

Frontiers in Ambulatory Assessment

**SOCIETY FOR AMBULATORY ASSESSMENT
4TH BIENNIAL CONFERENCE**

ABSTRACT BOOKLET

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THE PENNSYLVANIA STATE UNIVERSITY

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Abstract #: A1

Abstract Title: *Ecological Momentary Assessment (EMA) in patient-focused psychotherapy research – Feasibility, Reactivity and Acceptance in an outpatient setting*

Lead Author: Kristin Bergmann-Warnecke **Co-Author(s):** Wolfgang Lutz

Abstract:

Objective: We apply EMA to measure real time affect, the realization of resources, rumination and accompanying sensory qualities with patients waiting to begin their outpatient psychotherapy treatment. The aim is to find out whether EMA-collected data allows predicting early treatment response. Therefore we investigate systematic changes in EMA reportings to identify whether reactivity effects undermine the advantages of the method.

Design: The dataset comprises real time data from approximately 50 patients with different diagnoses (mainly depression) that were followed via EMA over the course of a two week period (4 assessments per day). After the onset of therapy, patients are followed from session 1-10 to monitor their development early during therapy. Reactivity is tested by trends and changes in within person slopes via hierarchical linear models (HLM). Furthermore changes on different outcome measures during waiting time are compared between the EMA group and a control group. Missing analyses are carried out to identify whether data is missing completely at random. Patients' compliance and ratings of perceived burden are evaluated as an indicator for acceptance.

Results: Preliminary results indicate that reactivity effects can be neglected and do not seem to undermine the method's advantages in collecting real time data. High compliance (94.3%) and low ratings of perceived burden (Mean: 0.73; SD: 0.94, Range: 0-4) indicate high acceptance in outpatient settings.

Discussion: Applying a methodology that captures patterns of different psychological processes in patients' everyday lives before the onset of therapy, opens up the possibility to tailor intervention strategies to the individual patient. Real time data collection avoids retrospection and gives a chance to look at patterns of change related to within-person associations.

Abstract #: A2

Abstract Title: *Is changing one's daily life behavior valuable in depression? Prospective long-term and day-level associations.*

Lead Author: Evelien Snippe

Co-Author(s): Claudia J.P. Simons, Jessica A. Hartmann, Claudia Lothmann, M.A. Kramer, Sanne Booij, Wolfgang Viechtbauer, Philippe Delespaul, Inez Myin-Germeys, Marieke Wichers

Abstract:

Introduction: Although it has been shown that depressed individuals tend to disengage from daily life activities, it is less clear whether within-person changes in daily life behavior contribute to recovery from depression. Experience Sampling (ESM) assessments over a longer period of time may give insight in the associations between behavioral patterns and both long-term improvement in depressive symptoms and within-person daily fluctuations in symptoms.

Objectives: We aimed to examine whether (i) a long-term change and (ii) within-person daily fluctuations in daily life behaviors predict change in depressive symptoms using ESM assessments. A second objective of the study was to examine the effects of a six-week ESM intervention, with and without personalized feedback, on daily life behaviors in comparison with a control condition.

Methods: Depressed patients (N=102) receiving pharmacological treatment were randomized to an ESM intervention with personalized feedback, an ESM intervention without feedback, or a control condition. Social, sedentary, and physical behaviors as well as depressive symptoms were assessed using ESM in every-day life.

Results: Long-term change in physical activity and talking was associated with long-term change in depressive symptoms. Furthermore, participants had lower levels of end-of-day depressive symptoms when they engaged more in talking or physical activities and when they engaged less in nothing/resting or being alone during the day. Participants in the six-week ESM intervention conditions showed larger changes in talking, doing nothing/resting, and being alone over time than those in the control group. The analyses also revealed individual differences in the within-person associations and behavioral change over time.

Conclusions: Social, sedentary, and physical behaviors have important affective implications for daily mental health of individuals with depression. Self-monitoring using ESM leads to behavioral change and may be a useful add-on tool to gain personalized insight in which daily activities improve one's daily depressive symptoms.

Abstract #: A3

Abstract Title: *Lab vs. the "Real Life"? Multilevel Structural Equation Modeling as an Integrative Framework for Combining Experimental and Intensive Longitudinal Designs*

Lead Author: Andreas B. Neubauer

Co-Author(s): Andrea Voss

Abstract:

One of the great advantages of intensive longitudinal designs (ILD; daily-diary studies, ecological momentary assessment, experience sampling methods ...) is their ability to investigate "life as it is lived" (Bolger et al., 2003) without creating artificial experimental settings. However, many experimental psychologists still refrain from this methodology, partly because they question the internal validity of ILD. Proponents of ILD, in turn, argue that experimental studies lack ecological validity, since experimental situations are artificially created and thus, behavior in the laboratory might not generalize to "real-world behavior" outside of these controlled settings. We aimed at combining the strengths of both research traditions by means of multilevel structural equation modeling (MSEM), which simultaneously estimates covariance structures obtained within individuals across many measurement occasions (as found in ILD) and covariance structures obtained between participants at a single point in time (as found in experimental studies). Specifically, we followed 129 participants in a daily-diary design over the course of six weeks and had them rate their daily levels of need fulfillment and well-being. After these six weeks participants were invited into the laboratory where we experimentally frustrated (vs. fulfilled) their need for competence. When analyzing the data using MSEM, we found that experimental need frustration increased negative affect, and this effect was amplified for those participants who reacted strongly negative to daily competence dissatisfaction (high competence dissatisfaction strength) and did not react towards daily competence satisfaction (low competence satisfaction strength). That is, although negative affect increased after need frustration, the size of this effect differed between participants, contrary to SDT's conceptualization of competence as a universal need. Strengths and merits of the MSEM approach together with its limitations including issues of sample size requirements and model fit indices will be discussed.

Abstract #: A4

Abstract Title: *Heritability and temporal stability of ambulatory autonomic stress reactivity in unstructured 24-h recordings*

Lead Author: Melanie Neijts

Co-Author(s): Rene van Lien, Nina Kupper, Dorret Boomsma, Gonneke Willemsen and Eco de Geus

Abstract:

Objective: Measurement of ambulatory autonomic reactivity can help understand the long term health consequences of exposure to psychosocial stress in real-life settings. **Methods:** In this study, unstructured 24-h ambulatory recordings of cardiac parasympathetic and sympathetic control were obtained in 1288 twins and siblings, spanning both work time and leisure time. These data were used to define two ambulatory baseline (sleep, leisure) and four stress conditions (wake, work, work_sitting, work_peak) from which six ambulatory stress reactivity measures were derived. The use of twin families allowed estimation of heritability and testing for the occurrence of amplification or emergence of new genetic variance during stress compared to baseline conditions. **Results:** Real-life reactivity has moderate to high temporal stability over a three-year period ($0.43 < r < 0.83$). Depending on the definition of ambulatory reactivity employed, significant heritability was found, ranging from 28 to 38% for heart rate, 30 to 39% for cardiac parasympathetic control (indexed as respiratory sinus arrhythmia), and 13 to 23% for cardiac sympathetic control (indexed as the pre-ejection period). Heritability of ambulatory reactivity was largely due to newly emerging genetic variance during stress compared to periods of rest. **Conclusions:** Ambulatory autonomic reactivity extracted from an unstructured real-life setting shows reliable, stable and heritable individual differences. Real-life mental and social engagement with the environment uncovers new and different genetic variation compared to that seen in resting baseline conditions, including sleep.

Abstract #: A5

Abstract Title: *Comparing accelerometry derived moderate-to-vigorous physical activity and sedentary time with survey data of physical activity and leisure time exercise behavior*

Lead Author: Charlotte Huppertz

Co-Author(s): Stieneke Doornweerd, Matthijs D. van der Zee, Hidde P. van der Ploeg, Meike Bartels and Eco J.C. de Geus

Abstract:

INTRODUCTION: Due to its association with health outcomes, research on physical activity behavior is popular nowadays. Many epidemiological studies aim to quantify physical activity levels in the population at large, usually by relying on self-report data due to the costs of using objective instruments on a large scale. Critics doubt the validity of the subjective recall of physical activity, however, and recommend accelerometers as an alternative. The present study aimed to investigate the comparability between subjectively and objectively assessed physical activity in adolescents and adults. In addition, the association between objective physical activity and leisure time exercise behavior was examined, which is hypothesized to represent an aspect of physical activity that is less difficult to recall.

METHODS: Data were taken from two projects conducted by the Netherlands Twin Register – project 1 focusing on adolescents (N=94) and project 2 focusing on adults (N=32). Participants were asked to wear an Actigraph accelerometer during seven consecutive days. At the end of the week, they filled in the short version of the International Physical Activity Questionnaire (IPAQ). In project 1, they also indicated specific leisure time exercise activities that they participated in, including weekly frequency and duration. Four traits were extracted from the data, namely 1) moderate-to-vigorous physical activity (MVPA) as assessed by accelerometry, 2) MVPA as assessed by the IPAQ, 3) self-reported regular leisure time exercise behavior (LTEB), all expressed in METhours/week, and 4) sedentary behavior as assessed by accelerometry in hours.

RESULTS: The median score for MVPA was higher for the IPAQ compared to the objective measurement (28.0 versus 21.9 weekly MET hours for project 1 and 20.0 versus 13.9 for project 2). The correlation between the subjective reports and the objective measurements of MVPA was only moderate (around .45 for both projects). The correlation between objectively measured MVPA and subjectively reported LTEB (.348) suggested that about 10% of MVPA was due to leisure time exercise activities. As expected, individuals spend most of their time sedentarily (around 9 hours of the waking daytime on average in both projects). There was a negative correlation between objectively measured MVPA and objectively measured sedentary behavior (-.408 for project 1 and -.316 for project 2), suggesting that total physical activity and sedentary behavior were substantially confounded.

CONCLUSION: Our results imply that MVPA should not be measured by self-report surveys as the resulting variables differ remarkably from those derived through objective measurement. We did not replicate the often quoted lack of an association between physical activity and sedentary behavior. There were negative associations between the two behaviors both in adolescents and in adults, implying that they should not be studied in isolation.

Abstract #: A6

Abstract Title: *Effects of daily ICT use for work purposes during non-work time on employee recovery and well-being.*

Lead Author: Lenka Duranova

Co-Author(s): Antje Schmitt, Johanna Braukmann, and Sandra Ohly

Abstract:

The rapid development of new information and communication technology (ICT) makes it steadily easier to work anytime and anyplace (Davis, 2002). One of the consequences of the technological progress is the increase in supplemental work through technology after regular work hours (here after: ICT use) by knowledge workers. The effects of this phenomenon are currently a growing area of interest in work and organizational psychology. The present study sheds more light on the effects of ICT use in regard to employee recovery and well-being.

Experience sampling methodology was applied to test the hypotheses. Data were collected online from 138 knowledge workers in Germany who completed a general survey and three daily surveys over a period of 7 consecutive work days.

As results, multilevel analyses showed significant detrimental effects of ICT use on several indicators of employees' recovery and well-being (vitality, psychological detachment, and serenity). We did not find any significant main effect on morning indicators of recovery (e.g., sleep quality) and well-being (e.g., fatigue). Interestingly, some of the evening effects disappeared when controlling for working time. Psychological detachment and serenity seemed to be deteriorated by ICT use beyond the effects of daily work hours. Moreover, we elaborate on the potential mediating role of psychological detachment in the strain-well-being relationship. Additional analyses showed lack of detachment in the evening as a substantial predictor of morning well-being (e.g., fatigue or serenity).

We conclude that ICT use has a potential to serve as a stressor by direct negative influence on employees' recovery and well-being in the evening even beyond the effects of daily work hours. In the future research, the use of physiological measurements (such as melatonin production and sleep actigraphy) may further contribute to clarification of the ICT use effects on employees' recovery and well-being in the morning.

Abstract #: A7**Abstract Title:** *An Adjunctive, Smartphone-Assisted Intervention to Increase Treatment Adherence in Bipolar Disorder: Open Trial Results***Lead Author:** Susan J. Wenze**Co-Author(s):** Michael F. Armev and Ivan W. Miller**Abstract:**

Treatment non-adherence is prevalent in bipolar disorder (BD), and predicts serious negative outcomes. Although many studies have examined predictors or outcomes of non-adherence in BD, few studies have assessed interventions designed specifically to enhance treatment adherence in this population. We report open trial results of a novel, adjunctive, smartphone-assisted intervention to improve adherence in BD, focusing primarily on feasibility and acceptability.

“My Treatment” (MyT) spanned 3 months and consisted of 6 in-person, individual therapy sessions and 2 months of twice-daily ecological momentary intervention (EMI) sessions. MyT integrated psychoeducational and cognitive-behavioral principles.

Eight individuals with bipolar disorders (BD-I, n = 5; BD-II, n = 2; BD NOS, n = 1) and current depressive and/or (hypo)manic symptoms (mean QIDS score = 15.25; mean CARS-M score = 7.25) were recruited from inpatient (n = 2), partial hospital (n = 3), and outpatient (n = 3) settings. Perceived credibility of MyT and expectancy for change were high (mean CES score = 29.25/36). Participants completed all in-person sessions and an average of 80.43 (41-120) EMI sessions. All smartphones were returned. Treatment acceptability and satisfaction were high (mean CSQ-8 score = 30.86/32). On 5-point Likert scales, the average rating was 5 for overall satisfaction, 5 for satisfaction with the in-person sessions, and 4.57 for satisfaction with the smartphone sessions; 4.86 for helpfulness; and 4.57 for ease of use. Qualitative feedback was positive and highlighted numerous perceived benefits. Although this study was not powered to test efficacy, primary outcome variables changed in the expected directions, and the average depression score decreased by 20%.

These encouraging results suggest that MyT is feasible and acceptable to individuals with BD and may be an efficacious way to address treatment non-adherence. Future goals include testing MyT in a fully-powered RCT and determining which components of the intervention are most efficacious.

Abstract #: A8**Abstract Title:** *Ambulatory Assessment in the Elderly***Lead Author:** Anna Schlomann**Co-Author(s):** Christian Rietz**Abstract:**

Ambulatory Assessments offer great potentials to improve quality of life in many contexts. An important target group is the growing population of the elderly where Ambulatory Assessments can be used for health monitoring, prevention, prophylaxis, or for providing support in everyday life. Despite all possibilities, one should not forget that there might also be refusal of these relatively new methods of collecting data. People – especially those who are not comfortable with new technologies – might worry about being monitored or they are not able to operate the required devices.

In our current research project we focus on acceptance and actual usage of present systems for Ambulatory Assessment in the target population of the elderly. Various stakeholders who are involved in the process of data collection and evaluation like health care providers, people in old age, and their relatives are surveyed using semi-structured interviews (field time: 1st quarter of 2015). One of our key research questions is how health monitoring systems can be used to make everyday life easier for older people. Our aim is to explore key drivers and barriers of usage.

Being embedded in an inter- and transdisciplinary research group at the University of Cologne (graduate school “Well-Being into Old Age”, the project “Quality of Life and Subjective Well-Being of the Very Old in North Rhine-Westphalia”, and the “Cologne Center for Ethics, Rights, Economics and Social Sciences of Health (ceres)”) research benefits from a multiperspective view on the topic.

Findings of the survey will be presented referring to two main topics: We will define conditions and necessary developments that will lead to a higher acceptance and intention to use health monitoring systems by the elderly. In this way, our research allows to draw first inferences about the effects of health monitoring on older people’s well-being.

Abstract #: A9

Abstract Title: *Disentangling emotion dysregulation in Borderline Personality Disorder, Posttraumatic Stress Disorder, Bulimia Nervosa, and Healthy Controls*

Lead Author: Philip S. Santangelo

Co-Author(s): Marlies Houben, Gregory Verleysen, Peter Kuppens and Ulrich W. Ebner-Priemer

Abstract:

Emotion dysregulation with heightened affective instability is commonly seen as the core problem of patients with borderline personality disorder (BPD). Moreover, BPD is the only disorder in DSM-5 for which affective instability is a diagnostic criterion. Ambulatory Assessment is ideally suited to investigate unstable psychopathological processes because of the possibility to track symptoms over time. While BPD-patients can be clearly and robustly distinguished from HC, global instability indices (namely squared successive differences and probability of acute change) do not differentiate between BPD patients and clinical controls (patients with Posttraumatic Stress Disorder [PTSD] and with Bulimia Nervosa [BN]). To disentangle affective dynamical processes that underlie BPD we combine insights from basic affective science and the biosocial theory of BPD. By analyzing three components of affective dysregulation that are of theoretical relevance for BPD we try to achieve a better distinction between BPD-patients and clinical controls.

Forty-three BPD-patients, 28 PTSD-patients, 20 BN-patients, and 28 HC carried e-diaries for 24hrs in everyday life. Participants were prompted to rate their momentary distress and valence approximately every 15 minutes while awake. We analyzed three components of emotion dysregulation (affective homebase, variability, return to baseline) regarding distress and valence to identify differences between the four groups of participants. Both multilevel regression modeling and diffusion modeling approaches were used to allow for robust conclusions.

Our results indicate that HC differ from all three clinical groups showing a more positive affective homebase, lower variability of distress and valence as well as a faster return to baseline of distress (but not valence). However, the differences between the clinical groups are much less consistent and less robust across the different modeling approaches.

This the first study to apply a model of basic affective science to investigate specificity of emotion dysregulation in BPD. We discuss methodological considerations relevant to these findings.

Abstract #: A10

Abstract Title: *The Correlates and Predictive Validity of Automatic Behaviors and Coping Strategies among Couples Coping with Breast Cancer*

Lead Author: Megan L. Robbins

Co-Author(s): None

Abstract:

Past research has found that automatic and expressive behaviors in daily life can play an important role in the coping process; yet, it is a controversial notion to include them in the definition of coping. This study examined the degree of overlap between EAR-assessed, automatic behaviors and self-reported coping strategies, and their ability to predict couples' psychological adjustment. Fifty-two women with breast cancer and their spouses wore the EAR, a naturalistic observation method that records snippets of sound, over one weekend while patients were undergoing treatment. They also completed the COPE to self-report coping strategies, and the CES-D and PSS to report distress before and two months after the monitored weekend. Research assistants coded various behaviors (e.g., sighing, TV-watching), conversation type (e.g., cancer-related), and transcribed participants' utterances. The coding was aggregated across each participant's sound files, and LIWC, a software program, yielded the percentage of words comprised in various psychological categories. Correlations revealed that reported positive reframing was positively associated with spouses' positive emotion words in-general, rather than in the specific cancer context; whereas patients' reframing was associated with more cognitive processing words within cancer conversations. Behavioral disengagement was associated with TV-watching without social engagement, and use of fewer cognitive processing words, particularly among patients. Actor-Partner Interdependence Models revealed that spouses' positive emotion word use was predictive of reduced distress among both partners, whereas positive reframing was unrelated to distress. Further, spouses' TV-watching without social engagement predicted their own increased distress, whereas behavioral disengagement predicted decreased distress. These results highlight the importance of including both effortful and automatic measures of coping to predict psychological adjustment to a stressor such as breast cancer. Employing a broader definition of coping using naturalistic and observational methods will progress the field toward capturing a more comprehensive picture of what contributes to successful coping.

Abstract #: A11**Abstract Title:** *Long-term monitoring of communication, location, physical activity and mood in patients with bipolar disorders***Lead Author:** Esther Muehlbauer**Co-Author(s):** Ulrich Ebner-Priemer and Emanuel Severus**Abstract:**

The detection of early warning signs (EWS) in the course of bipolar disorders seems to have high potential in preventing new illness episodes and therefore is relevant for patients' personal wellbeing (such as higher level of psychosocial functioning and higher quality of life) as well as for economic costs (less sick days, less costs for health care system). The presented work aims to answer the question whether behavior-related parameters such as physical activity, communication patterns and sleep are able to differentiate between euthymic, (hypo-)manic and depressive episodes and whether they can predict new illness episodes. The detection of EWS for the prevention of new (hypo-)manic and depressive episodes is conducted via continuous ambulatory assessment, to increase objectivity of data and compliance to long-term mood charting. In detail, we monitor communication habits such as length of calls, number of dialed contacts, number and length of messages, etc.. In addition patients will answer end-of-the-day e-diaries regarding mood, sleep and medication. Monitored activity data is complemented by a wrist-wearable actigraphy sensor. 40 out-patient participants will be included in the study for 12 months each. Psychopathological interviews for the assessment of current (hypo-)manic, depressive and euthymic states take place on a fortnightly basis. First results will be reported. We expect to find significant effects in accumulated prediction scores of the described parameters when differentiating euthymic from (hypo-)manic/depressive days as well as when differentiating an euthymic episode from an episode that changes from euthymic to affective.

Abstract #: A12**Abstract Title:** *Comparing transthoracic echocardiography and impedance cardiography; systolic time intervals and stroke volume***Lead Author:** Ineke Nederend**Co-Author(s):** Eco de Geus, Derk Jan ten Harkel and Nico Blom**Abstract:**

Introduction: Heart failure, rhythm disturbances and increased risk of sudden cardiac death are not uncommon in patients (late) after operation for their congenital heart disease. Impedance cardiography enables noninvasive measurement of cardiac performance. Classically, three points are derived from the impedancardiogram (ICG): 1. The 'B point' represents the moment of opening of the aortic valves 2. The 'C point' the moment of maximal flow velocity of blood through the aorta and 3. The 'X point' depicts closing of the aortic valves.

Objectives: This study aims to validate systolic time intervals and stroke volume (SV) measured by ambulatory impedance cardiography using simultaneously recorded transthoracic echocardiography (TTE).

Methods: 77 Healthy volunteers (41 girls, 36 boys) with an average age of 11,5 y (range 1-18), were recruited to undergo simultaneous recording of impedance with an ambulatory device during echocardiography in a standard clinical set-up. In the echocardiogram, 3 systolic time intervals were mapped using a pulsed wave Doppler flow signal over the left ventricular outflow tract in a parasternal 5 chamber view. SV was assessed using velocity time integral. Bland-Altman plots and Intra Class Correlations were used for analysis of the agreement between TTE and ICG.

Results: Agreement between systolic time intervals measured by the two different modalities was moderate for opening of the aortic valves (B point) and maximal flow velocity (C point): ICC=.47. (95%CI .26-.63) and ICC=.52. (95%CI .33-.67) respectively. Agreement was high for the moment of closing of the aortic valves (X point): ICC=.94 (95%CI .90-.96). Agreement for SV was ICC=.58 (95%CI .40-.72).

Conclusions: The agreement between TTE and ICG from an ambulatory device is encouraging. A next step is to relate ambulatory recorded signals to clinical features in order to establish whether this might be of additional value in the clinical evaluation of (pediatric) cardiac patients.

Abstract #: A13**Abstract Title:** *Experiential Avoidance and Mood State in Bipolar Disorder***Lead Author:** Susan J. Wenze**Co-Author(s):** Michael F. Arney and Ivan W. Miller**Abstract:**

Experiential avoidance (EA) involves attempts to escape unwanted internal experiences even when doing so causes impairment or harm. EA has been linked with numerous disorders and negative outcomes, including depression, anxiety, stress, substance abuse, self-harm, PTSD, and psychotic symptoms. However, no published studies of which we are aware have explored the role of EA in bipolar disorder (BD). Given the unique fact that individuals with BD experience mood symptoms along two different dimensions (i.e., [hypo]manic and depressed), BD represents an intriguing disorder in which to examine the relationship between EA and mood. In the current study, part of a larger investigation, we tested the relationship between momentary mood and EA in a small sample of participants with BD.

Eight individuals with bipolar-spectrum disorders (BD-I, $n = 5$; BD-II, $n = 2$; BD NOS, $n = 1$) were recruited from inpatient ($n = 2$), partial hospital ($n = 3$), and outpatient ($n = 3$) settings to pilot test a novel psychosocial intervention. As part of the intervention, participants completed 60 days of ecological momentary intervention (EMI) sessions on a smartphone. At each momentary session, participants were asked to rate their mood, answer two questions drawn from the Acceptance and Action Questionnaire and adapted for momentary use, and complete other items relevant to the larger study. Hierarchical linear modeling analyses indicated that EA was higher when participants rated their mood as more depressed ($b_{10} = -0.82$, $SE = 0.23$, $p = .01$). Lag analyses revealed that depressed mood predicted subsequent increases in EA ($b_{10} = -0.21$, $SE = 0.07$, $p = .02$).

These findings suggest that those with BD experience depressed mood as particularly aversive, and that they may attempt to avoid or control such mood states as a result. Future studies should examine between-person moderators of this effect in larger samples.

Abstract #: A14**Abstract Title:** *Everyday Associations Between Precipitation and Physical Activity in Older Adults: On the Moderating Role of Age and Intentions***Lead Author:** Christiane Hoppmann**Co-Author(s):** Jessica Lee, Jochen P. Ziegelmann, Peter Graf, Karim Khan and Maureen Ashe**Abstract:**

Objective: Physical activity is a key health behavior that reduces chronic disease risk across the adult lifespan and into old age. Yet, most adults do not meet recommended physical activity levels. The purpose of this study was to examine time-varying associations between the physical activity that older adults perform as part of their everyday lives and a key barrier to physical activity, namely precipitation. We also explored age and physical activity intentions as potential moderators of the proposed negative everyday physical activity-precipitation association. **Method:** 128 community-dwelling older adults (M age = 72 years; 63 % women) from the Vancouver Metropolitan area reported socio-demographic information, physical activity intentions, and they wore accelerometers for up to 10 consecutive days during waking hours between May 13 and September 28, 2011. Corresponding daily weather information including precipitation, daylight hours, and temperature was collected from Vancouver meteorology stations. **Results:** Multilevel models corroborate previous research by showing that older adults engaged in less everyday physical activity on days with increased precipitation across three physical activity indices (average activity counts/minute, average step counts/minute, minutes of moderate to vigorous physical activity). Importantly, older as compared to younger old adults were more negatively impacted by the effect of rain on everyday physical activity. Furthermore, older adults with stronger physical activity intentions engaged in more everyday physical activity overall. Physical activity intentions modified the association between time-varying precipitation and everyday physical activity. **Discussion:** Findings highlight the important role of time-varying factors for everyday physical activity. Results on the moderating role of age and physical activity intentions are discussed in the context of the health psychological and aging literature.

Abstract #: A15**Abstract Title:** *Event-focused Indicators of Mixed Emotions and Adjustment in Emerging Adults***Lead Author:** Sangsun Kim**Co-Author(s):** Debora J. Bell and Jack H. Andrews**Abstract:**

Mixed emotions (ME) refer to coexistence of positive affect (PA) and negative affect (NA). ME has been regarded as an indicator of emotional complexity and increased maturity, which may premise complex understanding of one's and others' affective states (Gruhn et al., 2013; Labouvie-Vief et al., 2010). For example, older children were more likely to experience ME than younger children, and the effect of age on ME experiences was partially mediated by their empathetic ability (Zajdel et al., 2013).

Prior research using ecological momentary assessment has investigated ME by measuring intra-individual covariation of PA and NA during a specified period of time. However, this time-based indicator of ME yielded inconsistent findings regarding the relationship between ME and adjustment. Specifically, some investigators have reported that correlation between PA and NA was associated with emotional well-being and physical health (Carstensen et al., 2000; Hershfield et al., 2012), but others have reported that it was not predictive of psychological adaptation (Gruhn et al., 2013). In this context, it was suggested that time-based indicators may be affected by multiple events during that period, and therefore situational characteristics should be investigated (Scott et al., 2014).

The current study examines the relationship between situational or event-focused indicators of ME and adjustment. Participants are undergraduates taking part in a larger research project, and currently 40% of the sample (n = 70) have begun participation. In addition to measures of adjustment, an event-focused daily diary assesses individuals' emotional reactions to one multi-faceted event each day for 5 days. Analyses will examine the relations of the personal vs. social valence of the events to the experience of ME, as well as the relationships among ME, emotional awareness, and adjustment. Results should have important implications for understanding the role of context in ME's relationship to adjustment.

Abstract #: A16**Abstract Title:** *Beyond the road to hell: MOOCing against chronic procrastination – Ambulatory Assessment Intervention (AAI) to reduce procrastination in daily life – A pilot study***Lead Author:** Eliane Dominok**Co-Author(s):** Matthias F. Limberger, Sarah Holstein, and Ulrich W. Ebner-Priemer**Abstract:**

INTRODUCTION: Procrastination refers to a chronic pattern of postponing obligatory but unpleasant tasks (e.g. meeting friends instead of studying for an important exam). It is considered a time-dependent phenomenon, because behavioral patterns change as a function of time remaining up to the deadline. In previous studies using Ambulatory Assessment we have learned that the mapping of this "non-behavior" is quite challenging. In contrast to observable actions, it is difficult to examine what was originally planned when no visible action has taken place. Even worse, the aspect of avoidance is one major feature in procrastination behavior. Reminding participants of the unpleasant task at regular time intervals does however enhance reactivity or works as an intervention itself. Therefore, we now switch from AA to AAI and focus in this follow-up study on the use of AA exclusively as an intervention tool for procrastinators.

OBJECTIVES/METHODS: We investigated the feasibility of an entirely online implemented training of self-regulation (MOOC format – Massive Open Online Course) in combination with a mobile application. For such an online format in particular the question of sustainability and transfer of the learnings into everyday life has to be considered. Procrastination is a conditioned behavior that must be overcome to establish new behavior routines – this requires training. Thus, the functionality of our application is based on the components of training e.g. time management, emotion regulation etc. It works as a planning tool with differentiated feedback on planning accuracy, start-delay and mood in correlation to deferred and non-deferred activities. A cheer-up function which returns the degree of completion of a task is implemented to enhance motivation. The documentation of so-called pitfalls stimulates self-monitoring processes and helps to optimize the planning of future tasks.

RESULTS/DISCUSSION: First results of our second MOOC launch concerning feasibility, compliance and user satisfaction will be reported and discussed.

Abstract #: A17**Abstract Title:** *The Daily Experience Sampling Questionnaire (DESQ): A new approach to measuring momentary well-being***Lead Author:** Christine Blome**Co-Author(s):** None**Abstract:**

Introduction: Subjective well-being is an important outcome of medical interventions that can be measured with the help of Experience Sampling, asking participants to rate their well-being on a mobile device several times a day. A less costly, but time-consuming alternative is the Day Reconstruction Method (DRM), asking respondents to divide the complete preceding day into episodes and to retrospectively rate each episode for well-being.

Objective: We aimed to develop a measure of well-being that combines advantages of Experience Sampling and DRM by assessing only a random sample of moments (making the measure short) and using a once-daily assessment via questionnaires (making it affordable).

Methods: In the 'Daily Experience Sampling Questionnaire' (DESQ), participants retrospectively rate their well-being at six randomly selected single moments of the preceding day (e.g., 10:15). The DESQ was developed and pre-tested in four steps, including a) development of response options for the well-being rating scale within the DESQ, based on a survey among 26 healthy persons, b) interviews on the well-being rating scale with 10 healthy persons (both convenience samples), c) pre-test and revision of the DESQ in interviews with 11 patients with psoriasis treated in the University Medical Center Hamburg, and d) completion of the DESQ by six patients for seven consecutive days, followed by interviews on questionnaire feasibility.

Results: All participants of the 7-day-pre-test stated they had filled in the DESQ at each day of the week and that they did not have any difficulties completing or understanding it. Daily completion was not considered burdensome or time-consuming. Only one participant had a suggestion for a minor improvement.

Conclusions: The DESQ may be a time- and cost-reducing alternative to measuring patient well-being with Experience Sampling or DRM. We plan to determine criterion validity in future studies, using Experience Sampling as a gold standard.

Abstract #: A18**Abstract Title:** *Ambulatory Assessment Intervention to enhance a stress reduction program for university students***Lead Author:** Marie-Hélène Seidl**Co-Author(s):** Ulrich W. Ebner-Priemer**Abstract:****Introduction**

Complaints on high workload and experienced stress are common among university students in Germany. Accordingly stress management programs are immensely demanded and regularly booked out. In close cooperation with a local health insurance company called "Techniker Krankenkasse", we developed during the past year a stress management program specifically targeting stressors relevant to students. Although empirical findings regarding the efficacy of the program are promising, it remains unclear whether students apply their newly learned stress regulation skills and if so, how they implement them in everyday life.

Objectives/Methods

We will develop two Ambulatory Assessment Intervention (AAI) components to further explore and enhance a seven week stress management program. First, audio and video files covering specific training topics, like psychotherapeutic relaxation techniques, will be developed and put into effect on students' smartphones. Second, mood and stress will be monitored on a regular basis and lead to suggestions regarding stress management. To do this, individual threshold will be specified, which when exceeded will trigger the presentation of specific training components. These components are linked to most recent contents of the stress management program; i.e. that newly learned ways how to cope with stress are proposed on the smartphone in daily life to enhance their practice. In addition, students are reminded on a regular basis (randomly) to a) watch audio and video clips and b) exercise their newly learned skills. A first training trial starts April 2015 with two groups including 12 students each. Treatment efficacy will be monitored using e-diary ratings on stress and mood as well as traditional questionnaires on stress management, depression, psychosomatic symptoms, test anxiety, perfectionism, self-esteem and self-management.

Results and Discussion

Preliminary findings regarding compliance, usability and user satisfaction will be reported and discussed.

Abstract #: A19**Abstract Title:** *Using multilevel modelling to examine the effectiveness of ecological momentary interventions***Lead Author:** Tanja Lischetzke**Co-Author(s):** Dorota Reis and Charlotte Arndt**Abstract:**

Interest in the use of ecological momentary interventions—that is, interventions that are implemented in participants' everyday lives—to change experiences and behaviors has grown rapidly in recent years. Ecological momentary interventions in which the intervention is delivered on a daily basis ("daily interventions") can be easily combined with ambulatory assessment to analyze intervention effects on dependent variables that fluctuate over time. Our goal in this presentation is to demonstrate how the effectiveness of a daily intervention can be analyzed using multilevel modelling. We argue that multilevel models are the method of choice to analyze general effectiveness ("What is the average intervention effect across individuals?") and differential effectiveness ("Who benefits more from the intervention?") because they circumvent the shortcomings of analysis of variance (ANOVA) approaches. In particular, multilevel models can easily handle unbalanced data (different number of measurement occasions per person) and they allow analyzing both categorical and continuous person-level variables as moderators of an intervention effect. Another advantage of multilevel models is that they can be extended to analyze within-days effects of a daily intervention to test whether the intervention might be more effective on some days than on others. Time-varying characteristics of the situation (e.g., daily time pressure) or the individual (e.g., hours of sleep last night) might moderate the (within-days) effect of a daily intervention ("conditional effectiveness"). We show how multilevel models can be specified to examine general, differential, and conditional effectiveness of a daily intervention. As an illustration, we apply the models to data from a daily intervention workplace study (N = 51 full-time employees) that focused on the effects of daily savoring exercises on calm mood and vigor. In sum, we propose that multilevel models provide an advantageous approach for researchers who want to analyze intensive longitudinal data from daily intervention studies.

Abstract #: A20**Abstract Title:** *Your stress is eating you? An experience sampling study on stress-related eating and its moderators using smartphones***Lead Author:** Jens Blechert**Co-Author(s):** Markus Stuppner, Thomas Scherndl, Andrea H. Meyer, and Frank Wilhelm**Abstract:**

Background: Both laboratory and ambulatory studies have documented large individual differences in whether and how stress relates to eating: some individuals do not show an association, some eat less, others eat more when under stress. For the latter ones, food choice becomes biased towards high fat and sugar food when stressed, with negative implications for their health and body weight. However, the literature is still inconclusive with regard to the individual differences that predispose to stress-related eating.

Methods: In a time-contingent sampling plan, 28 students reported on stress (4 items adapted from the Perceived Stress Scale, PSS) and eating behavior 7 times per day for 7 consecutive days on a customized electronic diary on their smartphones. Between-meal snacking was targeted as dependent variable due to its hedonic nature (often eaten in the absence of actual hunger) and its relevance for nutritional health. We expected moderation of the stress-eating relationship by gender, body mass index (BMI), and the traits restrained and emotional eating (Dutch Eating Behavior Questionnaire).

Results: Results from hierarchical linear modelling confirmed a positive within-participant association of stress and eating, which was modulated by restrained eating, emotional eating, and gender. Individuals with high levels of restraint a) consumed less snacks in total and b) were less vulnerable to snacking under stress. Emotional eaters snacked more when stressed. Women consumed fewer snacks in total but snacked more when stressed. BMI was no significant predictor of snacking on any level.

Conclusions: The present results contradict some of the literature on BMI and restrained eating and point to the relevance of gender and emotional eating, conferring a risk to respond to stressful episodes with snacking. Thus, prevention programs may benefit from addressing these individuals in particular.

Abstract #: A21

Abstract Title: *Do some forms of pain coping weaken the association between momentary pain and physical activity in people with osteoarthritis?*

Lead Author: Anna L. Kratz

Co-Author(s): David A. Williams, Michael E. Geisser and Susan L. Murphy

Abstract:

The pain of osteoarthritis (OA) can limit engagement in physical activity (PA). The behavioral literature encourages the use of coping strategies to mitigate the impact of pain on PA; unfortunately, little is known about which strategies most effectively influence PA. The aim of this study was to examine the moderating effect of different pain coping strategies on the momentary pain/PA association. Adults with OA and mild to moderate pain (n = 152) completed the Coping Strategies Questionnaire (CSQ). Then, for seven days participants wore an Actiwatch-Score, a wrist-worn accelerometer that collected PA data as activity counts and self-reported pain intensity ratings (0-10) entered via a button at 5 regular intervals throughout the day. Multilevel models were used to examine whether 6 coping strategies assessed by the CSQ moderated the association between pain and subsequent PA. Three types of coping were found to significantly moderate the momentary pain/PA association: catastrophizing (CAT; B=4.68, p=0.01), ignoring sensations (IS; B=6.71, p<0.001), and reinterpreting pain sensations (RPS; B=-4.52, p=0.03). Graphical data revealed that high IS or RPS was related to stable levels of PA, regardless of pain intensity; whereas low levels of IS or RPS were related to steep declines in PA in the context of increased pain. High CAT was associated with stable low levels of PA, regardless of momentary changes in pain. Low CAT was associated with higher PA when pain was low, but declining PA as pain increased. The findings suggest that IS and RPS are both adaptive types of coping in terms of maintaining PA in the context of increased pain. Except at very low levels, CAT appeared to have a negative influence on PA. These findings add to the knowledge of how coping strategies relate to pain and physical activity in daily life among people with OA.

Abstract #: A22

Abstract Title: *Intensive ecological momentary assessment in individuals with multiple sclerosis: Acceptability, feasibility, and reactivity.*

Lead Author: Mitchell P. Belanger

Co-Author(s): Tiffany Braley, Susan L. Murphy and Anna Kratz

Abstract:

Multiple sclerosis (MS) is a chronic, autoimmune disease of the central nervous system characterized by physical disability and a spectrum of neurological symptoms. Lifestyle factors, symptom burden, and physical limitations may present challenges to using ecological momentary assessment (EMA) in MS; furthermore, reactivity to EMA protocols may present problems with data veracity. The goal of this study was to use data from an ongoing study to examine acceptability and feasibility of an EMA protocol and protocol reactivity in people with MS. Twenty adults with MS completed baseline surveys followed by 7-days of home monitoring during which they continuously wore a PRO-Diary (CamNTech, UK) accelerometer on the non-dominant wrist. Participants entered ratings of pain, fatigue, depression, and cognitive function at 5 regular daily intervals and, each night, completed 7 online surveys assessing that day's symptoms, medications, and participation. The last nightly survey included a feasibility and acceptability questionnaire. All participants were able to complete the study without assistance. 94% of participants rated the PRO-Diary as easy to use and 75% indicated they would be likely to complete a similar study that lasted 14 days. The mean time to complete the nightly surveys was 7.87minutes (range: 2-90minutes). Almost all of the nightly surveys (94.01%) and EMA entries (90.16%) were completed. Reactivity was found for within-day EMA rating of depression, such that depression ratings increased over the home monitoring period. Overall, participants reported high levels of acceptability for the surveys and the PRO-Diary. Survey completion times and rates of missing data were low. Reactivity in EMA depression ratings was unexpected and may be due to small sample size or increased missing data over time. An intensive EMA protocol can be successfully administered in MS; researchers interested in using EMA in MS should consider the potential for reactivity and participant motivation and accessibility factors.

Abstract #: A23**Abstract Title:** *Ecological Momentary Analysis for Bipolar Disorder***Lead Author:** Aubrey Reider**Co-Author(s):** Summer Schultz, Stefani Schwartz, Caitlin Millett, Sarthak Sawarkar, Venkatesh Krishnamurthy, and Erika Saunders**Abstract:**

Introduction: The advent of personal technology devices provides a window for researchers to efficiently capture daily mood variability in Bipolar Disorder (BD). Clinical monitoring forms used for tracking mood fluctuations in BD have been limited by recall bias and the influence of manic or depressive states on recollection of symptoms. Accurate monitoring of BD symptomatology allows clinicians to better tailor treatment approaches and study the effects of interventions on daily symptoms.

Objectives: We hypothesize that Ecological Momentary Analysis (EMA) via smartphone is a viable method to capture real time daily symptomatology in BD. Additionally, we aim to evaluate the mean values and variability of core symptoms in BD and control groups.

Methods: We report a two-arm, parallel group, observational study designed to measure a method of capturing information on symptoms of participants with BD (N=10) and healthy controls (HC) (N=10). Participants received cues for surveys three times daily: once at a time of the participant's choice regarding previous night of sleep, and twice at random, regarding mood state, energy, stress levels, and other symptoms.

Results: Both groups had high rates of completion (BD 91%, HC 86%, $p=0.68$). The BD group had mean values of lower mood and energy than HC ($p=0.02, p=0.01$), higher pain ($p=0.003$), and marginally significantly higher impulsivity ($p=0.05$). The BD group had higher variability in energy ($p=0.01$), speed of thoughts ($p=0.005$), pain ($p=0.024$), impulsivity ($p=0.005$), and trended towards higher mood ($p=0.05$).

Conclusions: Smartphone EMA for assessing daily BD symptomatology was supported. This study enriches current literature demonstrating adherence to ratings, positive participant experience, and ability to capture variability of symptoms in patients with BD. Additionally, concurrent variations in energy, impulsivity, pain, speed of thought, social/ task-based stress, and sleep patterns can be assessed using the same technique.

Abstract #: A24**Abstract Title:** *A Smartphone Application to Measure Physical Activity Using Sensor-Informed Context-Sensitive Ecological Momentary Assessment***Lead Author:** Genevieve Dunton**Co-Author(s):** Eldin Dzubur and Stephen Intille**Abstract:**

Introduction: Objective physical activity monitors (e.g., accelerometers), have high rates of non-wear, which leads to missing data. This study tested a smartphone application ("app"), which combined objective and real-time self-report methods to measure physical activity using sensor-informed Context-Sensitive Ecological Momentary Assessment (CS-EMA).

Objective: The goal was to describe the extent that the app could capture activities that would have otherwise been missed due to non-wear of a waist accelerometer.

Methods: The app was programmed to trigger CS-EMA surveys immediately after three types of events detected by the smartphone's built-in motion sensor: (1) Physical activity, (2) No activity (i.e., smartphone non-movement), and (3) No data (i.e., device powered off). Additionally, the app triggered random (i.e., signal-contingent) EMA prompts (up to 7 per day). A sample of 51 ethnically-diverse high school students in the U.S. (ages 14-18, 55% female) tested the app over 14 continuous days. Both CS-EMA and random EMA prompts asked "What did you do between (start time) and (stop time)?" (e.g., Reading/Doing homework, Eating/drinking, Sports/Exercising)" with times automatically inserted by the app based on information from the built-in smart- phone motion sensor. Activity was also measured with a waist-worn Actigraph accelerometer.

Results: On average, each participant completed $n=23$ CS-EMA prompts and $n=85$ random EMA prompts across the 14-day monitoring period. The average EMA compliance rate was 78% (range 27-97%). Answered EMA prompts during Actigraph non-wear periods (i.e., 60+ min of 0 activity counts) provided self-reported activity data for an additional 67 (SD = 77) min per day per participant. During this time, $n=40$ additional self-reported physical activity episodes (about 1 per child) were captured that would have been missed using the Actigraph alone.

Conclusion: Smartphone apps using motion sensor-informed CS-EMA are acceptable among high school students and may be used to augment objective physical activity data collected from traditional waist-worn accelerometers.

Abstract #: A25

Abstract Title: *Prospective measurement of daily health behaviors: Patterns of missing data, periodicity, and reactivity in an online daily diary study of gay and bisexual men*

Lead Author: H. Jonathan Rendina

Co-Author(s): Ana Ventuneac, Christian Grov and Jeffrey T. Parsons

Abstract:

Background: To inform research using daily assessment of health behaviors, the goal of the present study was twofold: (1) to examine cyclical patterns in substance use and sexual behavior by day of week and progression through 30-day cycle and (2) to examine evidence and predictors of behavioral change over the course of the cycle.

Method: We analyzed online daily diary data from a demographically diverse sample of 371 highly sexually active gay and bisexual men who reported on sexual behavior and substance use over the course of 30 days. We examined predictors of missing data, periodicity patterns in behavior by weekday and day of diary completion utilizing both trigonometric and polynomial functions, and reactivity using linear functions, all utilizing SAS 9.2 PROC GLIMMIX with dichotomous outcomes and random intercepts and an AR(1) autocorrelation structure.

Results: Higher education (AOR=1.71, $p=.003$) and older age (AOR=1.04, $p<.001$) were associated with higher completion, while race/ethnicity and HIV status were not. Adjusting for these effects, more days of heavy drinking (AOR=0.97, $p=.001$) and club drug use (AOR=0.93, $p<.001$) were associated with lower completion, while being more sexually active or risky were not. The best-fitting pattern explaining diary completion by day of week was trigonometric and accounting for this, the best-fitting pattern by day of diary cycle was also trigonometric. Sexual behavior by day of week was best explained by a quadratic function while substance use was trigonometric. There was a small but significant linear decline in both sexual behavior and substance use over the course of the diary cycle.

Conclusions: Both demographic and behavioral factors may confound diary measurement of health behaviors through increasing missing data. Discernable patterns in missingness and behavior exist and can be captured using existing mathematical functions. Behavioral change was small but non-zero despite being a measurement-only diary, suggesting slight reactivity.

Abstract #: A26

Abstract Title: *Momentary physical pain and its relationship with negative affect in Borderline Personality Disorder*

Lead Author: Ryan W. Carpenter

Co-Author(s): Sean P. Lane, Phillip K. Wood and Timothy J. Trull

Abstract:

Borderline personality disorder (BPD) is prevalent in chronic pain samples and is associated with increased past-year pain. However, the relationship of BPD and physical pain in daily life is unclear. Therefore, the current work explored the momentary experience of physical pain in BPD patients, as well as pain's relationship with negative affect. Previous work has found that these constructs are related and, as emotion dysregulation is a hallmark of BPD, we expected that their association would be stronger in BPD patients than controls. BPD patients ($n = 26$) and healthy controls ($n = 26$) carried an electronic diary for 21 days. Participants reported on their current physical pain and negative affect an average of 6 times per day. As expected, BPD patients reported greater and more variable physical pain and negative affect than controls. We next examined the concurrent relationship of physical pain and negative affect. Accounting for day- and person-level differences, multi-level modeling found that concurrent momentary pain and negative affect were more strongly associated in BPD patients than controls. We then examined the relationship of change (since previous time point) in physical pain and change in negative affect. Change in pain positively predicted change in negative affect across the sample. In contrast, while change in negative affect positively predicted change in pain in both groups, the effect was significantly smaller in BPD patients than controls. Thus, while concurrent effects were stronger in BPD patients than controls, effects were weaker in BPD patients when examining change over time. This may have been a result of BPD patients' greater variability in pain and negative affect. Physical pain may be an important and relatively understudied domain, with similarities to affect, in which BPD patients experience dysregulation. The implications of this for assessing dysregulation in BPD will be discussed.

Abstract #: A27

Abstract Title: *What are the psychophysiological reactions to a fall from 30 meters altitude? A field experiment with climbers.*

Lead Author: Peter Wilhelm

Co-Author(s): Pirmin Bertle and Jonas Hoffmann

Abstract:

Much of our knowledge about psychophysiological reactions in dangerous or stressful situations has been gathered in the laboratory, where quietly sitting participants are confronted with stimuli to elicit stress or fear reactions (e.g. movies, behavior of experimenter). However, due to practical and ethical constraints the intensity of evoked affects has been rather low and the ecological validity of such studies is limited.

To investigate psychophysiological stress reactions under naturalistic threat conditions we conducted a field experiment with 52 rock-climbers. They twice climbed a route at the limit of their capability, once with lead rope (climber fixes rope while climbing) and once with top rope (rope is already fixed). The order was random. In lead rope climbing the falling distance in the case of a drop can be 3 times longer. It should therefore be more stressful. Moreover, in both conditions, participants had to jump at 8 and 20-to-30 meters altitude. We expected jumps during lead rope climbing and in high altitude to be more stressful.

We assessed ECG, skin conductance, and physical activity with accelerometers. In addition, participants reported their appraisal of the situation and their current affect before and after climbing.

Preliminary results show that affect and appraisal before the jump were less positive and heart-rate was higher in the lead rope condition and when altitude was high (large effect-sizes). 10 seconds before a jump, physical activity decreased substantially. However, heart-rate further increased until participants were safely hanging in the rope, then heart-rate decreased. This indicates an additional physiological arousal due to the anticipation of a jump and an immediate parasympathetic slowdown when the potential danger is over. The fact that this pattern consistently occurred in every jump, suggests that there is no complete physiological habituation to an evolutionary wired fear of falling from heights.

Abstract #: A28

Abstract Title: *Personalized feedback based on momentary assessments: Problems and solutions*

Lead Author: Eeske van Roekel

Co-Author(s): Charlotte Vrijen, Vera E. Heininga, Maurits Masselink, Esther Nederhof and Albertine J. Oldehinkel

Abstract:

Attention for personalized interventions has increased rapidly in the past years. Several researchers have pointed towards using ambulatory assessment as a possible tool for providing insight in daily life patterns of mood (Ebner-Priemer & Trull, 2009; Wichers et al., 2011). Up to now, a few studies have started with providing feedback based on personalized patterns of momentary variables (e.g., Kramer et al., 2014). First results are promising, but the complex process from momentary assessments to personalized feedback also knows many potential pitfalls. For an intervention study, we developed a tailor-made lifestyle advice for anhedonic young adults, as a non-pharmacological means to restore the pleasure of everyday activities and accomplishments. Forty young adults will receive an advice based on their observed individual temporal patterns of lifestyle factors and experienced pleasure during the preceding month. In this presentation, I will discuss possible problems to consider when designing a study using personalized feedback based on momentary assessments and provide possible solutions, based on our own experience with developing a lifestyle advice. Further, I will present results and evaluations from a small pilot study in six young adults. As the main intervention study in anhedonic participants is currently conducted, I will provide some preliminary results with regard to the implementation and effectiveness of our lifestyle advice.

Abstract #: A29**Abstract Title:** *Associations Between Depressive Symptoms and Experience of Pleasure in Daily Life in Early and Late Adolescence***Lead Author:** Eeske van Roekel**Co-Author(s):** Elise Bennik, Jozanneke A. Bastiaansen, Maaïke Verhagen, Johan Ormel, Rutger Engels and Albertine J. Oldehinkel**Abstract:**

Although loss of pleasure (i.e., anhedonia) is one of the two core symptoms of depression, very little research has examined the relation between depressive symptoms and the experience of pleasure in daily life. The aims of the present study were to examine how depressive symptoms and the core symptom anhedonia specifically were related to (1) the frequency and intensity of positive events in daily life, (2) mean and variability of positive affect (PA), (3) reactivity to positive events, and (4) reactivity to PA (i.e., whether PA elicits positive events). We used the Experience Sampling Method to measure positive events and momentary PA (9 measures x 6 days in the early adolescent samples; 5 measures x 14 days in the late adolescent sample). Age differences were examined by comparing early adolescent girls with late adolescent girls and sex differences by comparing early adolescent girls with early adolescent boys. Results showed that depressive symptoms were related to a lower frequency of positive events, lower intensity of events, lower mean PA, and higher variability in PA, regardless of sex and stage of adolescence. The reactivity to positive events and reactivity to PA were not reduced in adolescents with more depressive symptoms. The effects found for depressive symptoms were not driven by anhedonia, as anhedonia was not associated with most daily life experiences of pleasure. Our findings suggest that although adolescents with more depressive symptoms experience less positive events and PA in general, they are able to enjoy pleasurable events to the same extent as individuals with less depressive symptoms.

Abstract #: A30**Abstract Title:** *Measuring BDNF in saliva: possibilities and pitfalls for ecological momentary assessment***Lead Author:** Charlotte Vrijen**Co-Author(s):** Eeske van Roekel and Albertine J. Oldehinkel**Abstract:**

Lower levels of BDNF (brain-derived neurotrophic factor) in blood serum and plasma have been associated with depression. It has been suggested that whereas BDNF in serum reflects the last five to ten days, plasma is more suitable for a momentary assessment of BDNF levels. Experience sampling methods combined with blood sampling would be particularly useful for investigating how moment-to-moment variation in certain lifestyle variables is associated with short-term changes in BDNF plasma levels, and how these are related to long term variation in serum. However, because of the infeasibility of drawing blood multiple times a day over a longer period of time, alternatives need to be considered. Saliva sampling is non-invasive, it can be continued for a longer period of time, and can be used in circumstances in which drawing blood is too high a burden on participants, e.g. in extremely stressful situations. Since it has not been established yet to what extent salivary BDNF reflects blood plasma levels, we performed a pilot study. In a first sample, plasma and saliva were collected from three participants in the morning after overnight fasting for five consecutive days. In a second sample, plasma and saliva were collected from three participants three times a day on two different days. This resulted in a total of 33 plasma and 33 saliva samples which will be analyzed by means of three different ELISA BDNF kits. Aims are: (1) to estimate the correlation between BDNF in plasma and in saliva; (2) to investigate inter- and intra-individual variation in salivary BDNF levels, e.g. day curves; and (3) to compare results between the three kits. At the SAA conference the results of our pilot will be presented, as well as potential pitfalls of salivary BDNF.

Abstract #: A31

Abstract Title: *Biomarker-based Behavioral Medicine, Clinical & Health Psychology: Ecological Ambulatory Patient Assessment, Intervention Efficiency and Efficacy Testing*

Lead Author: Roland A. Carlstedt

Co-Author(s): None

Abstract:

The need for routine biomarker-based diagnostics and ambulatory assessment and intervention efficacy testing is underscored by the incongruence phenomenon a psychophysiological dynamic in which positive self-report regarding "feelings," and symptoms during and after intervention, are, paradoxically, associated with subliminal mind-body responses outside of therapy that are inconsistent with expressed feelings of wellness after a therapy session. Although subjective patient-clinician expressions of wellness may persist beyond therapy sessions, biomarker monitoring often reveals abnormal brain activity and sympathetic nervous system hyper-reactivity in the absence of symptoms when tracked longitudinally. Consequently, cursory patient self-report and intuitive assumptions of intervention efficacy should be viewed with caution and routinely augmented with diagnosis relevant biomarker analytics at intake, during therapy and in the context of intervention efficacy testing. Until enduring biomarker verifiable positive changes can be documented proclamations of wellness should be tempered, especially when emanating from patients and therapists who are mutually high in hypnotic susceptibility, who tend to be placebo-prone and can mediate to a Dual-Placebo (Pseudo-Placebo) "Effect" interaction marked by strong mutual practitioner-patient beliefs that an intervention works. These beliefs can mask negative medical realities. Fortunately, biomarker assessment can serve to expose self-report and mind-body incongruence that might otherwise go undetected, and without treatment possibly lead to disease, but validate positive outcomes as well.

In this paper biomarker-based ambulatory assessment and intervention procedures and methodologies will be presented in the context of an integrative diagnostic, treatment and analytics protocol in which patients are monitored throughout therapy and via self-monitoring after a session. Heart activity instrumentation, including a wireless system is used derive and analyze heart rate variability data, the primary outcome measure that is used to determine intervention efficiency and intervention efficacy (the extent of intervention induced mind-body changes and health facilitative changes in HRV). Case studies will be discussed.

Abstract #: A32

Abstract Title: *Ambulatory ecological validation of the ABSP baseball "mental toughness" paradigm using ambulatory biomarker-based assessment and mental training procedures during official competition*

Lead Author: Roland A. Carlstedt

Co-Author(s): Casey Bosquez, Ellie Rawski, Naomi Friedberg, Peter Rodeka, Ariel Guerrero and Marc Prine

Abstract:

Previously an entire season of Major League Baseball (MLB) games (all regular season games, 30 teams/360 players/4860 games) was analyzed using the ABSP Protocol psychological performance analysis system to arrive at a player "mental toughness" (MT) quotient. Each At-bat was assigned a Situational Criticality Rating (SC) to determine to what extent a player's batting proficiency (quality of at-bat-QAB) was impacted by increasing pressure (situational criticality-SC). Although we were unable to criterion reference or cross validate our system in our MLB subject pool we subsequently attempted to do so in two follow-up investigations. These investigations that included elite youth and semi-professional baseball teams (11 with a total n of 105) used ambulatory heart rate variability (HRV) instrumentation and assessment procedures/ methodologies to determine to what extent differential SC-QAB proficiency was associated with differential levels of conceptually relevant HRV measures (e.g., SDNN). We also investigated whether Athlete's Profile (AP) measures would predict at-bat/pre-action phase heart rate deceleration (HRD; a biomarker signature of "focus" & mind-body priming in pre-action phases of numerous sports) and as blindly predict QAB proficiency and vice-versa (HRV responses blindly predicting AP & QAB proficiency) and if baseline stress-test HRV responses could be predicted on the basis of AP.

In this presentation we introduce advanced ambulatory assessment and intervention procedures and analytics that to the best of our knowledge have never been applied during official sport competition (real games that count toward league standings) including:

1. HRV-based baseline assessment of AP and testing of stress reactivity
2. HRV-based assessment during actual competition (pre-mental training)
3. HRV-based biofeedback during actual competition (mental training)
4. Continuous HRV monitoring using wireless instrumentation
5. APP-based HRD analytics
6. Concept of conceptual consistency as an analytic metric in ambulatory assessment
7. Prediction/Outcome/Validation analytics from the aforementioned studies

Abstract #: A33**Abstract Title:** *Alcohol Craving and Consumption in Everyday Life***Lead Author:** Timothy J. Trull **Co-Author(s):** Sean P. Lane, Ryan W. Carpenter and Kenneth J. Sher**Abstract:**

Although craving is now included as a criterion for substance use diagnosis in the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5; 2013), there is still relatively little research that investigates when, where, and with whom craving manifests in everyday life. The current study examined the various situations in which alcohol craving and consumption was most likely to occur within a sample of individuals with a current borderline personality disorder diagnosis (BPD; $n = 56$), a diagnosis that has been found to be highly comorbid with substance use disorders, and a comparison group of community individuals (COM; $n = 60$). All individuals reported consuming alcohol at least twice a week. Participants carried an electronic diary for approximately 21 days, reporting on where they were, who they were with, current craving for alcohol, and current consumption of alcohol, when randomly prompted (up to 6 times per day) and when self-initiated by a drinking, smoking, or self-harm episode. Although BPD individuals reported craving more often and to a greater degree compared to COM individuals in most contexts, it was particularly exaggerated in the morning, on weekdays, at work and at home, and with their romantic partners, coworkers, and children. Although the COM sample tended to engage in drinking behavior more often this was not the case when with romantic partners or coworkers, with whom BPD individuals tended to drink more. These results suggest that contextual factors are essential for understanding the link between craving and context as well as when it results in potentially problematic behaviors such as drinking. We find that at risk populations, such as those with BPD, may be especially likely to succumb to cravings when with individuals that may facilitate such behaviors.

Abstract #: A34**Abstract Title:** *Psychotic and affective reactivity to daily life and experimental social stress in second-generation Moroccan-Dutch men***Lead Author:** Martin Gevonden**Co-Author(s):** Inez Myin-Germeys, Marieke Wichers, Jan Booij, Wim van den Brink, Ruud van Winkel and Jean-Paul Selten**Abstract:**

Background: The increased psychosis risk for ethnic minority groups may be due, at least in part, to the experience of social exclusion. We hypothesized that repeated exposures to social exclusion, through a process of sensitization, may result in larger responses to experiences of social stress. The current study used a within-study cross-paradigm design to test the hypothesis that Moroccan-Dutch men, as a proxy for social defeat, respond stronger to social stress than Dutch controls 1) in daily life, and 2) in an experimental set-up.

Methods: Experience sampling study of stress reactivity in daily life and experimental exposure to negative social evaluation in a general population sample of 50 Moroccan-Dutch and 50 Dutch young adult males.

Results: In the course of daily life, no differences were found in affective ($B = -0.01$, 95% CI -0.08 to 0.06 , $p = 0.77$) or psychotic ($B = 0.03$, 95% CI -0.02 to 0.08 , $p = 0.28$) reactivity to social stress between Moroccan-Dutch and Dutch participants. When exposed to a negative social evaluation in a lab environment, a blunted affective ($B = -0.31$, 95% CI -0.52 to 0.10 , $p = 0.004$) response was found in the Moroccan-Dutch group, while the psychotic response ($B = -0.16$, 95% CI -0.36 to 0.04 , $p = 0.11$) did not differ between groups.

Conclusions: The findings from both paradigms are consistent and suggest that Moroccan-Dutch men are not sensitized to social stress. The blunted affective response to negative social evaluation in this migrant group may be a result of habituation rather than sensitization to repeated social exclusion exposures.

Abstract #: A35**Abstract Title:** *Interactive ambulatory assessment to investigate effects of cities on mental health***Lead Author:** Markus Reichert **Co-Author(s):** Ulrich Ebner-Priemer**Abstract:**

Introduction : Epidemiological studies revealed negative effects of cities on mental health, e.g. 38% heightened prevalence of affective disorders in urban population (Pedersen & Mortensen, 2001). Accordingly, urbanity increases risk for schizophrenia and impacts on neural stress processing (Lederbogen et al., 2011). However, it is unknown which critical components of the environment (e.g. traffic, population density etc.) account for these findings.

Objectives : Our study addresses specific environmental risk mechanisms for mental illness, exploring risk factors (e.g. noise, pollution) and resilience factors (physical activity). To investigate the relation between individual exposure to environmental characteristics and stress-reactivity, we use interactive ambulatory assessment (IAA).

Methods : IAA is an innovative approach to optimize the sampling strategy in real time. Common strategies in AA, like for example time-based sampling, might fail to catch episodes of interest. The purpose of the IAA is to maximize the variance sampled. Therefore, continuous monitoring is combined with real-time analysis of the monitored signals. E-diaries are triggered, when predefined thresholds are passed, improving the chance to detect associations between the parameters of interest.

In our study, we continuously monitor the participants' geographic position via GPS and trigger e-diaries when environmental characteristics of interest are present. Location tracking is done by an adaptive strategy, combining CELL, WLAN and GPS to minimize energy consumption of the smartphone. Changes in location, e.g. caused by participants driving in the city, are traced in real time on environmental components maps. Using a sophisticated algorithm, significant changes on these maps trigger e-diaries in real-time, querying for affect and stress-reactivity.

Results : Our study started recently, using a longitudinal design. Preliminary findings regarding associations between environmental risk, resilience factors and stress-reactivity will be reported and discussed.

Conclusions : In summary, IAA enables optimizing the sampling strategy in real time to get a closer look at the phenomena of interest.

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Pedersen CB, Mortensen PB. Evidence of a dose-response relationship between urbanicity during upbringing and schizophrenia risk. *Arch Gen Psychiatry* 2001;58:1039-46.

Abstract #: A36**Abstract Title:** *The Effects of Craving and Social Contexts on Intraindividual Variability of Positive Affect among Korean American Emerging Adult Smokers***Lead Author:** Jimi Huh **Co-Author(s):** Genevieve Dunton, Chih-Ping Chou and Donald Hedeker**PAPER OR POSTER****Abstract:**

Background: Korean American emerging adult (KAEA) smokers identify social contexts and craving as important factors for smoking, leading to frequent cigarette use in group settings. Given the relatively low levels of nicotine dependence among these individuals, clarifying the psychosocial and cultural correlates of smoking is of importance. In this study, we examined positive affect often associated with group settings among these younger smokers and how variabilities of positive affect are associated with concurrent craving and social settings, using data from ecological momentary assessment (EMA). **Methods:** Seventy eight KAEAs (28% Female; 22.4 yo \pm 1.79) participated in a 7-day mobile-based EMA study. Participants responded to both signal-contingent (random) and event-contingent (smoking) prompts. At each prompt, participants reported mood, craving, and who they had been in the previous 15 minutes of the prompt. Mixed-effects location scale models were conducted to examine the effects of craving, social contexts and smoking on means and inter- and intra-individual variances of positive affect. **Results:** Including random subject effects for scale improved the model fit ($p < .001$). When reporting more craving than one's average level (est=.08, $p = .02$) and being with Korean peers (vs. alone) (est=.21, $p < .001$), participants reported higher positive affect. However, mean levels of positive affect did not differ between smoking and random prompts ($p = .69$). Further, when experiencing craving more than one's usual level and being with Korean peers (vs. alone), more intraindividual variability in positive affect was observed (est=.16, $p = .03$; est=.83, $p < .001$). Smoking was associated with less intraindividual variability in positive affect (est=-.22, $p = .01$). **Discussion:** When with peers and experiencing greater craving, these young smokers experience higher positive affect. Greater instability in positive affect was associated with being with peers and momentary craving, whereas more stability in positive affect was observed when smoking. The findings have implications for interventions and emphasize the importance of addressing KAEAs' social contexts/space.

Abstract #: A37 Paper Withdrawn

Abstract Title: *Eat your fruits and veggies: Using daily diaries and smartphones to understand the role of fruit and vegetables in everyday well-being*

Lead Author: Tamlin S. Conner

Co-Author(s): Kate L. Brookie, Jayde A.M. Flett and Laura M. Thompson

Abstract:

This presentation will focus on research using daily diary methods and smartphone tracking to understand the role of fruit and vegetables in daily psychological well-being. Study 1 used a 21-day Internet diary to track daily self-reported fruit and vegetable consumption and positive and negative affect (PA, NA) among 281 young adults. Study 2 used a 13-day Internet diary to track these same measures plus additional measures of well-being (daily flourishing, curiosity, and creativity) among 405 young adults. Study 3 used an ecological momentary intervention (EMI) with smartphones to increase fruit and vegetable consumption and test for causal changes on daily self-reported PA, NA, and well-being. Results from Study 1 and Study 2 showed significant between-person and within-person associations between fruit and vegetable consumption and PA, but not NA. People who ate more fruit and vegetables reported being happier on average (between-person Pearson correlation coefficients ranged from .110 to .176, $p < .10$ to $< .001$), and happier on days when they ate more fruits and vegetables compared to days when they ate fewer servings (within-person $b(SE)$ s from multilevel modelling ranged from .026(.011) to .147(.038), $p < .05$ to $< .001$). Study 2 showed similar associations for self-reported flourishing, curiosity, and creativity (between-person Pearson correlation coefficients ranged from .107 to .200, $p < .05$ to $< .001$; within-person $b(SE)$ s from multilevel modelling ranged from .038(.015) to .078(.015), $p < .05$ to $< .001$). These patterns were unique to fruits and vegetables and were not found with unhealthy foods. Study 3 results will be available in time for the SAA conference (preliminary data collection to be completed in May 2015). Overall, this programme of research capitalizes on ambulatory assessment to show that fruit and vegetable consumption is related to (and may potentially increase) human flourishing in early adulthood.

Abstract #: A38

Abstract Title: *An N-of-1 Trial of Personalized Feedback on Daily Dynamics of Psychopathology*

Lead Author: Harriette Riese

Co-Author(s): Renske Kroeze, Date van der Veen, Michelle Servaas, Jojanneke Bastiaansen, Richard Oude Voshaar, Eric Ruhe and Robert Schoevers

Abstract:

This proof-of-principle study concerns a 67 year old female patient initially suffering from treatment-resistant mixed symptoms of anxiety and depression. Residual complaints were high levels of anxiety and depression combined with feelings of derealization and depersonalization upon awakening. Symptoms generally resolved around mid-afternoon. To gain insight in the complex symptom dynamics, ecological momentary assessments (EMA) were combined with statistical network analysis (1). We investigated whether a personalized network based on the interrelationship between fluctuations in affect, somatic and context variables could be achieved and would provide useful information for personalized insight in symptom dynamics and intervention selection.

The patient filled out items on her smartphone for two weeks, five times a day. Items were used for modeling and visualization of the variables (nodes) and the connections between these nodes in network graphs using the R-package Qgraph (2).

Graphs were explained to the patient and her husband by her clinician and the researcher. The circadian pattern of complaints was confirmed with the EMA data. Network graphs were explained as that feeling relaxed seemed to incite physical activity, causing physical discomfort in the following hours and experiencing stress about these physical symptoms. The patient recognized the graphical network dynamics. Recognition that tension, expressed as (feared) somatic anxiety symptoms, played a central role was increased. This started a discussion how to cope with tension itself and persuaded the patient to try interoceptive exposure intervention, which she previously rejected.

This innovative approach provided better insight in the patient's complex symptom dynamics and guided intervention selection. More research is needed and ongoing in our clinic, in which we aim to test the added value of the approach compared to care-as-usual.

(1) Borsboom et al., *Annu Review Clin Psychol* 2013;91-121

(2) Epskamp et al., *J Stat Soft* 2012;48:1-18

Abstract #: A39**Abstract Title:** *Can state work engagement be differentiated from state mood? An analysis of within-persons dynamics***Lead Author:** Dorota Reis**Co-Author(s):** Charlotte Arndt, Tanja Lischetzke and Annekatriin Hoppe**Abstract:**

State work engagement (SWE) is a multidimensional construct of work-related well-being. The vigor dimension refers to high levels of energy and persistence at work. Absorption is characterized by high levels of immersion. Although work engagement was originally conceptualized as a trait, results from ambulatory assessment studies have revealed within-persons fluctuations and differential associations with external criteria for state versus trait work engagement. However, it still remains unclear whether vigor and absorption can be empirically differentiated from mood dimensions such as energetic arousal and pleasant affect. Thus, our goal in the present study was to examine the construct validity of these SWE dimensions. In particular, we aimed to analyze the within- and between-persons relations between SWE and mood dimensions, compare SWE and mood dimensions with respect to their degree of within-person variability and their links to daily sleep quality and daily time pressure at work. Fifty-two employees (44% female) participated in the study, which included 3 assessments per day over the course of 2 work weeks. Multilevel analyses revealed that pleasant affect and energetic arousal fluctuated more strongly within persons than vigor and absorption (ICCs of .32 and .22 for mood versus .50 and .48 for SWE). On the within-persons level, correlations between SWE and mood were lower (.28-.34) than on the between-persons level (.49-.72). Daily time pressure was negatively related to mood and positively related to SWE within persons. Multilevel analysis with lagged variables demonstrated that daily sleep quality predicted more pleasant affect (but not SWE) at noon and better SWE (but not mood) in the afternoon. In sum, our study demonstrates how ambulatory assessment can contribute to a better understanding of SWE as a time-varying construct. SWE showed some overlap with mood dimensions, but also demonstrated discriminant validity.

Abstract #: A40**Abstract Title:** *Bias in retrospective ratings of emotions: The role of momentary emotional clarity***Lead Author:** Charlotte Arndt**Co-Author(s):** Tanja Lischetzke, Claudia Crayen and Michael Eid**Abstract:**

There is often a discrepancy between momentary emotional experience (rated during or close in time to an event) and remembered emotional experience (rated retrospectively, e.g., days or weeks later). Research showed that personality traits and stereotypic beliefs are related to the degree of bias in retrospective ratings of emotions. Our goal in the present studies was to examine another source of bias in retrospective ratings of emotions that is tied to a time-varying characteristic of individuals' meta-knowledge of their momentary emotional experience: the degree to which individuals are clear about the emotions they momentarily feel. We hypothesized that emotional experience is recalled more accurately for events in which individuals were clear about their feelings than for events in which individuals were unclear. We conducted two ambulatory assessment studies (Study 1: N = 28 students, daily assessment, 7 days; Study 2: N = 72 students, 3 occasions per day, 7 days). Participants were asked to report daily events and rate the intensity of experienced emotions. Momentary emotional clarity was measured indirectly by means of response time (RT) for emotion items (with shorter RT indicating higher clarity). After the ambulatory assessment part, participants were asked to recall events that they had reported during the ambulatory assessment phase and retrospectively rate their emotional experience. The difference between retrospective and momentary ratings served as the criterion. The results showed that, on average, individuals retrospectively overestimated the intensity of positive—but not of negative—emotions. Multilevel analyses confirmed our hypothesis that events in which individuals needed more time to rate their momentary emotional experience (i.e., moments with lower emotional clarity) were associated with a larger bias in retrospective ratings. The results were consistent across the two studies. Implications for the assessment of emotional experience and emotion regulation will be discussed.

Abstract #: A41**Abstract Title:** *What counts count. A comparison of counts and movement acceleration intensity data in the assessment of physical activity***Lead Author:** Holger Hill**Co-Author(s):** Ing Jörg Ottenbacher and Ulrich W. Ebner-Priemer**Abstract:**

Acceleration sensors are frequently used to assess physical activity in daily life. In former years, due to hardware limitations, acceleration raw data [m/s²] were preprocessed using linear circuits and stored as arbitrary units ('counts'). Probably based on this old tradition, most modern acceleration sensors still provide activity as counts, despite they can provide raw data as well. Although it is known that count measures are not linearly related to physical activity, and different devices are even "calibrated" differently, the majority of published studies still relies on counts.

To investigate the nonlinearity of count measures in two different setups, MOVE2 and ActiGraph GT3X three-axial sensors were attached to the horizontally orientated axis of a motor and the gravitational effect on the vertical orientated sensor axes was measured for different rotation frequencies (study 1). In study 2, participants wore both sensors at the hip while walking and running at different velocities on a treadmill. Movement acceleration intensity (MovAcclnt) was computed from raw data of both sensor types by removing the static gravitational component, lowpass filtering (11 Hz), vectorizing, and averaging for each condition.

In study 1 the counts delivered by the Actigraph peaked at a rotation frequency of 0.68 Hz. At 2.2 Hz 45%, at 4.7 Hz <1% of the peak value remained. Physically correct, MovAcclnt data were identical at rotation frequencies below 8 Hz.

Study 2 revealed higher MovAcclnt values and step frequencies with increasing movement speed. In contrast, the counts delivered a lower activity for walking with 8.8 compared to 6.4 km/h and for running with 17.6 compared to 8 km/h. This is biomechanically and physiologically implausible and due to the filter characteristics of the algorithm computing counts from the raw data.

In conclusion, we recommend to refrain from count measures and base analyses on raw data instead due to its extremely higher accuracy and comparability between different sensor types.

Abstract #: A42 Paper Withdrawn**Abstract Title:** Emotion Sense: Analyzing Subjective Well-being with Smartphone Sensor Data**Lead Author:** Neal Lathia**Co-Author(s):** Gillian M. Sandstrom, Peter J. Rentfrow and Cecilia Mascolo**Abstract:**

We have developed a smartphone sensing application, Emotion Sense, that uses experience sampling to measure subjective well-being and self-reported physical activity, while passively capturing an objective measure of physical activity via the device's accelerometer. We released the application to the public and conducted a large-scale deployment that provided us with data that captured both subjective reports and objective signals of behavior from over ten thousands users. Happier users reported a greater percentage of active behaviors (walking, running, cycling); further, these self-reports line up with the data sensed from the accelerometer in the 15 minutes prior to the self-report. We also applied unsupervised machine learning approaches to analyse features of the data: by using k-means on features of the accelerometer data to detect groups of users who exhibit similar diurnal patterns, we observe a relation between diurnal acceleration patterns and the subjective well-being of users. The results validate the potential of smartphone sensor-based research, and preview a future where large-scale data gathered from our smartphones can be used to monitor, analyze, and potentially modify behaviors that impact on subjective well-being and public health. We will discuss how we are taking this work forward with (a) a generic tool that for researchers to replicate our work and conduct their own sensor-enhanced experience sampling studies, and (b) a feasibility study of an app that uses a smoking episode reporting system with location sensing to inform support content and delivery for people trying to quit smoking.

Abstract #: A43**Abstract Title:** *The use of ambulatory real-time assessments to measure children's daily life experiences***Lead Author:** Saskia Euser**Co-Author(s):** Rani C. Damsteegt, Marian J. Bakermans-Kranenburg and Marinus H. van IJzendoorn**Abstract:**

Most children develop well and find their way into society without many problems, but not all children manage to do so. This difference may be related to a combination of the child's disposition and the environment in which he or she is raised. It is thus far unclear which children are most susceptible to the environment, and what the mechanisms are of environmental influences on developmental outcomes. Using an experimental longitudinal intervention study, we aim to examine who is most susceptible to the environment and what the mechanisms are of environmental influences on children's behavioral control and social competence. We aim to include 300 twin pairs of 3-4 years of age. Besides annual home or laboratory visits, parents carry out annual ambulatory assessments (AA) at home during four consecutive days, using their smartphone. AA include self-reports of children's daily activities and parents and children's mood five times per day, video recordings of family interactions, audio recordings of auditory stimuli in the home, collecting saliva samples, actigraphy during sleep, and tympanic membrane temperature measures. Preliminary results ($n = 88$) showed adequate variance for both parents and children on each of three mood dimensions; energetic arousal, valence, and calmness. Mean mood ratings across four days ranged for different dimensions and time points between 48 and 85 for children and between 60 and 79 for parents on a 100 point scale. Parent and child mood were positively correlated, irrespective of the time of day, indicating synchrony between daily experiences of children and their parents. Furthermore, children's actigraphy-based sleep efficiency was negatively correlated with their mood ratings in the morning, as reported by the parent. The use of ambulatory real-time assessments is important to examine children's daily life experiences as a possible underlying mechanism in the environmental influences on children's developmental outcomes.

Abstract #: A44**Abstract Title:** *Temporal order of change in sleep quality and positive affect in major depressed patients and healthy controls***Lead Author:** Maria E.J. Bouwmans**Co-Author(s):** Elisabeth H. Bos, Albertine J. Oldehinkel and Peter de Jonge**Abstract:**

It is well known that sleep and affect are related to each other. Up to 70% of depressed patients report hypersomnia or insomnia. The temporal order of changes in sleep and affect is not well understood. Recent studies indicate that sleep quality (SQ), rather than sleep duration, reflects the subjective sleep experience best. Until now, only one study examined the temporal relationship between sleep quality and affect with ambulatory assessments (Galambos, Dalton, & Maggs, 2009). This study, which was conducted in healthy individuals, found that changes in SQ were associated with and preceded changes in positive affect (PA), and the other way around.

In the present study, 27 depressed patients and 27 pair-matched healthy controls assessed their sleep and affect 3 times a day for 30 days in their natural environment. Daily SQ reported in the morning and daily average PA were used to examine whether changes in SQ preceded or followed changes in PA, and whether this was different for patients and healthy controls.

Multilevel models showed that changes in SQ predicted changes in PA ($B=.08, p<.001$), but not the other way around ($B=.03, p=.638$). Patients and controls did not differ significantly from each other. Both models (prediction of PA by SQ and vice versa) indicated significant variability among individuals.

This study is the first to establish the order of change in SQ and PA in depressed patients and healthy controls. The design allowed to investigate both intra- and inter-individual variability. On a group level, sleep predicted affect but not vice versa, but we observed significant heterogeneity among individuals. In the upcoming months, this inter-individual heterogeneity will be further explored, and presumptive mediating factors (fatigue, rumination) will be investigated.

Abstract #: A45

Abstract Title: SOCIAL INTEGRATION MODERATES THE EFFECTS OF ROLE-RELATED STRESSORS ON MOMENTARY AFFECT DURING DAILY LIFE: AN ECOLOGICAL MOMENTARY ASSESSMENT (EMA) STUDY

Lead Author: Thomas W. Kamarck

Co-Author(s): Saul Shiffman and Sheldon Cohen

Abstract:

Social integration (SI), or social role diversity, is associated with reduced mortality risk. Dynamic social processes that may account for these effects are not understood. We examined associations between SI, role-related stressors, and momentary affect in the Pittsburgh Healthy Heart Project (PHHP) a sample of healthy older adults (N = 340, age 50-70). SI was measured using the Social Network Inventory. EMA interviews were administered by electronic diary every 45 minutes over 6 waking days. Multi-item 10-point scales assessed momentary affect (negative and positive), demand and decision latitude, and social conflict and affiliation during a recent social interaction. For each workplace interview, work strain was assessed using dichotomous ratings ("1" if momentary ratings of demand > sample median and decision latitude < sample median, otherwise "0"). Models included demographic covariates. SI moderated the effect of social conflict on momentary negative affect during marital interactions (n = 254, $F(1, 8474) = 4.23, p = .04$). The partial regression slope linking momentary conflict and negative affect was significantly steeper among those who were low ($b = 1.26, p < .0001$) as compared with those high in SI ($b = 1.05, p < .0001$). In a similar manner, SI moderated the effect of momentary work strain on momentary positive affect in the workplace (n = 152, $F(1, 6413) = 3.94, p = .047$). The partial regression slope linking work strain and reduced momentary positive affect was significant for those low ($b = -.12, p = .04$) but not for those high in SI ($b = .03, p = .55$). In the course of daily life, investments in multiple social roles may reduce affective responses to the stressors associated with any single role, a process with possible implications for understanding some of the mechanisms by which social integration may be health protective.

Supported by HL056346.

Abstract #: A46

Abstract Title: *The dynamics and relations of intentions and behavior in everyday life*

Lead Author: Jennifer Inauen

Co-Author(s): Gertaud Stadler, Urte Scholz, Patrick E. Shrout and Niall Bolger

Abstract:

Intention-behavior relations are a much studied phenomenon in psychology. However, most research has looked at this from a between-person perspective and not from a within-person one. Also, little is known about how much intentions and behaviors vary over time. The present study investigated intentions to avoid unhealthy snack consumption and subsequent behavior. Forty-five young adults were prompted on their smartphones five times a day for one week to fill in an online diary. We found that 49% of the variability of a given report of behavioral intentions is attributable to between-person differences, and that 42% of the variance was attributable to complex interactions of person, day and time of day that also includes error variances. Relatively little of the total variance was due to systematic day or time of day effects, or the interactions of these with person. Nonetheless, we found that reports of unhealthy snack consumption were better predicted by within person variation in intentions than by between person differences in average intentions. A negative binomial mixed linear regression revealed no significant association between person-averaged intentions and unhealthy snack consumption, but it did reveal significant within-person intention-behavior relations: When intentions were stronger, subsequent unhealthy snack consumption was 57% lower than it was when intentions were weaker. Thus, although time-related variations in intentions and unhealthy snacking are smaller than expected, the link between intentions and snacking is substantial. An open question is how often intentions and behaviors need to be assessed. Perhaps a single daily assessment at the time of day when self-regulation is most variable would suffice. However, rare time-related variations of intentions might be missed by a once-daily measure. Another open question is what predicts within-day fluctuations in intention strength. Answers to these questions will have valuable implications for intervention development.

Abstract #: A47

Abstract Title: *21-days of Monitoring: Using Actigraphy to Elucidate the Relations between Physical Activity, Sleep, and BMI in Middle-Aged Women*

Lead Author: Moé Kishida

Co-Author(s): Steriani Elavsky

Abstract:

Prevalence rates for sleep disturbances increase as women reach midlife and enter the menopausal transition. Poor sleep has been linked to adverse health consequences such as cardiovascular disease, obesity, and all-cause mortality. Physical activity has been recognized as one lifestyle factor that can enhance sleep; however, few studies have addressed this relation using objective assessments of physical activity and sleep. The main aims of the present study were (1) to elucidate the reciprocal associations between physical activity and sleep, and (2) to better understand the role of BMI in these health behaviors through an intensive longitudinal design. As part of a daily diary study, community-dwelling midlife women (N = 104; age range 40-60 years) wore an Actigraph accelerometer for the objective assessment of physical activity and sleep for 21 consecutive days. Both concurrent and lagged multilevel models were estimated to test associations between physical activity (activity counts, moderate and vigorous-intensity physical activity (MVPA)) and sleep parameters (total sleep time, sleep efficiency, sleep fragmentation). In concurrent analyses that controlled for age, BMI, depression, and menopausal symptoms, daily activity counts was associated with greater total sleep time ($p < 0.05$). In lagged analyses, greater total sleep time on a given night ($p < 0.05$) and greater sleep fragmentation ($p < 0.05$) were associated with less MVPA the subsequent day. A moderation effect by BMI was also observed such that women with high BMI engaging in overall lower levels of physical activity demonstrated lower sleep efficiency ($p < 0.05$) and greater sleep interruptions ($p < 0.05$). The reciprocal, within-person associations that emerged in this sample of middle-aged women illustrate the complexity of the physical activity and sleep link. Notably, these data suggest that leading a physically active lifestyle may have protective effects on sleep parameters, especially for overweight and obese women.

Abstract #: A48

Abstract Title: *Using Group Iterative Multiple Model Estimation (GIMME) to Study Dynamic Individual Structures in Ambulatory Assessment Data of Psychiatric Patients*

Lead Author: Aidan G.C. Wright

Co-Author(s): Kathleen M. Gates, Adriene M. Beltz, Peter C. M. Molenaar and Leonard J. Simms

Abstract:

Introduction: When treating new patients, mental health practitioners (e.g., psychologists, psychiatrists, social workers) must identify their key maladaptive processes to guide successful interventions. However, psychiatric diagnoses provide only limited information for this purpose because of high within-category heterogeneity and shared features that cut across categories. Also challenging is comprehensively assessing the multitude of potentially interesting processes using clinical interview and self-report questionnaires which both rely on retrospection. Accordingly, ambulatory assessment (AA) has been suggested as a complement to traditional assessment approaches. A challenge facing AA for these purposes involves estimating and selecting viable models for each individual. Group Iterative Multiple Model Estimation (GIMME) is a recently developed behavioral network mapping technique that outperforms related approaches in large-scale simulation studies that holds promise for this purpose.

Objectives: Evaluate GIMME's suitability for the purpose of estimating and selecting individual models among individuals with personality disorders (PDs) by using similarities across individuals as a prior.

Methods: Participants previously diagnosed with PDs (N=96; 65% Female) completed daily diaries on interpersonal behavior, affect, stress, and PD symptomatology over the course of 100 consecutive days. GIMME was applied to the individual multivariate time-series of daily diary assessed variables.

Results: In line with the heterogeneous characteristics of the sample, our findings indicated widespread variability across individuals in the temporal relations of these variables. The data suggested that two subgroups exist with distinct similarities in their models. However, only a minority of temporal relations among daily symptoms was replicated with high frequency. Most individuals' models contained patterns of relations that were specific to them.

Conclusions: Initial results suggest GIMME may offer an attractive modeling framework for AA data assessed in psychiatric patients. We discuss successes and challenges faced within this specific data set, and implications for the quantitative modeling of AA data and our understanding of psychiatric nosology.

Abstract #: A49**Abstract Title:** *Momentary Health among Patients with Chronic Disease as a Function of Anger Experiences and Anger Expression Style***Lead Author:** Michael A. Russell**Co-Author(s):** Joshua M. Smyth**Abstract:**

INTRODUCTION: Anger expression styles are associated with physical health, and may affect health by modulating the experience and health significance of anger in daily life. However, there is little research examining these presumed pathways in the daily lives of clinically relevant populations. Moreover, although some research suggests gender differences in both the expression and the experience of anger, there is again little work examining such processes in daily life.

OBJECTIVE: To examine the unique and joint contributions of trait-level anger expression styles, momentary anger experiences, and gender on momentary health in patients with chronic disease.

METHOD: Community adults with physician-verified asthma (N=97, 71% Female, M age=42.3) or rheumatoid arthritis (RA; N=31, 74% Female, M age=50.0) completed measures of trait-level anger expression styles (anger suppression/anger-in and anger expression/anger-out) followed by ecological momentary assessments of anger and physical health 5 times daily for 7 days (other assessments were taken but not used in this analysis).

RESULTS: High anger-in predicted greater momentary anger, physical limitations, and greater asthma symptoms. High anger-out predicted reduced RA symptoms. Momentary anger was robustly associated with worse physical health in daily life. Three-way interactions showed that these momentary relationships between anger and health differed by trait level of anger-in and by gender. Specifically, high trait anger-in appeared to exacerbate the momentary relationships between anger and physical health more strongly among men; whereas among women, low trait anger-in appeared to intensify the momentary relationship between anger and physical limitations.

CONCLUSIONS: Anger expression styles, particularly anger-in, appear to affect the momentary health of patients with chronic disease. This seems to occur, in part, by altering the dimensions and significance of everyday anger experiences in ways that differ by gender. Among those with chronic illness, high anger-in may be particularly problematic for men, whereas low anger-in may be problematic for women.

Abstract #: A50**Abstract Title:** *Using Dynamic Real-Time Ambulatory Methodology to Examine the Effects of Stress and Socioemotional Wellbeing on Weight-related Behaviors in First-year College Students***Lead Author:** Jacinda Li**Co-Author(s):** Moé Kishida, Kamila Dvorakova, Daniela Torrisi and Jing Xu**Abstract:**

College students face unique challenges and increased stress from various developmental and academic demands (Towbes & Cohen, 1996). Of great concern is prevalence of maladaptive coping behaviors in response to stress and socioemotional problems (e.g. emotional eating, sedentary activity, drinking) that may contribute to the development of obesity (Smith-Jackson & Reel, 2012; Lloyd-Richardson, et. al., 2008). The present study aimed to use Dynamic Real-time Ambulatory Methodology (DREAM) technique to examine the dynamic associations among daily stressors, socioemotional wellbeing, and weight-related behaviors (i.e. eating, exercise, drinking, and screen-time).

A subgroup of first-year Penn State undergraduate students participating in an eight-week mindfulness training pilot study was randomized to also participate in DREAM assessments. In addition to completing summary measures, these students answered four randomly-prompted smartphone-based assessments throughout the day (morning and momentary surveys) and one self-initiated survey (end-of-day surveys) in the evening for eight consecutive days. In total, three 8-day smartphone-based assessment bursts were delivered prior to, during, and after the intervention period. The present analysis drew from the baseline assessment burst.

Fifty-two students participated in the baseline DREAM assessment burst. Completion rates for morning, momentary, and end-of-day surveys were 80%, 81%, and 97%, respectively. Data analysis will utilize multilevel modeling methods to examine between- and within-person variability in stress and socioemotional states in relation to weight-related behaviors. We hypothesize that individuals who report, in general, higher stress and lower socioemotional wellbeing levels will be more likely to engage in overeating, reduced exercise, drinking, and screen-time compared to those who report lower stress and higher socioemotional wellbeing levels. Furthermore, on days when students report higher stress and lower socioemotional wellbeing levels, students will be more likely to engage in these behaviors. This effect will be magnified for individuals who generally report higher stress and lower socioemotional wellbeing.

Abstract #: A51**Abstract Title:** *Assessing Coparenting Quality in Mothers and Fathers in Daily Life***Lead Author:** Brandon T. McDaniel**Co-Author(s):** Douglas M. Teti**Abstract:**

Introduction: Coparenting deals with how parents support/undermine one another in rearing children. The creation and validation of a daily coparenting measure is important because daily stability/instability in coparenting likely has implications for family/child outcomes. For example, children experiencing instability in coparenting may develop insecure attachment to parents as they are unable to feel safe.

Objectives: The current study developed and validated a daily coparenting measure to estimate day-to-day variability in coparenting feelings.

Methods: Preliminary data are available on 71 families with a child under age 5. Mothers and fathers completed the Coparenting Relationship Scale (CRS), an established measure of coparenting, and then an online survey each night for 14 days. On average, participants completed 11.86 days (SD = 3.12).

The Daily Coparenting Scale (D-Cop) was developed from a careful review of the extant research. Participants responded to 10 items (e.g., "Today, we supported one another in parenting") on how they worked together as parents that day on a 7-point agreement scale. We also included measures of daily relationship feelings and parenting stress.

Results: Due to the nested nature of the data (parents within families across time) we utilized multilevel models (MLM) in SAS Proc Mixed. The intraclass correlation indicated that 90% of the variance in D-Cop scores was related to within-person variability or differences across days. In predicting daily coparenting, higher baseline scores on the CRS related to higher D-Cop scores, and on days when relationship feelings were more positive and when parenting stress was lower D-Cop scores were higher.

Conclusions: Results suggest that the Daily Coparenting Scale is a valid measure. It captured daily variability, while also related as expected to the established CRS and daily relationship feelings and parenting stress. By conference time, we will have a larger sample and will expand on these results.

Abstract #: A52**Abstract Title:** *The Big Five as predictors of momentary emotions and behavior in Borderline Personality Disorder***Lead Author:** Johanna Hepp**Co-Author(s):** Ryan W. Carpenter, Sean P. Lane and Timothy J. Trull**Abstract:**

Meta-analyses have shown that Borderline Personality Disorder (BPD) is associated with above average levels of Big Five Neuroticism and below average levels of Agreeableness, Conscientiousness and Extraversion. By definition, this personality profile should convey information about how BPD patients 'behave, feel and think' in everyday life. To test whether the Big Five are indeed predictive of patients' momentary emotions and behaviors, core features of BPD were measured using ecological momentary assessment (EMA). Seventy-five BPD patients responded to six random measurement points per day over 28 days. Big Five traits were measured at the beginning of the 28 day period using the NEO-PI-R. Associations between Big Five traits and BPD features were assessed using bivariate correlations at the person level and multilevel modeling at the occasion level. At the person level, EMA measures of affective instability showed positive correlations with Neuroticism and negative ones with Conscientiousness and Agreeableness, whereas only Neuroticism had significant effects at the occasion level. The BPD features of intense anger and impulsivity were positively correlated with Neuroticism and negatively correlated with Agreeableness at both the person and occasion levels of analysis. Finally, interpersonal conflict was negatively correlated with Agreeableness and Conscientiousness at the occasion level. Implications for understanding BPD within the Big Five framework and the usefulness of EMA for assessing BPD symptoms will be discussed.

Abstract #: A53

Abstract Title: *Associations between spontaneous physical activity and mood states in older adults: an ambulatory assessment approach in daily life*

Lead Author: Jinhyuk Kim

Co-Author(s): Fumiharu Togo, Hiroko Shimura, Akitomo Yasunaga, Toru Nakamura, Kazuhiro Yoshiuchi and Yoshiharu Yamamoto

Abstract:

We have confirmed that behavioral patterns characterized by reduced activity with intermittent bursts, as measured by ambulatory assessment (AA) of actigraphy, are associated with worsening of depressive mood recorded by ecological momentary assessment (EMA) in healthy adolescents, undergraduate students, and office workers, and patients with major depressive disorder. However, these associations using AA and EMA have not been rigorously examined in older adults. In this study, we investigated associations between local statistics of spontaneous physical activity (i.e., locomotor activity) and mood states (depressive mood and anxious mood) using data recorded simultaneously. Nine healthy older adults (6 males/3 females, 71.3 ± 6.6 years of age) wore a wrist actigraph to monitor locomotor activity for a week. Subjects also recorded mood states approximately 6 times per day using EMA software equipped on a smartphone. We calculated local statistics for locomotor activity data using time frames of various lengths (from 10 to 120 min with 10-min intervals) within a 4-hour window (2 hours before and after) surrounding each EMA recording. Multilevel modeling analysis confirmed that reduced activity patterns preceded or occurred concurrently ($p < 0.05$) with, rather than followed, the worsening of depressive mood. We did not find any significant association of locomotor activity with anxious mood. These results indicate that the temporal variations in depressive mood are affected by the underlying changes in locomotor activity in older adults. They also suggest that monitoring of actigraphy may contribute to identification of changes in depressive mood and refined management of this mood in daily life.

Abstract #: A54

Abstract Title: *Association between mood and heart rate variability in daily life*

Lead Author: Lars Pieper

Co-Author(s): John Venz, Jan Hoyer, Catharina Voss and Katja Beesdo-Baum

Abstract:

The aim of this study is to examine the association between affective states in real life during the course of two days and several heart rate variability (HRV) indices. The majority of studies on the association between HRV and mood have been conducted in controlled settings with retrospective questionnaires. In contrast, our study will examine the association of various HRV parameter (time- and frequency-domain) and three dimensions of mood (valence, calmness and energetic arousal) in real life. The current analysis is a part of the piloting of a large scale epidemiologic study in Dresden, Germany ("BeMIND" - Behavior and Mind Health Study) to examine mental health and illness conditions as well as psychological, developmental, cognitive-affective and biological risk factors of adolescents and young adults.

RR-intervals and movement data (body acceleration) were recorded continuously from forty students (age 19-34) for two days of normal daily life with a HRV recorder (Firstbeat Bodyguard 2) attached to the skin with two chest electrodes. Current affective states were assessed using a short scale based on the Multidimensional Mood Questionnaire (MDMQ), which has been developed for use in Ecological Momentary Assessment (EMA) studies. During waking hours subjects should rate their current mood states on six bipolar visual analogue scales (tired - awake, full of energy - without energy, comfortable - uncomfortable, satisfied - dissatisfied, agitated - calm, relaxed - tense) eight times a day (approximately every 2 hours). Participants were prompted with acoustic signals to complete EMA items via smartphone.

Multilevel analyses are used to identify associations between HRV indices and mood states. To account for the influence of physical activity on heart activity, HRV data with body accelerations exceeding 30 mG will be excluded from the analysis. The pilot phase of the study is ongoing at present and first results will be presented at the conference.

Abstract #: A55

Abstract Title: *Device-initiated versus subject-initiated diary entries: Can context explain variations in adherence to ecological momentary assessment?*

Lead Author: Shayna L. Henry

Co-Author(s): Larry D. Jamner, Sarah E. Choi and Madeleine V. Pahl

Abstract:

A smartphone-based electronic diary was used for EMA in a sample of adults with end-stage renal disease. Over one week, respondents were signaled 6-10 times each day at quasi-random intervals to respond to a fixed question set. Previous studies in our lab have found that respondents generally complete 75-80% of prompted diary entries. However, participants in the present study completed fewer than 40% of entries, and many were subject-initiated rather than device-initiated. The purpose of this investigation was to determine whether contextual information reported in completed diary entries could explain variations in adherence to, and/or the source of initiation of, electronic diary entries in this chronically ill sample. We hypothesized that respondents initiated unprompted entries when alone, bored, or upset. Twenty-two kidney failure patients (Female $n = 11$; Mean age = 44) received an average of 85 (Range = 5-257, SD = 69.8) signals, but completed only an average of 46 (Range 0-213, SD = 67.9) prompted entries. On average, participants self-initiated 16 entries (Range 0-38, SD = 14.0). The rate of self-initiated entries differed significantly by physical ($p < .0001$) and social context ($p = .0021$). Among the physical contexts, the highest number of manual entries was made while respondents were at school (92.9%), events or games (75.0%) and work (72.7%). Among the social contexts, respondents were mostly likely to make a manual entry when with coworkers or classmates (87.5%), friends (57.1%), or relatives (50.8%). However, only 38.3% of manual entries were made when alone, and the likelihood of making a self-initiated entry versus a random entry was not associated with differences in negative or positive mood ratings (ORs Range .996-1.00). It is possible that manual entries were initiated to "show off" the diary system to others, rather than when alone. Implications for context-dependent EMA will be discussed.

Abstract #: A56

Abstract Title: *Functional Data Analysis of Electrodermal Activity Data Collected via a Biosensor*

Lead Author: Donna L. Coffman

Co-Author(s): Noelle Leonard, Rich Fletcher, Chuck Cleland, Rasheeda Salaam and Marya Gwadz

Abstract:

Introduction: Many adolescent mothers have challenges effectively regulating emotion, which interferes with their ability to engage in positive parenting skills and places them at risk for maltreating their offspring. In conjunction with a clinician-delivered mindfulness-based parenting intervention, adolescent mothers used a biosensor band that continuously measured electrodermal activity (EDA) and wirelessly connected to a smartphone app. In this talk, we describe EDA reactivity patterns among these adolescent mothers.

Methods: Forty-two adolescent mothers received a baseline assessment (prior to the intervention) and a 3-month follow-up assessment post-intervention as part of a larger group-randomized controlled trial. Adolescent mothers wore the biosensor band throughout each 2 hr. assessment, which included two potentially stressful tasks: (1) a timed Stroop task and (2) a 10 min. videotaped interaction with their child where mothers were asked to teach their child a task slightly above the child's developmental level. The biosensor band recorded EDA four times per second.

Results: We used functional data analysis (FDA) to examine EDA reactivity beginning 5 min. prior until 5 min. post completion of both the Stroop task and the child interaction task. We compared the EDA reactivity differences for the Stroop task at baseline vs. 3 mos. post-intervention and EDA reactivity differences for the child interaction task at baseline vs. 3 mos. post-intervention. The intervention was designed to help adolescent mothers manage parenting stress, but not the type of stress induced by the Stroop task. Graphical display of the data showed EDA varied both between-individuals and within-individuals during both tasks.

Conclusions: We discuss how FDA is one approach that can be used to examine continuous EDA data collected via biosensor bands, and the types of questions that it can address. FDA has applicability to the analysis of other types of ambulatory assessments, such as accelerometer data.

Abstract #: A57**Abstract Title:** *Valence and Arousal in Daily Life Differentially Predict Ambulatory Blood Pressure***Lead Author:** Matthew J. Zawadzki**Co-Author(s):** Jennifer Mendiola and William Gerin**Abstract:**

Although associations have been found between emotional states and blood pressure (BP), findings are mixed. One potential reason may be that these emotional states comprise different dimensions – according to the circumplex model, valence and arousal – each which may have a differential impact on autonomic functioning. This study examined whether valence and arousal assessed in daily life differentially predict ambulatory BP. Given its longitudinal relationship in predicting cardiovascular events, understanding associations with ambulatory BP is important for informing interventions aimed at improving health and well-being. A community sample ($n = 41$; 27 women, 14 men; aged 28-77, $M = 51.54$) wore ambulatory BP monitors that took readings of systolic and diastolic BP every twenty minutes for 24 hours. Accompanying each BP reading, participants completed an electronic diary assessing their current levels of arousal (sleepy vs. alert) and valence (unpleasant vs. pleasantness). The electronic diary also assessed physical positioning and caffeine ingestion, which were controlled for in analyses along with age and sex as these variables can impact BP levels. Multilevel models tested whether valence and arousal contemporaneously predicted systolic and diastolic BP; all models also controlled for time of day. For systolic BP, momentary arousal predicted higher BP while valence predicted lower BP. For diastolic BP, only momentary arousal predicted higher BP – an effect which was non-significant when the controls were included. Follow-up analyses, however, indicated that one's average level of arousal for the full 24-hour period was associated with greater diastolic BP over the same time period. Results suggest that valence and arousal have differential effects on ambulatory BP and may shed light on why approaches using emotive states that blend these dimensions produce null or mixed findings. Moreover, these results point to the importance for interventions to target reducing momentary levels of arousal to achieve desired BP-lowering benefits.

Abstract #: A58**Abstract Title:** *Using Diversity as a Metric for Capturing Emotion Experiences over Time***Lead Author:** Lizbeth Benson**Co-Author(s):** Nilam Ram**Abstract:**

Individuals' emotional experiences can be characterized by both the overall abundance of specific types of emotions and the diversity of those emotions (Ram et al., 2011; Quoidbach et al., 2015). Building on prior work, the present investigation fuses ideas related to daily assessment of discrete emotions with models of ecosystem biodiversity in order to (1) refine the measurement of emotion diversity, and (2) examine the extent to which the diversity of emotions experienced in day-to-day life relates to indicators of health and well-being. Diversity was calculated using 60+ daily reports on whether each of 26 emotions (13 positive, 13 negative) were experienced by persons (age 18-90 years, 51% female) who participated in the Intraindividual Study of Affect, Health, and Interpersonal Behavior (iSAHIB; Ram et al., 2014). Simpson's index (Simpson, 1949) was used to calculate positive and negative emotion diversity. The average level (i.e. overall abundance) of experienced emotions was also computed. As expected from prior research, overall abundance of positive and negative emotions related to various health and well-being measures ($|b|'s > 0.02$, $ps < .05$). In addition, positive emotion diversity uniquely related to lower emotional well-being, more role limitations due to emotional problems, and more depressive symptoms ($|b|'s > 0.09$, $ps < .001$); simultaneously diversity attenuated the association between abundance of positive emotions and those variables. In parallel, greater diversity of negative emotions was associated with lower emotional well-being, more depressive symptoms, and higher energy ($|b|'s > 0.28$, $ps < .05$); in some cases diversity attenuated the association between abundance of negative emotions and those variables. All together, these findings highlight the importance of considering the diversity of individuals' emotional experiences when examining indicators of psychological well-being and physical health.

Abstract #: A59**Abstract Title:** *Handling Missing-data in the Modeling of Ambulatory Assessment Data***Lead Author:** Linying Ji**Co-Author(s):** Sy-Miin Chow and Nick Jacobson**Abstract:**

The last two decades have evidenced the growing popularity of ambulatory assessment data, as well as a parallel increase in the need for more sophisticated methods of studying change, particularly methods that can handle the intensive repeated measures nature of such data. Unfortunately, many ambulatory assessment studies feature data that are either irregularly spaced due to the design of the study, or contain intermittent missingness in the key modeling variables and other associated covariates. One example arises in the study of family processes using diary data, in which child-related variables are included as covariates that influence the parental interaction processes, but are not modeled as endogenous or dependent variables in the model. Many contemporary approaches for analyzing such data treat the data as equally spaced and are not particularly conducive for handling missing covariates, particularly those composed of mixed (e.g., categorical) responses. Uninformed deletion of cases and occasions with missing covariates would alter the intervals between successive measurement occasions and lead to biased estimation. Another possibility is to include the covariates as dependent variables in the model, in which case the missingness is handled via standard full information maximum likelihood approaches. Yet, this method is not always applicable because the dynamic model may not be able to accommodate the broad-ranging measurement characteristics (e.g., non-normal and categorical nature) of the covariates. In this study, we consider and illustrate the use of two approaches for interpolating or imputing the missingness in intensive ambulatory assessment data, including a spline-based nonparametric interpolation approach and a multiple imputation approach. The advantages and limitations of each approach are demonstrated using data from an empirical study involving $n = 111$ families in which children's influences on parental conflicts are modeled as covariates over the course of 15 days.

Abstract #: A60**Abstract Title:** *Solving the technical challenges of interactive ambulatory assessment***Lead Author:** Jürgen Stumpp**Co-Author(s):** Jörg Ottenbacher, Ulrich Großmann and Stefan Hey**Abstract:**

1. INTRODUCTION

The ambulatory assessment of psychological variables together with objective measures like behavior and physiology is well established in several research fields. Very often psychological variables must be linked with the objective measured data. In ambulatory studies the environment is not controlled like in laboratory studies. Therefore some events under research may be very rare in daily life. The objective measures can be used to detect these rare events and trigger subjective questionnaires. This is called interactive ambulatory assessment. This can also reduce the burden for participants, because the number of prompts, the participant has to answer during a study, can be reduced.

2. OBJECTIVE

The objective was, to find a solution that solves the technical challenges of interactive ambulatory assessment: High power consumption and connectivity issues with wireless coupled sensors and the engineering involved with setting up studies with the technologies.

3. RESULTS

In the presentation we will discuss the following use cases to trigger questions:

- Depending on the phone usage of the participant
- Depending on the environment and the location of the participant
- Depending on the physical activity and physiology of the participant

We present the architecture of the system that solves many difficulties of current solutions for interactive ambulatory assessment. This new architecture allows energy-efficient, long term interactive ambulatory assessment while being flexible to be adopted by different studies. The system consists of wearable sensors and a smartphone.

4. CONCLUSION

This technology can help the field of ambulatory assessment to gain new insights about events that are rare in daily life.

Abstract #: A61**Abstract Title:** *A Multilevel Approach to Modeling Social Interactions, Positive Affect, and Blood Pressure in Daily Life***Lead Author:** Jennifer Mendiola**Co-Author(s):** Matthew J. Zawadzki and William Gerin**Abstract:**

The common experience of social interactions impacts adults' health. For instance, adults who perceive less quality from their social interactions also experience less positively valenced affect and worse cardiovascular health. Yet, much of this research has been examined as cross-sectional or laboratory studies that do not track the effect of social interactions over time. The present study aims to clarify the affective and cardiovascular health effects of social interactions through a micro analytic approach by examining repeated measures of the occurrence of social interactions, the perceived quality of those interactions, positive affect, and ambulatory blood pressure (BP) over a 24-hour period. A community sample of 41 adults (27 women, 14 men; aged 28-77, $M = 51.54$) wore ambulatory BP cuffs and completed electronic diaries every 20 minutes on the occurrence and quality of their social interactions and positive affect, with an average of 30 assessments per participant. Both the momentary experience of social interactions, including its occurrence and perceived quality, as well as one's average tendency of these social interactions (i.e., the proportion of all measurement occasions in which a social interaction occurred, and the average quality of all interactions), was explored as predictors of positive affect and BP. After controlling for sex, age, physical position, food, tobacco and caffeine consumption, hierarchical level models indicated that one's average amount of social interactions (but not the average quality of those interactions) was related to greater systolic blood pressure. In contrast, the momentary occurrence and perceived quality of an interaction was associated with less positive affect (but not BP). In sum, aspects of social interactions impact both affective and cardiovascular health, suggesting the potential for interventions to promote positive social interactions that improve health and well-being.

Abstract #: A62**Abstract Title:** *The Buffering Effects of Prosocial Behaviors on Stress Effects in Daily Life***Lead Author:** Emily B. Ansell**Co-Author(s):** Elizabeth B. Raposa and Holly B. Laws**Abstract:**

Stress creates vulnerability for a host of mental health problems and these effects are evident on a day-to-day basis. However, it remains unclear what factors might buffer or mitigate the negative effects of stress on mental health. While a large body of research suggests that receiving social support alleviates the negative impact of stress, providing support (i.e., prosocial behaviors) might also be an important factor in mitigating stress effects (Krause, 2006; Poulin & Holman, 2013). The current project tested whether engaging in prosocial behavior buffers the negative impact of stress on emotions and mental health using a daily diary methodology. Participants were 77 adults (53.2% female; mean age 24.5; 71.4% Caucasian) who were recruited for a study on social processes, stress and drinking. Data analyses were conducted using hierarchical linear modeling (HLM). Higher levels of daily stress predicted higher levels of negative affect ($b = 0.72$, $SE = 0.12$, $p < .001$) and worse overall mental health ($b = -2.75$, $SE = 0.71$, $p < .001$). Higher levels of daily prosocial behavior predicted higher levels of daily positive affect ($b = 0.23$, $SE = 0.06$, $p < .001$) and better overall mental health ($b = 0.97$, $SE = 0.46$, $p < .05$). Analyses then examined whether prosocial behavior moderated the effects of stress on mental health outcomes. Results showed that on a given day, higher levels of prosocial behavior buffered the negative effects of stress on positive affect ($b = .09$, $SE = .04$, $p < .05$) and overall mental health ($b = 1.22$, $SE = .52$, $p < .05$). Findings support the importance of engaging in prosocial behaviors in daily life as a method to reduce the detrimental impact of stress on positive affect and ratings of overall mental health.

Abstract #: A63

Abstract Title: *The challenges of ecologically valid interventions: discussing compliance and non-adherence in a pilot study testing the effects of self-selected activities in everyday life*

Lead Author: Marcellus M .Merritt

Co-Author(s): Matthew J. Zawadzki

Abstract:

Laboratory and cross-sectional work has indicated that engagement in recurring self-selected activities (SSAs; leisure-based activities that people choose so as to cope with stress or relax) that are attentionally absorbing may lower daytime and nighttime ambulatory blood pressure (ABP) levels. As such, we attempted to translate this work into real-life contexts so as to better understand the potential of using SSAs as a formal intervention aimed at improving cardiovascular health. Although the premise appeared simple – identify candidate SSAs, assign participants to complete the SSA on one day and to not complete any SSA on another for comparison, and to measure mood and blood pressure throughout each day – many unique challenges related to feasibility, compliance, and adherence immediately arose. The purpose of this abstract are to discuss the many challenges that might arise when translating interventions to everyday lives. We discuss our implementation of SSAs in the field as an example of how potential issues with translation can be identified in general, and what specific solutions we implemented. Specifically we focus on the importance of conducting initial interviews to probe for barriers to compliance and the potential need for conducting motivational interviewing techniques to enhance adherence. Given the increased importance of personalized medical care and use of ambulatory assessments to measure the effectiveness of such case, interventions such as the SSA-based approach we are proposing are appearing to become more normative. Thus, results from our attempts at translation are offered as a way to engage discussion and an initial attempt at a best-practices approach to translating such interventions from the laboratory to real-world environments.

Abstract #: A64

Abstract Title: *A novel approach to build ecologic momentary interventions*

Lead Author: Jürgen Stumpff

Co-Author(s): Jörg Ottenbacher, Ulrich Großmann and Stefan Hey

Abstract:

1. INTRODUCTION

Psychological treatments can be extended beyond traditional clinical settings with interventions, delivered to patients in their daily lives by using mobile technologies. Interventions are mainly used to change the behavior of the participant, but they can also be used to motivate the participant during a study. Very often, special smartphone-apps are developed to implement these ecological momentary interventions (EMIs). The development of these smartphone-apps requires a lot of engineering effort.

2. OBJECTIVE

The objective was, to find a solution that utilizes existing software for ecological momentary assessment and extend them to allow flexible interventions.

3. RESULTS

In the presentation we will discuss the following use cases for interventions:

- Interventions, based on previously answered questions
- Interventions, based on context and sensor information
- Interventions, based on statistical analysis of answered questions by the participant or in comparison with the study group

For each use cases, we present possible solutions on how to extend existing solutions. For the statistical analysis of answered questions we found a novel approach to extend currently available software for ecological momentary assessment by fusing web technologies with the powerful R language for statistical computing.

This allows the researcher to use his already known skills in statistical computing and apply it to real-time interventions based on ecological momentary assessment.

4. CONCLUSION

The presented use cases for interventions show the current technological possibilities and limitations. The presented approach to utilize the R language for statistical computing will give an outlook, how EMI studies may be implemented in the future.

Abstract #: A65**Abstract Title:** *Examining Sleep & Stress Physiology Using a Modified Ecological Momentary Assessment Approach***Lead Author:** Scott A. Van Lenten**Co-Author(s):** Leah Doane**Abstract:**

The role of both the hypothalamic-pituitary-adrenal (HPA) axis and autonomic nervous system (ANS) in responding to psychological states has been the focus of an emerging literature linking daily experiences with physiology and subsequent health (McEwen, 2007). Activation of stress-responsive systems as a result of psychological states may depend, in part, on daily health behaviors such as sleep (Meerlo et al., 2008). For example, children and adolescents with poorer sleep quality and less sleep duration had higher afternoon cortisol levels and exaggerated reactivity to lab-based stress tasks compared to those with better sleep (Capaldi et al., 2005; El-Sheikh et al., 2008). The current study utilizes a modified ecological momentary assessment (EMA; Stone & Shiffman, 1994) protocol to examine the interplay of sleep, momentary reports of affect, and HPA (cortisol) and ANS (salivary alpha-amylase; sAA) reactivity. Seventy-six older adolescents (Mage= 18.52, SD=.36; 25% male; 54% European-American) provided saliva samples and diary reports of affect across three days (5x per day), and wore actigraphs (wrist-based accelerometer) for four nights. In each diary, participants rated their levels of affect using the Positive and Negative Affect Schedule (PANAS; Watson et al., 1998). Three-level hierarchical linear growth curve models (moments within days, days within persons) were used to test associations between momentary affect, cortisol, sAA, and prior night sleep duration. Within-person main effects indicated negative affect was associated with increases in momentary cortisol ($\beta=.17$, $p<.05$) but not sAA ($\beta=.02$, ns). Prior-night sleep duration moderated the association between momentary negative affect and momentary cortisol ($\beta=-.09$, $p<.05$), but not sAA the next day ($\beta=-.005$, ns). Probing of significant interactions revealed that momentary negative affect was associated with increases in cortisol at low levels of sleep duration ($\beta=.11$, $p=.06$), indicating that cortisol reactivity to negative affect may depend on day-to-day changes in sleep quantity.

Abstract #: A66**Abstract Title:** *Patient Preferences in Using an Electronic Pillbox After Transplant***Lead Author:** Stephanie Chen**Co-Author(s):** Josh Mervis, Yena Song, Matt Riccio, Rita Jakubowski, Shakira Riley, Eileen Scigliano, William Redd and Gertraud Stadler**Abstract:**

Purpose. Adherence to multiple medications is rapidly becoming an important issue for patient care with the increase in chronic conditions in aging populations (Wu & Green, 2000; Kung et al., 2008). A meta-analysis across 95 clinical trials found that 40% of patients had stopped taking the studied medication 12 months after enrollment (Blaschke et al., 2012). The current study addressed electronic tracking of a multiple-medication regimen in alloHCT patients using an electronic pillbox. AlloHCT is used to treat blood and lymphoid cancer. Patients' post-transplant medication regimen typically includes at least 24 pills per day, some with frequent severe side effects and potential for toxic drug interactions. We investigated the feasibility of using an electronic pillbox in the first 6 months of self-care at home after alloHCT

Methods. Patients (N = 37) were approached in the hospital and if willing to participate, were interviewed 3 and 6 months after discharge from in-patient care. If they agreed to using an electronic pillbox, patients received it at discharge.

Results. Out of 37 patients undergoing alloHCT, 30 accepted the pillbox and received pillboxes pre-tested for functioning.

The 7 patients that were recruited to the study and did not accept a pillbox expressed concerns over the size and usability of the device. Patients who used the pillbox showed large variability in signal transmission and experienced similar challenges. Patients reported that the size of the pillbox prevented them from incorporating the box into their daily routines. Additional challenges included patient travel between work and home and on weekends, necessity of wireless signal, keeping the device plugged in at all times, and necessity to keep the medication out of reach of small children.

Conclusions. We discuss patient preferences and challenges associated with electronic medication monitoring using an electronic pillbox. An updated device would have great potential for delivering a multi-faceted intervention with text-message based adherence reminders.

Abstract #: A67**Abstract Title:** *The Differential Time-Varying Effect Model (DTVEM): Identifying Optimal Time Lags in Intensive Longitudinal Data***Lead Author:** Nicholas C. Jacobson**Co-Author(s):** Sy-Miin Chow and Michelle G. Newman**Abstract:**

In the design and analysis of intensive longitudinal data, there is a pressing need to determine when variables optimally predict outcomes. Standard exploratory methods for identifying the optimal time lags (i.e. the partial autocorrelation and cross correlation functions) in univariate and multivariate time series data are greatly under-powered when used to identify optimal time lags at the group (i.e., population) level with short time series data from multiple subjects, and are not applicable to unequally spaced data. In addition, theories in psychology often do not hypothesize a specific time relationship to determine which lags of the predictors should be modeled to examine if they predict the outcomes. Given the lack of an exploratory technique to address the optimal time lags of when processes predict outcomes at the group level or with unequally spaced data, researchers often arbitrarily choose to analyze their data one lag later (with no regard for the question of when the optimal time period may be). We describe a novel diagnostic approach, referred to herein as the Differential Time-Varying Effect Model (DTVEM), which targets these inadequacies and allows for the examination of when processes predict outcomes at the group level with equally or unequally spaced intensive longitudinal data. Using a simulation study, we illustrate the effectiveness of the DTVEM in identifying the true lag times in multiple-subject, finite-length time series data with missingness, and its effectiveness as a hybrid exploratory/confirmatory approach compared to other confirmatory likelihood-based approaches. Data from an empirical ecological momentary assessment study are used to demonstrate the utility of the proposed approach in identifying the optimal time lag for studying the linkages between tension and uneasiness in a group of undergraduate students.

Abstract #: A68**Abstract Title:** *Ecological Momentary Assessment of PTSD symptoms and Sexual Risk-taking among OEF/OIF Veterans: A Pilot Study***Lead Author:** Anne C. Black**Co-Author(s):** Marc I. Rosen and Ned L. Cooney**Abstract:**

Background: Of approximately 1.9 million soldiers returning from recent wars in Iraq and Afghanistan (OEF/OIF), an estimated 20% will suffer symptoms of post-traumatic stress disorder (PTSD). Veterans with PTSD report higher rates of risk-taking, including substance use and high-risk sexual behaviors (HRSB), than Veterans without PTSD. The purpose of this pilot study was to assess the feasibility of using EMA with OEF/OIF male Veterans to assess to what extent PTSD symptoms vary within person over time and how changes in PTSD symptoms relate temporally to substance use and HRSB.

Methods: Nine OEF/OIF male Veterans reporting recent HRSB participated in this VA-funded study. Participants were called three times per day for 28 days on a quasi-random schedule. After each call prompt, participants used Smartphones to complete an on-line questionnaire inquiring about PTSD symptoms, mood, substance use, and sexual behavior since the last questionnaire. Multilevel modeling was used to assess the within-time association between PTSD symptom severity and events of risk behavior.

Results: Median EMA completion rates (within 2 hours of the call-prompt) were 79%, 74%, 81%, and 51% for weeks 1-4, respectively. Within-person PTSD symptom variability ranged from 30-59 points on a 0-80 point scale, illustrating high variability over a 28-day period. Six (67%) Veterans reported substance use, and seven (78%) reported high-risk sex (range 5-28 events) in the 28-day period. Multilevel model results suggest positive PTSD symptoms (e.g., hyperarousal, irritability), but not negative symptoms (e.g., isolation) co-occur temporally with HRSB.

Conclusions: The feasibility of using EMA to assess daily variability in PTSD symptoms and risk behavior was demonstrated. EMA has the potential to provide rich data about event sequences that can improve understanding of the timing and function of risk behavior for OEF/OIF Veterans experiencing PTSD symptoms. A larger-scale EMA study of OEF/OIF Veterans is underway by our research group.

Abstract #: A69**Abstract Title:** *Differential Equation Modeling Approaches to Representing Sudden Shifts in Intensive Dyadic Interaction Data***Lead Author:** Sy-Miin Chow**Co-Author(s):** Lu Ou, Arridhana Ciptadi, Emily Prince, James M. Rehg, Agata Rozga and Daniel S. Messinger**Abstract:**

Postulates of discontinuous shifts in dynamics have proliferated in the social and behavioral sciences for decades. From Piaget's concept of stagewise cognitive development to models positing abrupt shifts in economic trends, motor movements, affects, and organization dynamics, social and behavioral scientists have long faced challenges in diagnosing evidence for qualitative shifts in dynamics, as well as ways of determining the timing and possible determinants of such shifts. In this paper, we discuss regime-switching differential equation models – a novel modeling framework for representing abrupt changes in a system's dynamics using differential equation models. The proposed methodology offers a direct tool for representing change processes that undergo sudden shifts in dynamics, while allowing the data to be irregularly spaced — an increasingly prevalent feature of many longitudinal studies aimed at capturing momentary changes. To demonstrate the utility of the proposed approach, we use an empirical data set featuring automated measurements of movement data from $n = 17$ mother-infant dyads during the Strange Situation Procedure (SSP), a behavioral assessment where the infant is separated from and reunited with the mother twice. In the SSP, children are observed to manifest ongoing shifts between a desire to stay close to their mothers, and intermittent interest in moving away from their mothers to explore the room. We will provide step-by-step guidelines on the process of model exploration/fitting/evaluation, including ways to: (1) obtain empirical estimates of derivatives for model exploration and development purposes, (2) perform model fitting, (3) diagnose and interpret results from model fitting; and (4) evaluate possible determinants of between-dyad differences in dynamics.

Abstract #: A70**Abstract Title:** *Engagement with and practice of parenting skills in a family preventive intervention: A Within-person Variability Approach***Lead Author:** Katharine T. Bamberger**Co-Author(s):** Nilam Ram and Doug Coatsworth**Abstract:**

Introduction: Family interventions that aim to improve youth outcomes or prevent negative outcomes commonly target parenting and family interactions – processes that occur moment-to-moment. Although intensive longitudinal methods have not been used to evaluate traditional group-based family interventions, these methods provide new opportunities for understanding when and how parents' uptake material, practice skills, and change their family interactions. This study uses an experience sampling design to examine the within-person causal relation between parents' engagement in the intervention sessions and subsequent practice of new parenting skills.

Method: Parents ($N = 35$) who were participating in a randomized controlled trial of a preventive family intervention (the Strengthening Families Program, Molgaard, 2000; Coatsworth et al., 2014) and who were assigned to attend intervention sessions in Fall 2012 were recruited to participate in an additional intensive longitudinal data collection module. Each evening, for up to seven weeks, parents completed web-based reports about their, parenting, family interactions, and participation/engagement in the intervention (once per week), as well as their daily practice/use of the parenting skills introduced in the intervention program that week.

Results: Multilevel analysis with heterogeneous variance (Hedeker et al., 2012) revealed that daily skills practice is a function of both daily within-person changes in child behavior, parenting emotions, time, and engagement, as well as between-parent differences in these variables.

Conclusion: Results indicate that both the level and variation of engagement in the intervention influence parents' daily skills practice, demonstrating the utility of intensive assessment and quantification of within-person variability in evaluation and design of family interventions.

Abstract #: A71**Abstract Title:** *Modern Statistical Approaches for Actigraphy Data***Lead Author:** Vadim Zipunnikov**Co-Author(s):** Jennifer Schrack, Jeff Goldsmith, Jiawei Bai, Luigi Ferrucci and Ciprian Crainiceanu**Abstract:**

Current methods for analyzing actigraphy data fail to make use of the full range of data collected, often relying on summaries such as multi-day averages, and may miss opportunities to provide insight into activity metrics that may be quite meaningful for health outcomes in older adults. We will discuss three fundamental issues of this oversimplification: (i) the loss of information about the temporal distribution of activity over the course of a day, (ii) the loss of potentially informative features beyond activity intensity (e.g., distribution and variability of activity intensity within activity bouts, fragmentation of activity profiles with respect to alternating activity and inactivity bouts), and (iii) day-to-day variability in activity patterns over all observed days. We will apply new methods to actigraphy data of NHANES 2003-2006 and recover several previously unknown hallmarks of age-related functional decline.

Abstract #: A72**Abstract Title:** *Higher social rank, and not objective resources, is associated with more positive daily social interactions***Lead Author:** Jenny M. Cundiff**Co-Author(s):** Thomas W. Kamarck and Stephen B. Manuck**Abstract:**

There is recent convincing evidence that material resources (e.g., SES) may affect health because they influence social rank (one's relative place within the social hierarchy; Daly, Boyce, & Wood, 2014). Relative social rank may be more closely related to health, in part, because it is more closely associated with individuals' daily social experiences. Using EMA collected hourly during waking hours over the course of 4 days, the current study examined whether positive and negative aspects of daily experience were associated with subjective ratings of social rank in a large community sample (N=475). Results reveal that higher social rank is associated with more frequent positive social experiences (e.g., $B=.18$, $p<.001$). This association was independent of well-characterized objective markers of SES (education, income, occupation) and personality traits that could potentially confound the association between perceived social rank and perceptions of momentary experiences such as Neuroticism and Extraversion. We found no reliable differences in negative social experiences by social rank. More proximal measures of social rank (e.g., social rank in one's community vs. social rank in one's country) were more strongly associated with differences in positive social interactions. Further, the association between social rank and positive affect was mediated by positive social experiences. These results suggest that higher social rank, but not material resources, is associated with more positive social interactions during daily experience. This relationship was not due to confounding with personality, and suggests that differences in daily positive social experiences may be a viable pathway linking social rank to health.

Funding support: HL040962 and HL007560.

Abstract #: A73**Abstract Title:** *Examining the effects of fear habituation and multiple contexts on situational exposure outcomes in the field***Lead Author:** Andrew J. White**Co-Author(s):** Dieter Kleinböhl, Thomas Lang, Alfons O. Hamm, Alexander L. Gerlach and Georg W. Alpers**Abstract:**

Introduction: Although a core treatment component for many anxiety disorders, in vivo exposure is not equally effective for all patients. One explanation for this may be that patients are often instructed to remain in exposure until their fear has subsided. Recent findings suggest that fear habituation is not a reliable index of successful outcomes and that multiple exposure contexts can strengthen extinction learning and prevent return of fear. Whether these findings transfer to actual situational exposure remains unclear.

Objectives: We explored the effect of within-patient patterns of fear habituation on changes in expected anxiety. Further, we assessed the extent to which multiple exposure contexts were associated with relapse prevention.

Methods: Eighty-five patients with panic disorder with agoraphobia undertook repeated bus exposure as part of a 12-session treatment program. GPS position and self-reported anxiety were recorded with a commercial sports watch and a handheld computer. Fear habituation was operationalised as the consistency of patient's adherence to exposure instructions (i.e., to remain on the bus until fear had reduced); multiple contexts was defined as the proportion of unique unaccompanied exposure paths, which was determined by inspecting GPS paths. Expected anxiety was assessed prior to each exposure and relapse was assessed at post-assessment and six month follow-up using the alone subscale of the Mobility Inventory.

Results: Results revealed that patients who only occasionally waited for their fear to habituate experienced greatest reductions in self-reported anxiety. Further, patients who undertook exposure in multiple contexts had greater maintenance of gains following treatment.

Conclusions: Our findings suggest that superior outcomes can be achieved by varying exposure instructions and contexts. Implications for the planning of exposure and the development of technologies that support this therapy will be discussed.

Abstract #: A74**Abstract Title:** *Managing Basic EMA and EMI Methodologies within a Single User Interface***Lead Author:** Frank Materia**Co-Author(s):** Ryan Chesnut and Jennifer DiNallo**Abstract:**

Various companies offer highly affordable online survey software services, enabling researchers across disciplines to design and distribute surveys, as well as analyze procured data, within an easy-to-use interface via a web browser. Some online platforms offer advanced capabilities that allow researchers to conveniently implement basic ecological momentary assessment (EMA) and intervention (EMI) methodologies into their survey research and/or intervention delivery designs. Exemplar capabilities include: (a) multimodal distribution of assessments, including SMS, MMS, email, web-links, and downloadable smartphone apps; (b) multi-device support, including basic phones, smartphones, tablets, and laptops; (c) the ability to automatically or manually deliver mobile interventions to participants through a variety of experiential forms, including video, audio, or text; (d) advanced capabilities for scheduling the distribution of assessments and interventions; and (e) straightforward tools for programming survey flow, which allow participant responses to trigger ecologically sensitive survey items and/or interventions. This poster outlines how applied researchers are currently using Qualtrics® Research Suite, a widely available and highly affordable online survey software platform, to enhance an evidence-based parenting program. Specifically, Qualtrics has been employed to administer ongoing weekly SMS assessments of participant behavior, as well as deliver mobile video interventions to participants throughout their program enrollment. The investigators have found that managing both their SMS and video intervention needs within a single user interface has been advantageous, allowing them to develop, deliver, analyze data, and coordinate logistics of their assessment and intervention design within the same online platform. The cost, ease of use, and limitations of Qualtrics are highlighted.

Abstract #: A75

Abstract Title: *Just Take a Moment and Breathe and Think: Young Women with Depression Talk About an Ecological Momentary Intervention to Reduce Their HIV Risk*

Lead Author: Lydia Shrier

Co-Author(s): Allegra Spalding

Abstract:

Depressed young women are at increased risk of HIV and other sexually transmitted infections, but brief risk reduction interventions have not targeted their specific needs for affect management and impulse control. We developed an intervention that combines in-person safer sex counseling and cognitive-behavioral therapy (CBT) skills training with a mobile phone based ecological momentary intervention (EMI). On reporting momentary states and contexts that the young woman has identified as being associated with her own risk behavior, the EMI provides positive messages prompting CBT skills. This study evaluated the perspectives of young women with depression and HIV risk on this novel intervention (Momentary Affect Regulation-Safer Sex Intervention, or MARSSI). We interviewed ten young women age 15-23 years with depression and sexual risk behavior. Using thematic analysis, we identified themes related to the EMI experience (comforting, helpful with affect recognition, encouraging reflection) and acceptability (simple, brief, immediate, momentary, intuitive). Participants indicated that receiving the timely messages would reduce their likelihood of engaging in HIV risk behavior, particularly if the messages were tailored and varied, yet with some repetition. Some young women would want to write their own messages; others thought it would be better if somebody else wrote them or they were able to choose from a list. Participants provided content for both general messages of support (giving affirmations, encouraging oneself, putting momentary state in context, suggesting distracting activities) and messages to specifically help to avoid HIV risk (slowing down, applying logic, questioning oneself, providing reassurance, recognizing self-worth). They did not have major concerns about privacy or confidentiality regarding the sensitive nature of the EMI. In conclusion, depressed young women felt that a highly flexible and personalized approach to EMI for addressing the link between their symptoms and their behavior would be acceptable, supportive, and potentially effective in reducing their HIV risk.

Abstract #: A76

Abstract Title: *Investigating the mechanisms underlying the health-beneficial effect of music listening in daily life*

Lead Author: Mario Wenzel

Co-Author(s): Alexandra Linnemann, Urs Nater and Thomas Kubiak

Abstract:

Introduction: Music listening is associated with a stress-reducing and, thus, health beneficial effect. However, most of the studies have been set in experimental contexts examining highly selective patients. Although the yet limited number of studies set in daily life can find health beneficial effects of music listening, these studies rely on participants' subjective self-report. Objective data on the music listening behavior is not available. Therefore, it remains unclear why music listening unfolds these beneficial effects. Is it due to specific 'objective' characteristics of the music (such as tempo, loudness, valence, arousal)? Or is it due to personal characteristics of the listener (such as music preference, musical proficiency)?

Objective: We set out to investigate the mechanisms that underlie a health-beneficial effect of music listening in daily life. We hypothesize that the interaction of both music characteristics and personal characteristics contributes to the health-beneficial effect of music listening.

Methods: 60 healthy participants will be investigated by means of ecological momentary assessment. Seven times per day (directly after awakening, approx. 11:00, approx. 13:00, approx. 15:00, approx. 17:00, approx. 19:00, 21:00), participants rated perceived stress, momentary mood, and music listening behavior (valence/arousal, tempo, loudness, reasons for music listening). Additionally, any music listening occurring during the day is logged (with title, track, genre, exact time point of music listening).

Results: Data will be analyzed by means of hierarchical linear modelling. Analyses will focus on the interaction between music characteristics and listener characteristics with respect to stress and mood. Results will be presented at the conference.

Conclusions: Results will shed light on the mechanisms that underlie the health beneficial effect of music listening. This knowledge is relevant to the field of health psychology as individually tailored music interventions can be developed to promote health and wellbeing in daily life.

Abstract #: A77

Abstract Title: *Effectiveness of mobile technologies delivering Ecological Momentary Interventions for stress and anxiety: a systematic review*

Lead Author: Brendan Loo Gee

Co-Author(s): Kathleen M. Griffiths and Amelia Gulliver

Abstract:

Objectives: Mobile technologies may be suitable for delivering Ecological Momentary Interventions (EMI) to treat anxiety in real-time. This review aims to synthesize evidence on the effectiveness of EMI for treating anxiety conditions.

Methods: Four databases and the reference lists of previous studies were searched. A total of 1927 abstracts were double screened for inclusion. Sufficient studies were available to undertake a quantitative meta-analysis on EMIs on generalized anxiety symptoms.

Results: The 15 randomized trials and randomized controlled trials examined anxiety (n=7), stress (n=3), anxiety and stress (n=2), panic disorder (n=2), and social phobia (n=1). Eight EMIs comprised self-monitoring integrated with therapy modules, seven comprised multimedia content, and three comprised self-monitoring only. The quality of studies presented high risk of biases. Meta-analysis (n=7) demonstrated that EMIs reduced generalized anxiety compared to control and/or comparison groups (ES = 0.32, 95% CI = 0.12 to 0.53). Most EMIs targeting stress were reported effective relative to control as were the two EMIs targeting panic disorders. The EMI targeting social phobia was not effective.

Discussion: EMIs have potential in treating both anxiety and stress. However, few high quality trials have been conducted for specific anxiety disorders. Further trials are needed to assess the value of EMI technologies for anxiety in enhancing existing treatments. Overall, this study found a small significant effect of EMI studies on reducing generalized anxiety. Studies on stress demonstrated EMI was effective compared to control with the small number of studies on panic and social phobia demonstrating mixed results.

Abstract #: A78

Abstract Title: Pairing Ambulatory and Global Assessments to Better Understand Psychological and Physiological Health

Lead Author: Vanessa Juth

Co-Author(s): Matthew J. Zawadzki & Joshua M. Smyth

Abstract:

In the context of daily life, perceived stress is consistently linked with a range of momentary psychological and physiological health indicators. Yet, daily life is experienced within a larger general life context; this context includes stressful life events (SLEs) that may also impact these health indicators. The current study extends prior work by using global self-report measures, ecological momentary assessment (EMA), and ambulatory salivary biomarker assessments to examine the relative importance of SLEs versus momentary perceived stress for daily health indicators, and to test for interactive effects between stress experienced within daily and general life contexts. A community sample of working adults (n = 124; age: 19-63; 75% female; 75% Caucasian) reported on their general life stress by indicating if they experienced any of 12 SLEs during each of the previous 6 months (possible range = 0-72) at baseline; they then reported on their daily life stress (average score of five perceived stress items), mood, pain, tiredness, and interest via EMA surveys and provided ambulatory cortisol samples via salivettes 6 times/day for 3 days. Separate multilevel models, controlling for demographics, time of day, and day of week, showed that SLEs significantly predicted sadness, tiredness, and cortisol, but not happiness, pain, or interest. Momentary perceived stress significantly predicted all outcomes. When both life stress predictors and their interaction term were included in the model, momentary perceived stress predicted all outcomes, and SLEs predicted sadness and cortisol, but no longer predicted tiredness; interaction effects were significant for happiness, sadness, pain, and interest, but not for tiredness and cortisol. These data support and extend past findings that stress experienced in different life contexts has implications for psychological and physiological health indicators. Moreover, these data show that momentary stress is more tightly linked to ambulatory outcomes, and that global and momentary life stress have a synergistic effect for some aspects of daily health. Findings suggest that ambulatory assessment methods may be paired with global life assessments to better understand momentary associations between stress and health indicators in daily life.

Abstract #: A79**Abstract Title:** A Dual Process of Older Adult's Sedentary Behavior**Lead Author:** Jaclyn Maher**Co-Author(s):** David E. Conroy**Abstract:**

Older adults engage in the greatest amount of sedentary behavior yet little is known about the factors that motivate them to sit so much. In younger populations, sedentary behavior has been partly explained by a dual-process model of motivation that integrates habit strength with established social-cognitive influences on behavior. This study was designed to evaluate the between-person (time-invariant) and within-person (time-varying) processes associated with older adults' daily sedentary behavior. Older adults (n=100) used tablet computers to rate their motivation and behavior at the beginning and end of each day, respectively. Participants also wore ActivPAL3™ activity monitors throughout the study. A series of multilevel models were estimated to predict daily sedentary behavior, action planning, and intention formation. Both self-reported and objectively-measured sedentary behavior were (1) negatively associated with planning at the within-, but not the between-person level, and (2) positively associated with habit strength for sedentary behavior. Daily action plans to limit sedentary behavior were (1) positively associated with task self-efficacy at the within-person level, but negatively associated at the between-person level, and (2) positively associated with intentions at the between- and within-person level. Intentions to limit sedentary behavior were (1) positively associated with task self-efficacy at the between and within-person level, but (2) not associated with lightintensity physical activity outcome expectations, sedentary behavior risk perceptions, or sedentary behavior habit strength. This study was the first to systematically identify a set of controlled and automatic processes associated with daily fluctuations in older adults' sedentary behavior. Interventions aiming to reduce sedentary behavior in older adults should interrupt established sedentary habits and promote counterhabitual daily intentions and action plans.

Abstract #: A80**Abstract Title:** Parent-Child Synchrony in Diurnal Cortisol Patterns**Lead Author:** David Almeida**Co-Author(s):** Kimberly Walter, Susan McHale, Kelly Davis, & Siwei Liu**Abstract:**

This study examines predictors of diurnal cortisol synchrony between working parents and their adolescent-aged children. Data are from 200 father- and mother-adolescent dyads during the daily diary component of the Work, Family, & Health study, a work-place intervention study of employee and family well-being. The data collection involved eight consecutive days of telephone interviews wherein one parent and a target adolescent child separately answered questions about their daily experiences, health, and well-being. Participants also provided saliva samples (5 times/day for parents, 4 times a day for children) on four of the diary days (days 2 to 5). In this paper we assess diurnal cortisol synchrony by calculating within dyad associations between parents and youths' daily diurnal cortisol patterns across the matching 4 cortisol collection occasions each day. Furthermore we use the diary interview data from those same days to create the measure of daily time children spent with parents. Multivariate multilevel modeling first assessed the extent to which parent's and youths' diurnal cortisol patterns exhibit synchrony across four diary days. Preliminary results show that on days when an individual exhibits a steeper daily decline in cortisol slope (DWS) or steeper after work/school to bedtime cortisol slope (AWS) than his or her average level, the other dyad member also exhibited a steeper DWS or AWS than his/ her average level. Additional analyses will test the moderating effects of family structure variables (i.e., gender-constellation of the parent-youth dyad, age of the target youth, and number of children in the home) on this synchrony. Finally we will examine whether the amount of time parents and children spend together has implications for diurnal cortisol synchrony. We hypothesize that parents and children who spend more time doing activities together will have stronger diurnal cortisol synchrony. Discussion will center on the use of daily biological markers to assess characteristics of parent-adolescent relations.

Abstract #: A81**Abstract Title:** Daily Emotional Support Congruence Relationship Well-Being in Couples Coping with Breast Cancer**Lead Author:** Jean-Philippe Laurenceau**Co-Author(s):** Amber Becher & Niall Bolger**Abstract:**

Couples facing breast cancer cope with daily stressors that can affect the marital relationship as well as the individual well-being of its members. Dyadic coping views support transactions as a central component to understanding how couples work together to maintain their relationship while jointly managing their shared stress. We hypothesized that daily emotional support congruence (i.e., when both partners agree that supportive behaviors occurred) would predict the highest levels of individual and relationship well-being. An intensive longitudinal method was used to evaluate three sets of congruent support interactions: (1) support that is provided to the recipient; (2) support that matches the recipient's need; and (3) support that is reciprocated to the partner. Early-stage breast cancer patients and their spouses/partners (N = 54) independently completed an Internet-based daily diary for ten consecutive mornings and evenings. Dyadic multilevel models consistently showed that support congruence was beneficial both to the patient and the spouse, particularly when it met the recipient's need, and was reciprocated to the partner. The findings in the current study underscore the importance of emotional support congruence and add to a growing body of research that couples cope with cancer as mutually supportive members of a dyad rather than merely as "patient" and "caregiver."

Abstract #: A82**Abstract Title:** Dating Aggression and Physiological Connectedness in Everyday Life**Lead Author:** Adela C. Timmons**Co-Author(s):** Theodora Chaspari, Laura Perrone, Tiantian Feng, Shrikanth Narayanan, & Gayla Margolin**Abstract:**

What does it mean to be physiologically "in sync" with your romantic partner? Partners who are physiologically linked might be attuned and responsive to each other or they may be interpersonally reactive and aggressive. This study examined this question by testing the association between dating aggression, history of family aggression, and physiological linkage. We hypothesized that couples that are highly linked would be at the extremes, with high physiological linkage being associated with both the least and most aggression in family and dating relationships. As part of a pilot study, 36 individuals (18 couples), ages 18 to 25, completed the How Dating Partners Treat Each Other Questionnaire (adapted from the Conflict in Adolescent Dating Relationships Inventory; Wolfe et al., 2001) and the Adverse Childhood Experiences Scale (Felitti et al., 1998). The couples also wore ambulatory biosensors for one day. Linkage in electrodermal activity was measured using joint-sparse representation, which models two signals as a linear combination of a small number of common atoms. We used a directional version that quantifies the degree to which one signal represents the other. Multilevel dyadic modeling was then used to examine the association between physiological linkage and aggression. Results showed that there was a curvilinear relationship between linkage and both dating aggression ($\beta = -1.555, p < .001, \beta^2 = 1.05, p < .001$) and history of family aggression ($\beta = -1.29, p < .01, \beta^2 = 1.01, p < .01$). Specifically, individuals with low dating aggression had high linkage, individuals with moderate dating aggression had low linkage, and individuals with high dating aggression had high linkage; history of family aggression showed the same pattern of results. These findings help explain the association between linkage and relationship functioning and suggest that physiological connectedness in everyday life may reflect both attunement and conflict processes.

Abstract #: A83**Abstract Title:** Satisfaction at shift handovers: The importance of accuracy of handover partners**Lead Author:** Petra L. Klumb**Co-Author(s):** Antje Rauers & Chantal Nick**Abstract:**

Empathic accuracy is the ability to infer the content of another person's thoughts and feelings. The present study applied this paradigm to shift handovers between physicians taking place at intensive care units of five Swiss clinics. At the intake assessment, 34 physician residents filled in selected items of the Social Competence Inventory (SCI, Kanning, 2009). During an event-sampling phase (N=235 handovers), we assessed each partner's mood and other state-related information on the basis of which actual empathic accuracy was computed and also satisfaction at the end of the handover. We expected ratios of accuracy and bias to vary as a function of residents' roles and of display rules in professional contexts. First analyses show that overall, residents are moderately successful in taking their counterparts' perspective. Outgoing physicians displayed lower accuracy and higher bias than incoming colleagues. Positive affect was not rated more accurately than nervousness. Ultimately, both empathic accuracy and habitual perspective taking will be used to predict handover partner's satisfaction.

Abstract #: A84**Abstract Title:** Receiving daily support is associated with higher accelerometer-assessed activity**Lead Author:** Gertraud Stadler**Co-Author(s):** Edy Moulton-Tetlock & Yaena Song**Abstract:**

Purpose: Social support has been found to be a correlate of physical activity in cross-sectional studies, but the support-activity link has rarely been studied in daily experience studies. This intensive longitudinal study examined the link between daily social support and physical activity both between and within participants.

Methods: Participants (N = 68) wore accelerometers to capture daily activity and reported the amount of exercise-related social support in an online evening diary for 6 consecutive days.

Results: Participants who received more social support on average and on a given day were more physically active. Individuals with higher levels of social support showed more physical activity on average (between-person support-activity link, $b = 858$ daily steps, $p = .02$). Within participants, on days when participants received more social support than usual they were more physically active (within-person support-activity link, $b = 652$ daily steps, $p = .01$).

Conclusions: Social support and activity showed day-to-day fluctuations and evidence for a between-person and within-person link, underscoring the importance of studying social processes and health behaviors in daily life.

Abstract #: A85**Abstract Title:** Weekly drinking outcomes predict assessment and intervention engagement in mobile interventions**Lead Author:** Frederick Muench**Co-Author(s):** None**Abstract:**

Purpose: Text messaging interventions have the ability to reach individuals in their natural environment and recent evidence highlights they are helpful in reducing drinking. Engagement in text messaging interventions can be assessed in a number of ways including how outcomes are related to response to mobile assessment, help messaging initiation, response latency and other mobile metrics.

Methods: We are comparing 6 different types of text messages including assessment only messaging on improving drinking outcomes over a 12 week period in participants seeking to reduce their drinking. Participants are followed for 12 weeks and offered the opportunity for an additional 12-week period of messaging. Weekly mobile assessment examines drinks per week, heavy drinking days and goal achievement. Primary outcomes include the relationship between engagement metrics, overall intervention satisfaction and drinking outcomes.

Results: We have recruited over 120 of the 170 potential participants into the study. Preliminary results indicate that all groups reduced drinking indices. Compared to EMA only, all groups except consequences based messaging were significantly more likely to improve all drinking outcomes at week 12. EMA only had the highest response rate (due to infrequency of messages) but the worst outcomes. 61% of participants chose to continue to receive messages following the 12 week period though this varied based on outcome. Preliminary results indicate that engagement in EMA varied based on condition and poor drinking outcomes over the prior weeks predicted declining engagement over the course of the study when removing the EMA only group who had the worst outcomes.

Conclusions: Preliminary results indicate remote automated text messaging designed to reduce problem drinking with minimal initial contact with a research assistant can reduce drinking frequency and quantity and engagement can be predicted by previous weeks EMA outcomes. Implications will be discussed.

Abstract #: A86**Abstract Title:** Analyzing real-world user data for a mobile app to optimize the design of a national ecological momentary intervention supporting smoking cessation**Lead Author:** Heather Cole-Lewis**Co-Author(s):** Erik Auguston, Yvonne Hunt, Brian Keefe, Amy Sanders, & Mary Schwarz**Abstract:**

Purpose: The QuitGuide is a free mobile phone application from the Tobacco Control Research Branch of the National Cancer Institute (NCI). Written by tobacco control professionals and cessation counselors, with the help of ex-smokers, this app utilized ecological momentary intervention to help people prepare to quit smoking and provide support throughout their cessation effort. The purpose of this study was to explore real-world user data from the ecological momentary intervention mobile application to inform optimization of the app.

Methods: The app allowed for daily self-monitoring of smoking cessation (e.g., number of cessation days, triggers, cravings, slips, mood, personal motivation for quitting). This ecological momentary intervention encompassed techniques for managing cravings and mood including phone calls for social support, journaling, and motivational messaging. Data from users who downloaded the app from the Apple App store were analyzed to determine patterns of engagement and self-reported outcomes (e.g., cessation, cravings, mood).

Results: We describe the most commonly occurring patterns of individual use for the app, most accessed content, frequency of use of the phone call for social support function and self-monitoring of emotions, and average number of cessation days achieved by users of the app. Results from analysis of engagement patterns are used to inform optimization of ecological momentary intervention aspects of the app, such as how to incorporate push notifications that are tailored to self-reported triggers or push notifications that attempt to increase an individual's engagement with the app based on patterns observed in that individual's previous app use.

Conclusions: This study described challenges of implementing an ecological momentary intervention in a real-world setting and strategies to increase user engagement.

Abstract #: A87

Abstract Title: An interpersonal goals perspective on parenting: caregiving goals shape parental well-being, responsiveness, and the quality of parent-child bonds

Lead Author: Bonnie M. Le

Co-Author(s): Emily A. Impett

Abstract:

Purpose: In the current talk, we take an interpersonal goals perspective on parental caregiving to identify the goals that motivate parents to provide care for their children, as well as how the pursuit of different goals shapes parental well-being, parent-child relationship quality, and responsiveness to a child's needs.

Methods: We examine these questions using a scale we developed called the Parental Caregiving Goals Scale (PCGS), which measures four unique caregiving goals including the following: child love and security goals, child growth and development goals, parent self-consciousness goals, and child acceptance goals. We examined pursuit of these goals in a 10-day daily experience study of 118 parents.

Results: Multi-level modeling analyses indicated that within-person increases in the pursuit of child love and security goals were associated with greater emotional well-being, parent-child relationship quality, and responsiveness to a child's needs. In contrast, within-person increases in the pursuit of parent self-consciousness goals predicted lower emotional well-being, parent-child relationship quality, and parental responsiveness to a child's needs. Lastly, the pursuit of child growth and development goals was associated with greater negative emotions whereas the pursuit of child acceptance goals was associated with higher positive emotions.

Conclusions: This work brings an interpersonal goals perspective to caregiving to shed light on why parenting can be paradoxically a source of great happiness as well as negative emotions.

Abstract #: A88

Abstract Title: When good things happen: Explicit capitalization attempts of positive events promote intimate partner's daily well-being

Lead Author: Ariela F. Pagani

Co-Author(s): Silvia Donato, Miriam Parise, Raffaella Iafra, Anna Bertoni, & Dominik Schoebi

Abstract:

Purpose. Sharing good news with the partner improves individual and relational well-being. While prior research has confirmed the benefits such capitalization processes, knowledge on how the type of events that are shared and the way they are shared, affect individuals and relationships is less documented. This study examined the associations between the explicitness in the disclosure of events (internal vs. external to the couple), and individual and relational well-being, above and beyond the effects of the events and their disclosure.

Methods. Forty-nine married couples completed 2 times a day for 2 weeks a daily diary in electronic format (PDA) containing items capturing partners' positive events; capitalization attempts; communication explicitness; and individual and relational well-being.

Results. Multilevel analyses showed that individual and relational well-being increased as a function of women's and men's reports of internal and external positive events, but not as a function of the mere disclosure of the event. Being explicit when disclosing a positive event to the partner was positively associated with individual and relational well-being in women and in men, beyond the effects of the event and its disclosure.

Conclusion. This study contributes to extend the knowledge on the capitalization process and its benefits. Moreover, it underlines the importance of communication skills.

Abstract #: A89**Abstract Title:** Emotion dynamics and emotional reactivity to interpersonal events**Lead Author:** Tamara Luginbuehl**Co-Author(s):** Dominik Schoebi**Abstract:**

Purpose: Emotional experience has a profound impact on relationship functioning, and they play a crucial role in interpersonal adjustment processes and communication. Individual differences in emotional response tendencies are therefore likely to affect how partners navigate their relationships in daily life. Both a lack of emotional responsiveness or overreactivity can be maladaptive (e.g., Kuppens, Allen & Sheeber, 2010; Ebner-Priemer et al., 2007), and this may also affect interpersonal adjustment: Interpersonal adaptation may be compromised if individuals fail to respond to relevant interpersonal events, but also if they are highly reactive (Tolpin, Gunthert, Cohen & O'Neill, 2004). The current paper examines individual differences in emotional dynamics, and investigates how those differences relate to the emotional impact of daily interpersonal events, such as conflict or intimate interactions.

Method: Participants ($N = 81$) recorded their emotions and their interpersonal experiences 4 times a day over the course of four consecutive weeks with an electronic diary. After this period, they took part in a laboratory interaction with their intimate partners.

Results: Multilevel analyses suggested nonlinear associations between the degree of emotional changeability in daily life and event-related emotional responses. We also report on individual differences in emotional dynamics as associated with the likelihood of interpersonal event reports, and observed interaction behaviors.

Conclusions: The data emphasize the interpersonal dimension of individuals' emotional dynamics, and underline the complexity and different dimensions of emotional dynamics.

Abstract #: A90**Abstract Title:** Using ambulatory assessments for precision diagnostics: HowNutsAreTheDutch**Lead Author:** Elisabeth H. Bos**Co-Author(s):** Lian van der Krieke, Ando Emerencia, & Peter de Jonge**Abstract:**

Current classification systems depict psychiatric diseases as homogeneous and static disease entities, ignoring existing variability across individuals and time. As a result, their usefulness for research and clinical practice is limited. With the advance of smart technology it has become feasible to monitor individuals intensively over time within their natural environment. A major asset of such intensive longitudinal data is that they allow for the analysis of the dynamic relationships between variables at the level of the individual. This opens the possibility to examine which factors play a key role in a person's symptom dynamics. Such person-specific diagnostic information can help to optimize treatment strategies. The present study is an attempt to individualize diagnostic information based on ambulatory assessments, using idiographic analyses of mental health variables and automatically generated person-tailored feedback. We launched a website, www.HowNutsAreTheDutch.com, via which individuals from the general Dutch population could participate in a diary study with mobile-based self-assessments, 3 times a day for 30 days. Participants were offered tailored feedback including personalized dynamic networks based on vector autoregressive modeling. In the first six months 629 individuals participated in the study. They completed 28,430 assessments in total. A clear bimodal distribution of the number of completed assessments was observed, with half of the participants quitting early (<45 assessments) and the other half being compliant (≥ 45 assessments). Almost 40% of the participants ($n=238$) completed enough assessments (≥ 68) to receive a personal network showing the key dynamic relationships between their mood, cognitions, and behaviors. This study shows that a large-scale mobile-based diary approach including automatic generation of personalized feedback is feasible. This may be an important step towards personalizing health diagnostics, which may promote self-management of health and disease and help tailor treatments to specific individuals.

Abstract #: A91**Abstract Title:** Making the Most of Your Rich EMA Data: Innovative Outcomes**Lead Author:** Arthur A. Stone**Co-Author(s):** Stefan Schneider**Abstract:**

Ambulatory assessment technologies based of self-reporting bring with them the promise of more accurate renderings of people's daily experiences and there is little doubt that these methods are feasible and can achieve a much higher resolution of the dynamic flow of experiences than was formally possible. The argument I will make in this presentation is that EMA researchers and clinicians have not fully tapped the rich potential of EMA data sets in ways that could enhance our research efforts and clinical practice. Our view is that we have been overly wedded to prior conceptualizations of creating outcome measures, for example, those used as end points in clinical trials. We tend to simply average all of our momentary observations over a period of time to create outcomes, yet there are many creative ways of thinking about EMA data that could enhance our ability to truly capture respondents' experiences in meaningful ways. I will present the justification for some of the proposed, alternative outcomes derived from EMA, and will provide preliminary data for some of them. I will also describe a project that is currently in the field to take these novel outcomes into the future, for example, by extensively testing the validity and utility of the new outcomes in secondary data analyses and by including multiple stakeholders in the evaluation of the outcomes.

Abstract #: A92**Abstract Title:** (Innovative) Sampling strategies to investigate real-life psychopathology**Lead Author:** Ulrich Ebner-Priemer**Co-Author(s):** None**Abstract:**

Psychopathology is not simply experiencing weird symptoms or more negative than positive affect. Such a static view would ignore the moment-to-moment ebb and flow of affect and other symptoms. Most importantly, the ebb and flow can be explained by internal (e.g., cognitive) and external (e.g., events) factors and, therefore, offer starting points for psychotherapeutic interventions. However, capturing the ebb and flow in everyday life is not trivial, as the frequencies of the underlying processes are mostly unknown. In my talk, I will focus on four examples of different sampling strategies to illustrate opportunities in psychopathology research:

- a) utilizing high frequency data assessment to model affective dynamics in borderline personality disorder,
- b) using location-triggered e-diaries to investigate the relation between stress-reactivity and environmental components, which are suspected to be relevant for the development of schizophrenia,
- c) continuously monitoring physical activity and telecommunication behaviour to predict upcoming episodes in bipolar patients and
- d) implementing experimental manipulation in everyday life to better understand rumination processes in depression.

In conclusion, ambulatory assessment does offer a wealth of different of sampling strategies. We recommend carefully selecting the most promising strategy to capture the whole variety and dynamics of experienced symptomatology.

Abstract #: A93**Abstract Title:** Mental disorders as complex dynamical systems: Empirical support from ESM studies**Lead Author:** Marieke Wichers**Co-Author(s):** Marten Scheffer, Hanneke Wigman, & Denny Borsboom**Abstract:**

Introduction: Mental disorders are influenced by such a complex interplay of factors that it is extremely difficult to develop accurate predictive models. Complex dynamical system theory may provide a new route to assessment of personalized risk for transitions in depression. In complex systems generic early warning signals (EWS), signaling critical slowing down of the system, are found to precede critical transitions. Experience Sampling Methodology (ESM) may help to empirically test whether principals of complex dynamical systems also apply to mental disorders Objective: To find empirical support whether or not mental disorders behave similar as other complex dynamical systems. Method: ESM techniques were employed both in group and individual time-series data to examine i) differences in the dynamic patterns of experiences and symptoms between individuals with differing levels and risk of psychopathology and ii) whether intra-individual changes in dynamic patterns -that are hypothesized to signal risk for transition- indeed anticipate qualitative shifts in symptoms. Results: Empirical findings suggest that higher levels of psychopathology co-occur with higher levels of autocorrelation, variance and dynamical connectivity, which are the three EWS that have been reported in other complex systems. Results will be visualized in network models during the presentation. Furthermore, support was found that within-person rising EWS anticipated a significant shift in symptoms. This also included intra-individual changes in the network structure of affect. Conclusions: Empirical findings, as obtained with ESM, suggest that transitions in mental disorders may behave according to principles of complex dynamical system theory. This may change our view upon mental disorders and yield novel possibilities for personalized assessment or risk for transition.

Abstract #: A94**Abstract Title:** Bidirectional associations of sleep with positive events, emotions, and stressful experiences in daily life across a week, & a randomized workplace intervention improves actigraphic sleep across a year**Lead Author:** Orfeu Buxton**Co-Author(s):** None**Abstract:**

Adequate sleep duration and sleep quality are associated with resilience, health and well-being. Sleep is a target for Healthy People 2020. In everyday life, sleep is modified by many factors, including stress in work and personal domains. The Work, Family, and Health Network Study is a cluster-randomized workplace intervention study with ambulatory assessment at baseline, 6, and 12-months. This presentation summarizes the longitudinal effects of the workplace culture intervention on actigraphic sleep, and the bi-directional associations of sleep and stress/emotions across a week of daily reports. We tested the hypothesis that a workplace intervention designed to increase family-supportive supervision and employee control over work time improves actigraphic measures of sleep in IT company employees. The workplace intervention did not overtly address sleep, yet intervention employees exhibited greater sleep time and reported greater sleep sufficiency compared to control employees. Effects were in part mediated by reductions in work-family conflict, an intervention target, and type of work-related stress.

Sleep disturbance is a common feature of psychiatric conditions and increases risk of developing affective disorders. However, evidence linking sleep and emotions is primarily based on laboratory studies or single-administration measures of trait affect and typical sleep. We therefore evaluated the reciprocal, lagged relationships of daily emotions and events with self-reported nightly sleep across one week among cohorts of employees in 2 companies in different sectors. Findings support the reciprocal roles of sleep and psychosocial experiences in everyday life. Within-person predictors of sleep are greater than between-person contributors to variability in sleep. Inadequate sleep may alter emotional reactivity and perceptions of daily experiences, and stress-induced rumination and arousal may impair sleep. We conclude that future workplace interventions should address environmental and psychosocial causes of sleep deficiency, including workplace factors, and that improvements in either sleep or stress reactivity may have long-lasting, and synergistic benefits.

Abstract #: A95**Abstract Title:** The development and evaluation of a physical activity intervention using real-time feedback via smartphones**Lead Author:** Kristin Heron**Co-Author(s):** Joshua M. Smyth, David Conroy, Christopher Sciamanna, & Liza Rovniak**Abstract:**

Background: In recent years there has been a growing interest in the field of mHealth, which involves using mobile technologies to both assess information and to deliver interventions in people's daily lives. As mobile technologies (e.g., smartphones, wearable sensors) continue to evolve, it is increasingly possible to integrate real-time assessment and intervention capabilities, thus allowing for tailored treatment programs to provide interventions to people at the specific times and places when they might be most in need of treatment. Objective: The goal of the present study was to develop and evaluate the feasibility and initial efficacy of a physical activity intervention that integrated wearable accelerometers with smartphones to increase people's daily step counts. Method: Overweight and obese adults not meeting recommended activity levels (n=37, Mage=35 years) were randomized to treatment or control conditions. All participants completed 2 weeks of baseline assessment using an accelerometer. For the following 4 weeks, participants in the treatment condition wore an accelerometer and received feedback on a smartphone throughout the day on their activity levels and personalized step goals; control participants continue assessments for all 6 weeks. The intervention involved individual goal setting (based on baseline activity), but was unique in that it then provided people with real-time personalized feedback on their progress toward their daily step goals at various times throughout the day on smartphones. Results: Objective step count data were available for 12 participants (6 treatment, 6 control). Although not statistically significant ($p=.11$) due to the small sample size, participants in the treatment condition substantially increased their daily steps (by an average of 1037 steps/day, an 18% increase in steps from baseline), whereas control participants had only a modest average increase (9.5 steps/day, 5% increase). Examining the daily and momentary data also provided evidence that participants specifically responded to the real-time feedback intervention. Conclusions: These data offer preliminary evidence that providing real-time feedback about physical activity to inactive overweight or obese adults is feasible and may increase daily step counts. Although real-time intervention methods offer new possibilities for treatment delivery, they also present practical and technical challenges, which will be discussed.

