebe H. Lam, BA, Makeda Austin, BS, Edith Chen, PhD, Psychology, Northwestern University, Evanston, IL

The availability of a responsive and dependable caregiver is critical to healthy development across the lifespan (Bowlby, 1969/1982). Children's perceptions of caregivers as a secure base have been linked with socioemotional outcomes, but little is known about connections to physical health. Studies linking attachment and health in childhood and adolescence are often difficult to conduct because few youth have overt disease, and the validity of biomarkers is less well established. One way to circumvent this constraint is to study a sample of children who have a chronic disease, such as asthma. In the present study, we examined whether secure base representations are associated with children's asthma symptoms, family asthma management strategies, and inflammatory processes in children with asthma. Participants included 308 children ($M_{age} = 13.0$; 54.7% male) who were physician-diagnosed with asthma and one parent. Children reported on perceptions of their mothers as a secure base using the Secure Base Scale (Cassidy & Woodhouse, 2003). Children also reported on their asthma symptoms and limitations. Parent-child dyads completed the semi-structured Family Asthma Management System Scale (McQuaid et al., 2005) to tap families' asthma management knowledge, beliefs, and behaviors. Children completed a blood draw to measure stimulated Th1 (IFN-y, IL-2) and Th2 (IL-4, IL-5, IL-10, and IL-13) cytokine secretion by peripheral blood mononuclear cells (PBMCs). We incubated 0.5×10^6 PBMCs with 25 ng/mL of phorbol 12myristate 13-acetate + 1µg/mL of ionomycin for 24 hours at 37°C

in 5% CO₂. In a separate well, we incubated cells with the same mitogen cocktail and 1.38×10^6 mol/L hydrocortisone.

Analyses revealed that children's secure base perceptions were associated with fewer asthma symptoms, better family asthma management, and lower Th2 cytokine production after mitogen presentation; similarly their cells were less sensitive to anti-inflammatory signals from cortisol their cells were less sensitive to anti-inflammatory signals from cortisol (as indicated by higher Th2 cytokine responses after incubation with PMA/INO + hydrocortisone). These findings held even when controlling for demographic and biomedical covariates. These findings suggest that secure base representations may be protective for children with asthma.

Individual Abstract Number: 1204

Caregiving Quality Predicts Immune Health in Early Adolescence

Thomas G. O'Connor, Ph.D., Psychiatry, University of Rochester Medical Center, Rochester, NY

Research findings indicate that (early) stress exposure may have a long-term impact on behavioral and physical health outcomes. The current study was designed to build on and extend this literature in several important ways. We examined the impact of caregiving quality on immune health in pre-adolescent children, selected from a prospective longitudinal study of an ethnically diverse, high psychosocial risk sample.

A subsample of 461 families was selected from an ongoing longitudinal study for intensive assessment of stress, health, and immune function when the children were 11.5 years old. A home visit was conducted where interviewers and phlebotomists obtained data on mental and physical health, diet, sleep, exercise and stress exposure; a blood sample for immune analyses; physical exam data; EF from standardized measures; observational data of caregiving quality. We focus our assessment of the innate immune system on circulating levels of IL-6 and TNF- α and the acute phase protein CRP; levels of each were measured using high sensitivity ELISA procedures. Caregiving quality was assessed from questionnaire, interview, and observational measures.

The race/ethnic diversity of the sample is indicated by the high rate of minority participation (34% of the children were African-American); the high-need nature of the families is indicated by a low level of educational attainment (35% of parents had a high school degree or less). Analysis indicated that circulating cytokines were associated with several markers of health. For example, independent of current covariates (including current BMI), IL-6 and CRP in early adolescence were predicted from a history of elevated BMI in toddlerhood and middle childhood (ES ~.5). Also, IL-6 and CRP were significantly associated with systolic and diastolic blood pressure and current exercise (r's .15-.25), an effect that was not entirely accounted for by current BMI. Analyses also indicated that, after accounting for health and sociodemographic factors, positive parental engagement/monitoring predicted significantly reduced levels of IL-6 (p<.05).

The study provides preliminary evidence that caregiving may be associated with circulating cytokines and may provide a protective influence for current and later health outcomes. Additional analyses will expand these results to consider markers of the adaptive immune system.

Symposium 1190 Saturday, March 10 from 3:35 to 4:50 pm

Positive Psychological Well-Being and Successful Aging: Insights from Longitudinal Studies

Lewina O. Lee, Ph.D., Psychiatry, Boston University School of Medicine and VA Boston Healthcare System, Boston, MA, Lewina O. Lee, Ph.D., Psychiatry, Boston University School of Medicine and VA Boston Healthcare System, Boston, MA, Eric S. Kim, PhD, Social & Behavioral Sciences, Harvard T.H. Chan School of Public Health, Boston, MA, Claudia Trudel-Fitzgerald, Ph.D., Social and Behavioral Sciences, Harvard T.H. Chan School of Public Health, Boston, MA, Julia K. Boehm, PhD, Psychology, Chapman University, Orange, CA, Suzanne C. Segerstrom, Ph.D., Psychology, University of Kentucky, Lexington, KY

Although psychosomatic science has historically adopted a disease perspective by focusing on factors underlying disease onset and progression, emerging research has demonstrated the potential value of considering positive psychological well-being (PPWB) as causally related to improved health outcomes. As the global population ages, it is critical to identify factors - including those related to positive psychological functioning - which contribute to successful aging. This symposium presents studies connecting facets of PPWB with successful aging and sheds light on possible behavioral and biological pathways. Presentations will be based on longitudinal studies conducted within 3 large epidemiologic cohorts. The first talk will present novel data on the prospective association between optimism and exceptional longevity, defined as surviving beyond age 85, across 3 decades in a sample of men from the Normative Aging Study. Further exploring what it means to age successfully, the second talk will discuss a study on the association between optimism and "healthy aging" in black and white midlife women from the Nurses' Health Study (NHS). Healthy aging is defined as: remaining free of major chronic diseases; having no subjective memory impairment; and having intact physical function. Prospective, race-stratified results will be reported. The third talk will focus on the relationships of optimism, life purpose, and mastery with changes in cortisol and dehydroepiandrosterone (DHEA) levels over a 1-year period. Using NHS data, this study also explores the stability of these two biomarkers assayed in toenails, a novel and easier-to-collect sample compared to saliva. The final talk will present new findings from 6,565 men and women from the English Longitudinal Study of Ageing demonstrating that PPWB may be a precursor to maintaining a healthy diet over 7 years of follow-up. Overall, this body of work adds to the emerging literature on the relation between PPWB and successful aging, and the biobehavioral mechanisms that may be at play. Throughout the symposium, speakers will consider the implications of their findings for future research and clinical practice. This symposium will highlight the role of PPWB in promoting resilient processes and the accumulation of resources to enhance later-life health and longevity.

Individual Abstract Number: 1191

Optimism and Exceptional Longevity: Prospective Findings from the VA Normative Aging Study

Lewina O. Lee, Ph.D., Psychiatry, Boston University School of Medicine and VA Boston Healthcare System, Boston, MA, Avron Spiro III, Ph.D., Epidemiology and Psychiatry, Boston University Schools of Public Health and Medicine; Massachusetts Veterans Epidemiology Research and Information Center (MAVERIC), VA Boston Healthcare System, Boston, MA, Laura D. Kubzansky, Ph.D., Department of Social and Behavioral Sciences, Harvard T.H. Chan School of Public Health, Boston, MA

Introduction: As life expectancy increases steadily in industrialized countries, exceptional longevity, defined as surviving beyond 85 years, has become more common. However, we know little about the role of positive psychological factors in longevity. Growing evidence suggests optimism is a health asset: It has been associated with reduced risks of adverse health events, as well as behavioral and cognitive predictors of good health. This study aimed to evaluate whether optimism predicts exceptional longevity in a sample of older men.

Methods: The sample comprised 1,429 community-dwelling men in the Veterans Affairs Normative Aging Study who completed the Minnesota Multiphasic Personality Inventory-2 (MMPI-2) in 1986 (M_{age} =61.6, SD=8.3). We used responses to 263 MMPI-2 items to derive the Revised Optimism-Pessimism scale (Malinchoc et al., 1995), which measures explanatory style on a bipolar, optimistic-pessimistic continuum. Analyses included: (1) Logistic regression to predict likelihood of exceptional longevity among 1,117 men who were old enough to turn 85 by the mortality cut-off date of 12/2016; and (2) accelerated failure time (AFT) models to test whether optimism predicted increased lifespan. Covariates were incorporated sequentially: Model 1 adjusted for baseline age; model 2 added demographic factors (potential confounders); model 3 added health behaviors (potential pathways of smoking, alcohol use, diet, exercise, body mass index, and regular physical exam); model 4 added depressive symptoms.

Results: In all logistic regression models, higher optimism (lower PSM-R score) was significantly associated with greater likelihood of exceptional longevity (e.g., Model 2: OR=0.84, 95%CI=0.74-0.95; Model 4: OR=0.87, 95%CI=0.76-0.99). In all AFT models, each *SD* higher in optimism was associated with 4-5% longer average survival time (Models 1-4: HRs=0.95-0.96; 95%CI range: 0.92-0.99).

Conclusion: Findings support optimism as a predictor of exceptional longevity in a sample of older men born between 1896-1945. The association was somewhat attenuated by demographic and lifestyle factors; however, optimism remained a significant predictor of exceptional longevity and longer survival time in fully-adjusted models, suggesting pathways beyond those we considered. More research is warranted to identify mechanisms underlying the health-promoting effects of optimism.

Individual Abstract Number: 1260 Optimism & Healthy Aging

Eric S. Kim, PhD, Social & Behavioral Sciences, Harvard T.H. Chan School of Public Health, Boston, MA, Peter James, ScD, Department of Population Medicine, Harvard Medical School, Boston, MA, Laura D. Kubzansky, PhD, Emily S. Zevon, MS, Claudia Trudel-Fitzgerald, PhD, Social & Behavioral Sciences, Harvard T.H. Chan School of Public Health, Boston, MA, Francine Grodstein, PhD, Channing Division of Network Medicine, Brigham and Women's Hospital, Boston, MA

Dispositional optimism—the generalized expectation that good things will happen—has emerged as a promising health asset, as it is associated with healthier behaviors, improved biologic functioning, and reduced chronic disease risk. Growing research finds that higher optimism is associated with lower risk of mortality, yet it is also critical to understand whether this prolonged longevity is accompanied by good health, which has not been well-considered. In this study, we tested whether higher

optimism was associated with increased likelihood of healthy aging, and whether associations were similar in Black and White women. Prospective data from the Nurses' Health Study, including 33,326 women with no major chronic diseases at baseline, were used. Poisson regression models evaluated if optimism was associated with healthy aging 8 years later, considering potential confounders (sociodemographic variables, depressive symptoms) and intermediate variables (health behaviors). Separate analyses stratified by race. Using mailed questionnaires, optimism was assessed in 2004 and healthy aging in 2012, defined as: 1) remaining free of major chronic diseases; 2) having no subjective memory impairment; and 3) having intact physical function. After adjusting for sociodemographic factors and depression, the most (top quartile) versus least (bottom quartile) optimistic women had a 23% greater likelihood of healthy aging (95% Confidence Intervals: 1.16-1.30). In racestratified models, associations were similar in White and Black participants. Higher optimism was associated with increased likelihood of healthy aging. Associations were maintained after adjusting for a range of confounders and health behaviors. Importantly, we found similar relations in Black as well as in White women, suggesting that optimism, a potentially modifiable health asset, merits further research for the potential to improve healthy aging across diverse populations.

Individual Abstract Number: 1372

From Head to Toe: Is Psychological Well-Being Associated with Markers of the HPA axis Measured in Toenails?

Claudia Trudel-Fitzgerald, Ph.D., Social and Behavioral Sciences, Harvard T.H. Chan School of Public Health, Boston, MA, Tianyi Huang, MSc, ScD, Epidemiology / Medicine, Harvard T.H. Chan School of Public Health / Harvard Medical School, Boston, MA, Shelley S. Tworoger, Ph.D., Epidemiology / Cancer Epidemiology, Harvard T.H. Chan School of Public Health / Moffitt Cancer Center, Tampa, FL, Laura D. Kubzansky, Ph.D., MPH, Social and Behavioral Sciences, Harvard T.H. Chan School of Public Health, Boston, MA

Methods: Postmenopausal women from the Nurses' Health Study II cohort who provided 2 toenail samples 1-year apart were included (n=36, mean age 58.7 years at baseline). Optimism, mastery, and life purpose were queried with validated scales at baseline. Self-reported covariates (i.e., age, body mass index, psychological distress) were time-updated. Spearman correlations evaluated associations of PPWB factors with HPA axis marker values at baseline. Intraclass correlation coefficients (ICC) and 95% confidence intervals (CI) then determined reproducibility of cortisol (pg/mg), DHEA (pg/mg), and the cortisol/DHEA ratio in toenails from baseline to 1-year follow-up. Using Cohen's d (where small: ~ 0.20 , moderate: ~ 0.50 , large: ~ 0.80 effect sizes), we determined the magnitude of change in biomarkers across the 2 time points in all women (main effect of time). Then, we compared changes in biomarkers exhibited by women with higher vs. lower suppression/reappraisal levels.

Results: At baseline, cortisol, DHEA and their ratio had low to modest correlations with PPWB factors (absolute *r*'s from 0.04 to 0.20, all ns). Unadjusted ICCs over 1 year were 0.45 (CI: 0.22-0.70) for cortisol, 0.65 (CI: 0.45-0.81) for DHEA, and 0.52 (CI: 0.30-0.74) for the ratio. From baseline to 1-year follow-up, in the overall sample there was an increase of small-to-moderate magnitude in cortisol and ratio levels (*d*'s, 0.36 and 0.37, respectively), while DHEA levels barely decreased (*d*=-0.14), after adjusting for covariates. Differences of small-to-moderate magnitude were evident across PPWB levels. Compared to women with lower mastery levels, those with higher levels had a

smaller increase of cortisol (d=0.33); women with higher vs. lower life purpose and optimism levels had a smaller decrease in DHEA (d's=0.31 and 0.38, respectively). Similar findings were obtained with the ratio of cortisol/DHEA.

Conclusions: In postmenopausal women, toenail cortisol and DHEA have good reproducibility over a 1-year period, supporting their utility in assessing long term HPA axis activity. Longitudinal analyses showed that higher vs. lower levels of optimism, mastery, and life purpose may promote healthier levels of HPA axis markers over a 1-year period, beyond the role of covariates including distress. If replicated, such results support the hypothesis that PPWB factors may promote healthier aging processes.

Individual Abstract Number: 1296

Aging Well through Healthy Behavior: Psychological Well-Being's Longitudinal Association with Fruit and Vegetable Intake in the English Longitudinal Study of Ageing

Julia K. Boehm, PhD, Psychology, Chapman University, Orange, CA, Jackie Soo, ScD, Ying Chen, ScD, Eric S. Kim, PhD, Laura D. Kubzansky, PhD, Social and Behavioral Sciences, Harvard T.H. Chan School of Public Health, Boston, MA

Psychological well-being is associated with longevity and reduced risk of disease in older age, but possible mechanisms underlying these relationships are understudied. Health behaviors like the consumption of fruits and vegetables may link psychological well-being with heathy aging; however, most evidence to date has been cross-sectional. This study investigated psychological well-being's longitudinal association with fruit and vegetable consumption across as many as seven years. Participants were 6,565 older adults from the English Longitudinal Study of Ageing, which included men and women who were initially ages 50 and older. Psychological well-being was assessed via self-report with 17 items from the Control, Autonomy, Satisfaction, Pleasure (CASP) Scale. Fruit and vegetable consumption was initially assessed during 2006-2007 and then approximately every two years through 2012-2013. Covariates included sociodemographic factors, health status, and other health behaviors. Results from mixed linear models showed that higher baseline levels of psychological well-being were associated with more fruit and vegetable consumption at baseline (beta=0.06, 95% confidence interval [CI] 0.03, 0.08) and that fruit and vegetable consumption declined across time (beta=-0.01, 95% CI -0.01, -0.002). Psychological well-being interacted significantly with time such that individuals with higher baseline psychological well-being had slower declines in fruit and vegetable consumption (beta=0.01, 95% CI 0.01, 0.02). Among individuals who initially met recommendations to consume five or more servings of fruits and vegetables (N=1,719), higher baseline psychological well-being was associated with 11% reduced risk of falling below recommended levels during followup (hazard ratio=0.89, 95% CI 0.83, 0.95). In sum, findings suggest that psychological well-being may be a precursor to healthy behaviors such as eating a diet rich in fruits and vegetables. These results may contribute to a better understanding of the pathways that foster healthy aging.