Symposia (In alphabetical order by last name of chair)

From mobile health (mHealth) to mental health: ESIs and EMIs as promising tools to improve psychological treatment

Chair: Jojanneke A. Bastiaansen PhD
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Discussant: Jojanneke A. Bastiaansen PhD

Description: Experience sampling methods (ESM) have primarily been used to investigate psychological mechanisms in daily life. Recently, the application of this method in psychological treatment is gaining popularity. In this symposium, we will discuss two types of promising ESM applications for clinical practice: 1) experience sampling interventions (ESIs), which use rich daily life ESM data and personalized feedback as add-on tool or stand-alone treatment, and 2) ecological momentary interventions (EMIs), which extend evidence-based treatments directly into the daily lives of its users, for instance by making use of daily-life reminders and behavioural prompts individually tailored to client's needs. In this symposium, we investigate whether these two types of mobile health (mHealth) interventions can improve the dissemination and quality of psychosocial interventions.
Daan Ornée will discuss how ESIs can be used as add-on tool in the treatment of depression by comparing the effect of two ESI modules (ZELF-i) on momentary positive and negative affect. Subsequently, Maud Daemen will present the development and feasibility of a novel CBT-based EMI (SELFIE) that aims to foster self-esteem in traumatized youth. Evelyne van Aubel will elaborate on the effects of Acceptance and Commitment Therapy in Daily Life (ACT-DL) as an EMI compared to active control in emerging adults with sub-threshold psychopathology. Finally, Ulrich Reininghaus will present the EMOCOMPASS intervention, a compassion-focused EMI to improve emotional resilience to stress in help-seeking youth, introducing ecological interventionist models to test causal criteria of underlying psychological mechanisms. Jojanneke Bastiaansen will chair the session and lead the discussion.

Abstract 1: Comparison of the effect of two experience sampling intervention modules for depression on momentary positive and negative affect

Experience Sampling Methods (ESM) have shown promise as an intervention strategy for depression. Thus far, which content works best has hardly received attention. The ZELF-i study consists of two different ESM intervention modules, enabling us to compare the impact of ESM content on the course of momentary affect during the intervention. ZELF-i is a web-based ESM application developed as add-on to treatment as usual for depressive complaints. Participants (N = 110; Mage = 32.9, SD = 12.2; 44.5% male) were randomly assigned to one of two ESM modules focusing on either activities and positive affect ("Do") or thinking patterns and negative affect ("Think"). All participants engaged in intensive self-monitoring (5x/day, 28 days) and received weekly personalized feedback. Linear mixed models were used to compare the two modules on momentary positive and negative affect, with module, time, and the interaction of module and time as independent variables. Time was modeled as both a linear and quadratic term. No significant (p > .18) differences were found between the two modules on positive and negative affect over time. Across modules, positive affect showed an initial decreasing trend that

leveled off towards the end of the intervention period (linear: B = -0.536, SE = 0.121, p < .001; quadratic: B = .016, SE = 0.003, p < 0.001). Negative affect did not change significantly over time (p > .06). Completing up to 140 questionnaires with a different focus did not produce a different trend in momentary affect during the period of self-monitoring. Furthermore and contrary to previous studies, participants showed a decline in positive affect. During my presentation, I will discuss possible explanations and implications of these findings.

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Abstract 2: Ecological Momentary Interventions (EMIs) and an introduction to a novel self-esteem EMI in traumatized youth: The SELFIE-study

An Ecological Momentary Intervention (EMI) delivers treatment in patients' daily lives, depending on their experience, behavior and social contexts, by using mobile devices such as smartphones. This principle extends the therapy beyond clinical settings into real life. The treatment uses Ecological Momentary Assessments (EMA) as a basis for tailoring the intervention to specific needs of the patient, and to the moments when it is needed most. An example of an EMI is the SELFIE-study. The aim of the study is to minimize the deleterious impact of childhood trauma and to test the efficacy of SELFIE (an EMI) for improving self-esteem in help-seeking youth with prior exposure to childhood trauma.In a randomized controlled trial, youth aged 12-25 with prior exposure to childhood trauma referred to mental health services across the Netherlands, are randomly allocated to the experimental (6-week SELFIE-intervention in addition to treatment as usual, TAU) or to the control condition (TAU only). Data is collected pre- and post-intervention and at 6-, 18- and 24-month follow-up. Subjects allocated to the experimental condition receive the guided self-help intervention "SELFIE" through a trained therapist. The intervention consists of three sessions with a trained therapist, e-mail contact, and the SELFIE using a guided self-help approach administered through a smartphone-based PsyMate® App to allow for interactive, personalized, real-time and real-world transfer of intervention components in individuals' daily lives. To our knowledge, this is the first EMI focusing on improving self-esteem in traumatized youth. The potential effects of this study can help to minimize the deleterious impact of childhood trauma by improving self-esteem.

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Abstract 3: ACT in Daily-Life: an RCT examining an Ecological Momentary Intervention to reduce sub-threshold symptoms of psychopathology in emerging adults.

In this study, 55 emerging adults with subclinical depressive and/or psychotic complaints were randomly assigned to Acceptance and Commitment Therapy in Daily Life (ACT-DL) (n=27), or to an active control condition (n=28). Within the ACT-DL condition, individuals attended 5 face-to-face ACT group sessions augmented with an mHealth application with which they could practice ACT skills in their daily lives. Assessments were completed at pre- and post-treatment and at 6 and 12 months follow-up and comprised measures of psychopathology, psychological flexibility, and daily life positive affect (PA) and negative affect (NA). Repeated measures mixed models with a fixed effect for condition were fitted. At post-treatment, interviewer-rated depression scores significantly decreased in ACT-DL participants relative to active control ($p<.05$), with a large effect size (Cohen's $d=2.22$). Decreases in self-reported depression, anxiety, and general psychopathology, did not differ between conditions. Decreases in self-reported psychosis-related distress were larger in the active control condition ($p<.05$), with large effect sizes at post-treatment (Cohen's $d=-1.15$), 6 (Cohen's $d=-2.68$) and 12 months follow-up (Cohen's $d=-1.76$). Furthermore, relative to active controls, ACT-DL participants reported increased mean NA post-treatment ($p<.05$) with a large effect size (Cohen's $d=-1.87$). Mean PA did not change in either group, nor was there an improvement in psychological flexibility. These results provide mixed findings on the effectiveness of ACT-DL in reducing subclinical symptoms in a sample of emerging adults, which may in part reflect a psychological placebo effect. In addition, it will be debated whether ACT-DL in its current form is suitable for the targeted population.

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Abstract 4: Efficacy of a novel, accessible, transdiagnostic, compassion-focused ecological momentary intervention for enhancing resilience in help-seeking youth

While most mental disorders emerge in youth, this is particularly evident for psychotic disorders, for which risk manifests already at a developmentally earlier stage in the form of subclinical psychotic experiences. These experiences often co-occur with anxiety, depression and mania, reflecting a transdiagnostic phenotype associated with a range of psychopathological outcomes. Elevated stress sensitivity is one of the most widely studied psychological mechanisms underlying psychotic and affective mental health problems. Thus, targeting this mechanism is a promising strategy for preventing future adverse outcomes. Compassion-Focused Interventions (CFIs) offer innovative therapeutic techniques for improving emotional resilience to stress in psychosis, especially when co-occurring with affective disturbances. In addition, recent technological advances provide a unique opportunity to deliver youth friendly, accessible, personalized, real-time ecological momentary interventions (EMIs) in daily life. The current study aims to examine the efficacy and clinical feasibility of a novel ecological momentary, compassion-focused intervention for improving emotional resilience to stress (EMOCOMPASS) in help-seeking youth. In an exploratory randomized controlled trial, youth aged 12-25 with psychotic, depressive, anxiety, and/or manic symptoms are randomly allocated to the EMOCOMPASS intervention in addition to treatment as usual (TAU) (experimental condition) or a control condition of TAU only. Ecological interventionist causal models will be tested to improve understanding of causal criteria of underlying psychological mechanisms, contributing to enhancing efficacy of EMIs for promoting resilience in youth, with the ultimate goal of preventing adverse outcomes later in life.

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Same Theories, New Methods: Using Real-Time Monitoring to Test Theories of Suicide

Chair: Daniel D.L. Coppersmith BA, Harvard University

Discussant: Evan Kleiman PhD, Rutgers University

For over a century, suicide has been a leading cause of death in all age groups. A plethora of potential theories have been offered for how someone can override an innate drive for self-preservation and end their life. Although there are many such theories of suicide, much of the work testing these theories has done so with months, years, or decades in between time points. This means that we have little information on what these theories of suicide can tell us about how suicide risk operates in daily life. It is important to observe suicidal thoughts and behaviors as they occur in daily life because thoughts of suicide vary considerably over short periods of time. Recent advances in smartphone-based real-time monitoring technology have made it possible for the first time to overcome these limitations and observe suicidal thoughts and behaviors as they occur in the real-world. This symposium explores how long-standing theories of suicide hold up with new data from real-time monitoring studies. First, Porter et al. will present ecological momentary assessment (EMA) data on the interpersonal theory of suicide among youth. Second, Kleiman et al. will discuss how the interpersonal theory of suicide functions over short periods of time in an EMA study of adults. Third, Coppersmith et al. will explore the emotion dysregulation theory of suicide in an EMA study among hospitalized adults. Forth, Wang et al. will apply a novel approach, network analysis, to demonstrate how real-time monitoring may be used to reduce suicidal thoughts. Finally, Evan Kleiman will serve as the discussant and highlight how this real-time monitoring research provides information about suicide that we could not have gained from other methods and opens the door for new theories of suicide.

Abstract 1: Testing the interpersonal theory of suicide using ecological momentary assessment among recently hospitalized youth

The interpersonal theory of suicide suggests that one pathway to suicidal desire is via increases in thwarted belongingness (e.g., loneliness) and feeling hopeless that this state will change. However, the degree to which these constructs predict suicidal desire over the short-term and in youth remains unclear. The current study is the first to use ecological momentary assessment (EMA) to examine the degree to which daily changes in thwarted belongingness and hopelessness predict suicidal desire in youth following discharge from psychiatric hospitalization. As part of a larger, ongoing study (total N=50), 18 youth (M age=14.54 years; SD=1.27; 61.5% female) completed an average of 3-5 assessments of hopelessness, thwarted belongingness, and suicidal desire each day over 28 days post hospitalization for suicide risk. Daily increases in thwarted belongingness with family (b=.32, p<.001), thwarted belongingness with peers (b=.18, p=.012), and hopelessness (b=.46, p<.001) each predicted daily increases in suicidal desire, controlling for the effects of each other. Hopelessness potentiated the effect of thwarted belongingness with peers (b=.30, p<.001), but not with family (b=.08, p=.306), in predicting suicidal desire. Findings suggest that, among youth, each predictor may be uniquely related to suicidal desire. However, hopelessness in tandem with disconnection from one's peers may be a more salient short-term predictor of suicidal desire than hopelessness in tandem with disconnection from one's family. By using EMA, the current study helps clarify the role of thwarted belongingness vís-a-vís suicidal desire and lends support for the utility of the interpersonal theory of suicide as a model for understanding short-term risk for suicidal desire in youth.

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Linda J. Alpert-Gillis PhD, University of Rochester Medical Center

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Abstract 2: How does the interpersonal theory of suicide function over hours and days? A smartphone-based real-time monitoring study

The Interpersonal Theory of Suicide posits that the desire to die by suicide is proximally predicted by beliefs that one is burdensome others and does not belong to a social group (called "thwarted belonginess"). The theory suggests that these proximal predictors should predict changes in suicidal thinking on the order of days or hours. Despite this, however, prior work testing the theory has been conducted with weeks or months in between timepoints. Thus, we have no information testing this theory on the time scale in which it was proposed. The presentation will be show data from a smartphone-based EMA and daily diary study testing this theory. 54 adults who were at risk for suicide completed 4x daily random (signal contingent) prompts assessing current levels of burdensomeness, loneliness (a proxy for thwarted belonging), and suicidal thinking. They also completed a nightly (interval-contingent/daily diary) prompt assessing past day thwarted belongingness, burdensomeness, and suicidal thinking. Results for the EMA data support contemporaneous relationships between suicidal thinking and (1) burdensomeness (b=0.33, 95%CI=0.25 to 0.40) and (2) loneliness (b=0.15, 95%CI=0.19 to 0.33). Results suggest a temporal (next observation) relationship between burdensomeness and suicidal thinking (b=0.15, 95%CI=0.03-0.27). Results for the daily diary data suggest contemporaneous relationships between suicidal thinking and (1) burdensomeness (b=0.08, 95%CI=0.03 to 0.13) and (2) thwarted belonging (b=0.16, 95%CI=0.11 to 0.20), but no temporal (next-day) relationships. This many mean that variables from the Interpersonal Theory of suicide may function as a correlate of suicidal thinking but, contrary to theory, less so as a proximal, short-term predictor of suicidal thinking.

Evan M. Kleiman PhD,   Rutgers University

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Matthew K. Nock PhD, Harvard University

Abstract 3: Clarifying the role of negative emotions in suicidal thinking: An examination of the emotion dysregulation theory of suicide with real-time monitoring

The emotion dysregulation theory of suicide places negative emotions at the center of the pathway to suicide. Suicidal thoughts are proposed to arise in the context of negative emotions. While cross-sectional research has found associations between negative emotional experiences and suicidal thoughts, parts of emotion dysregulation theory remain unanswered. First, are all negative emotions associated with suicidal thoughts or are only specific negative emotions (e.g. sadness) associated with suicidal thoughts? Second, do negative emotions just co-vary with suicidal thoughts or do they predict suicidal thoughts? The current study sought to test the contemporaneous and temporal relationship between negative emotions and suicidal thoughts. Participants were 55 adult psychiatric inpatients who were hospitalized for a suicide attempt or severe suicidal thinking. Participants received smartphone-based EMA surveys 6 times per day on 15 negative emotions and suicidal thoughts (total number of

observations = 761). We ran a series of multilevel models for each participant-mean centered emotion variable with severity of suicidal thinking as the outcome. For the contemporaneous models, all 15 negative emotions were associated with suicidal thinking, but the magnitude of the association differed by emotion. Loneliness had the weakest association (b=0.39, 95%CI=0.25 to 0.54) and rage had the strongest association (b=0.8, 95%CI=0.65 to 0.95). For the temporal models, only 8 of the emotions predicted severity of suicidal thinking. Overall, these results support the emotion dysregulation theory of suicide and help clarify the specific emotions involved in the relationship between negative emotions and suicidal thinking.

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Abstract 4: Application of personalized, longitudinal networks of affective states and suicide ideation in Dialectical Behavioral Therapy: A proof-of-concept study

We present a proof-of-concept study integrating real-time monitoring into Dialectical Behavioral Therapy (DBT) to inform treatment targets and reduce suicide ideation. The patient was a 25-year-old female presenting for DBT treatment. The therapist introduced real-time monitoring of affect and suicide ideation following six months of treatment nonresponse, sporadic attendance in treatment, and a suicide attempt. Goals were to (1) re-engage the patient, (2) gain insight into daily fluctuations in suicide ideation, and (3) identify affective states that increased risk for suicide ideation in her daily life. Personalized networks were computed weekly to identify treatment targets and inform skill usage. Results indicated that over the six-week course of the study, suicide ideation fluctuated daily but decreased overall and that skill usage increased. Visual inspection of contemporaneous and temporal networks indicated week-by-week variation in specific affect states that predicted and maintained suicide ideation. The therapist used this information for case conceptualization, as well as to help the patient increase awareness of various affective states that increased risk of suicide ideation, and to identify and implement appropriate DBT skill use. This study shows that real-time monitoring and computation of personalized networks may (1) increase patient awareness; (2) provide day-by-day insight into symptom fluctuations for the provider; (3) be used to inform person-specific treatment targets during individual sessions, and (4) increase treatment engagement. This study represents a first step at integrating idiographic research using real-time monitoring into clinical practice to increase the understanding of individual-level processes and enhance patient outcomes.

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Sarah Fischer PhD, George Mason University

Lauren Breithaupt PhD, Massachusetts General Hospital

Improving daily life resilience and adaptive functioning in clinical practice using the experience sampling method

Chair/Discussant: Philippe Delespaul, 1 - Department of Psychiatry and Neuropsychology, Faculty of Health Medicine and Lifesciences, Maastricht University, Maastricht, the Netherlands. 2 - Mondriaan Mental Health Trust, Department of Adult Psychiatry, Heerlen, the Netherlands

Description: Resilience is at the heart of the positive health concept. To understand an individual's opportunities for resilience in clinical outpatient care, we need to explore people's adaptive abilities. Current assessment strategies focus on symptomatology and ignore symptom variation in relation to context. Healthcare professionals lack relevant information to assess adequately what people experience and therefore plan interventions based on incomplete data. In contrast, contextualized and in-the-moment information documents adaptive abilities and provides valuable insight for treatment. The Experience Sampling Method (ESM) is a strategy that allows fine-grained contextualized assessments in daily life, beyond symptoms and including strengths. Modern IT technology allows the implementation of these strategies in clinical practice. In this symposium, we will explore the concepts of resilience and adaptive functioning in clinical care, and how ESM methods are used for shared decision making in clinical practice. We will provide examples of recovery-oriented projects. Philippe Delespaul will discuss the need of daily life adaptational strategies, focusing on the use of ESM technologies in clinical care. Naomi Daniëls will share her experience with implementing ESM in family medicine based on co-creation with psychological wellbeing practitioners. Simone Verhagen will show how cognition can be measured in daily life together with other relevant domains (e.g. mood) to increase awareness of both vulnerabilities and strengths.
ESM is a valuable and empowering tool that can change the way we develop clinical care by allowing person-tailored assessments across domains in daily life.

Abstract 1: The therapist in your pocket: hype or standard practice?

Introduction: There seems to be an imbalance between the prevalence of mental health problems and care needs on the one hand and available care provision on the other hand. Shifts from illness to wellbeing and resilience require a different care approach. Another challenge is to deliver services that have a 24/7 impact so that needs are also met outside the clinician's office. Therefore, it is important to find innovative ways to provide care with a daily life impact. Technology by means of mobile health can provide a solution. Objective: To discuss the current challenges in mental healthcare and how experience sampling technologies can be used as a shared decision making tool that focuses on the individual. Methods: ESM is adapted as a functional analyses tool for clinical practice. Technological advantages allow us to implement these techniques on mobile applications, facilitating widespread use in clinical practice. To use this method as a therapist in the pocket, the data must be returned to the user in an understandable way. The data can be made accessible through graphs and figures on an online platform, allowing to see variability in mood and to link this variability to contextual information. However, this approach still requires some explanation and dedication. Results: Providing patients with individualized feedback seems to be of added value and increases people's autonomy. However, actual implementation in regular care is difficult. Tools have to be redesigned and clinicians trained. Conclusions: Experience sampling interventions are valuable instruments for accessible care with a 24/7 impact. It is necessary to invest more in development and to make the method widely available and clearly understandable for public use and clinical care.

Philippe A. E. G. Delespaul Ph.D., Department of Psychiatry and Neuropsychology, Faculty of Health Medicine and Lifesciences, Maastricht Universityand Mondriaan Mental Health Trust, Department of Adult Psychiatry

Abstract 2: Re-design of PsyMate™ for family medicine: co-creation with healthcare professionals.

Introduction: Healthcare shifts from illness to wellbeing require new assessment technologies and intervention strategies. PsyMate™ is a mHealth experience sampling application that enables patients to monitor vulnerability and resilience in daily life. Although PsyMate™ is extensively used in mental health research, a translation from science into daily practice is needed. Objective: To investigate the redesign process of PsyMate™ for use by psychological wellbeing practitioners in family medicine. Methods: Redesign of PsyMate™ was performed according to the design thinking framework in three phases: understand, explore and materialize. Psychological wellbeing practitioners were closely involved using co-creation methods (nominal group technique - 2 sessions with N=15, empathy mapping - 1 session with N=5, moderated user testing - 1 session with N=4, testing in daily practice - 8 months with N=4). Qualitative data was analyzed using content analysis and discussed with an interprofessional project group. Results: During the 'understand' phase, practitioners reported that the patient population ranges from mild symptoms to full disorders and eHealth is used for diagnostic and intervention purposes. In the 'explore' phase, the key needs were based on the content and motivational functionalities of PsyMate™. In the 'materialize' phase, practitioners experienced barriers on the level of the organization, the device and the individual. Conclusions: Using PsyMate™ as a screening and diagnostics tool in family medicine seems promising, but not easy. The redesign process in co-creation with practitioners yielded meaningful insights into the needs and daily routines of family medicine. It helps to focus the implementation of PsyMate™ in clinical care.

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Abstract 3: Cognition in daily life – how to unravel momentary variation?

Introduction: People with depression, anxiety or psychosis often complain of confusion, concentration or difficulties to appraise contextual cues on a cognitive level. Traditional cognitive assessments are cross-sectional and occur in controlled situations. Information on moment-to-moment cognitive fluctuations and its relation to affect, fatigue and context is lacking. The development and evaluation of a mobile (smartphone) cognitive assessment tool for fine-grained mapping of cognition and its relation to other contextual and intrapsychic domains, is presented. Methods: The momentary Digit Symbol Substitution task is a modified digital version of the original paper-and-pencil task, restricted to a duration of 30 seconds and implemented in an experience sampling protocol (eight semi random questionnaires a day on six consecutive days). It was tested in the general population (N=40). Descriptive statistics and multilevel regression analyses were used to determine initial feasibility and assess cognitive patterns in everyday life. Cognition outcome measures were the number of trials within the 30-second time-window and the percentage of correct answers. Results: Subjects reported the task to be easy, reasonably pleasant and do-able. On average, participants completed 11 trials per session, with 97% correct. Cognitive variation (% correct) was related to positive and negative affect, but not to fatigue and cognition. Conclusions: Implementing a mobile cognitive task within an experience-sampling paradigm shows promise. Fine-tuning in further research and in clinical samples is needed. Gaining insight into cognitive functioning could help patients navigate and adjust the demands of daily life.

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Momentary negative affect in psychopathology samples: The context of distress, romantic relationships, drinking, and self-harm

Chair: Johanna Hepp MSc, Central Institute of Mental Health Mannheim (Heidelberg University)

Description: This symposium includes four talks that present Ambulatory Assessment (AA) data from psychopathology samples including individuals with borderline personality disorder (BPD), posttraumatic stress disorder, bulimia nervosa, non-suicidal self-injury (NSSI) and alcohol use. All studies assessed momentary negative affect in a disorder-specific context. The first talk presents data on specific types of negative affect that were captured with a high-resolution time-based design. Within this study, participants with BPD showed a specific pattern of frequent anger and associated distress that differentiated them from healthy and clinical control participants. The second talk presents data from 98 romantic couples in which one partner met criteria for a personality disorder. Over a course of three weeks, participants reported on their affective reactions to rejection or acceptance by their partner, and results showed that these reactions were moderated by the level of BPD pathology. The third study examined negative affect over the course of drinking episodes and found that it could be expressed as a function of momentary drinking motives and alcohol intoxication. The final talk presents data from individuals with frequent NSSI, who, in addition to providing self-report data, also provided saliva samples contingent upon NSSI to assess salivary beta-endorphin levels.

The authors modelled the negative affect decline following NSSI as a function of time and beta-endorphin levels. With regard to AA methodology, the speakers will discuss ways and merits of assessing specific types of negative affect with frequent sampling, of capturing and analyzing dyadic data, of modeling drinking episodes, and of collecting saliva samples in everyday life.

Abstract 1: Specific emotions in the daily life of patients with BPD, PTSD, bulimia nervosa, and healthy controls: Frequency, intensity, and associated distress

Background: Patients with borderline personality disorder (BPD) experience more frequent and more intense negative emotions and less frequent positive emotions in daily life compared to healthy controls (HC), but the specificity compared to other disorders is unclear. In addition, there is limited empirical evidence if a certain quality of emotion is especially associated with distress in BPD.

Methods: To investigate the frequency, intensity, and distressing effect of the quality of specific emotions, we assessed participants' current emotions and distress every 15 min over a 24-h period (high-resolution time-based design) using e-diaries. To test the disorder-specificity, we used multilevel modelling approaches to compare samples of 43 female patients with BPD, 28 patients with posttraumatic stress disorder (PTSD), 20 patients with bulimia nervosa (BN), and 28 HC.

Results: Patients with BPD exhibited anger more frequently in comparison to all clinical and healthy control groups, demonstrating specificity. All other negative specific emotions (e.g., anxiety, sadness, shame, disgust, jealousy, guilt, and unspecific negative emotions) were equally frequent and intense across all clinical groups. In addition, the emotional quality of anger accounted for additional distress above and beyond the pure intensity (valence) of these specific emotions in all clinical groups.

Conclusions: Although the majority of the group comparisons were transdiagnostic, we were able to reveal some important features that might distinguish BPD from other mental disorders. Patients with BPD reported anger more frequently than clinical controls and feel especially distressed by this specific emotion, which might characterize a specific element of the dysregulation in BPD.

Tobias D. Kockler Dipl.-Psych.,   Karlsruhe Institute of Technology
Philip S. Santangelo PhD, Karlsruhe Institute of Technology
Ulrich W. Ebner-Priemer PhD, Karlsruhe Institute of Technology

Abstract 2: Everyday Interactions between Individuals with Personality Disorders and their Romantic Partners: Negative Reactions to Positive and Negative Events

Individuals with personality disorders have pervasive problems maintaining romantic relationships. Such problems may be more acute in those with borderline personality disorder. We examined individuals' tendency to react to both positive and negative interactions with their romantic partners in a negatively biased way as a function of both partners' personality disorder symptomology. A sample of 98 romantic couples, in which one partner was a patient seeking treatment for a personality disorder diagnosis, were recruited to participate in an ambulatory assessment study. All participants, patients and partners, carried smartphones for 21 days, responding to 6 random prompts per day and completing self-initiated prompts after interacting with their partner. Each survey contained items assessing affect and reports of perceived acceptance and rejection behaviors by one's self and one's partner. Following reports of perceived acceptance behaviors by one's partner, individuals generally felt less hostile, less fearful, and more positive; however, individuals reporting greater borderline symptoms, specifically, felt relatively more fearful and less positive following such reports of acceptance. In contrast, following reports of perceived rejection by one's partner, individuals generally felt more hostile, more fearful, and less positive; but, individuals reporting greater borderline symptoms felt even more hostile and less fearful. Individuals' reports of their own acceptance and rejection behaviors did not impact their hostile, fearful, or positive feelings. We suggest that borderline individuals' negative expectations and reactivity undermine interaction quality, even for positive interactions, likely impacting more global relationship evaluations over time.

Sean P. Lane PhD, Purdue University
Timothy J. Trull PhD, University of Missouri
Stephanie D. Stepp PhD, University of Pittsburgh

Abstract 3: Affect during drinking episodes as a function of momentary alcohol use motives

The motivational model of substance use (Cooper et al., 2016; Cox & Klinger, 1988) posits that individuals use substances to achieve desirable affective outcomes. The model places motives as proximal predictors of alcohol use, implicating affect and other variables insofar as they influence an individual's motives for use. However, most studies of drinking motives have treated them as relatively stable and trait-like, with researchers only beginning to assess drinking motives in the moment in participants' daily lives. The momentary assessment of drinking motives aligns closely with the theory, treats motives as

proximal predictors of alcohol use, and allows for stringent tests of how motivational processes unfold in daily life. The current study utilized ambulatory assessment for 21 days of drinkers with (N=56) and without (N=59) borderline personality disorder, a disorder characterized by emotional instability and associated with maladaptive substance use patterns, to examine whether individuals experienced the affective outcomes from drinking that they reported wanting to achieve in the moment. Multilevel models were used to examine NA over the course of drinking episodes as a function of momentary coping motives in SAS PROC MIXED. Findings included that, across participant groups, NA during drinking episodes was significantly lower than NA reported earlier during those same days, pre-drinking. However, momentary endorsement of coping was positively associated with NA across drinking episode timepoints (b=0.10, p<.0001). Thus, in contrast to an overall finding of decreased NA during drinking episodes, drinking episodes characterized by higher endorsement of coping motives were also higher in NA. Additional interactions and group differences will be discussed.

Andrea M. Wycoff MA, University of Missouri
Johanna Hepp MSc, Central Institute of Mental Health
Ryan W. Carpenter PhD, Brown University
Timothy J. Trull PhD, University of Missouri

Abstract 4: The effects of non-suicidal self-injury on negative affect and beta-endorphin levels in daily life

Individuals who engage in non-suicidal self-injury (NSSI) describe an offset of negative affect following tissue damage and it has been theorized that both operant learning and neuroendocrinological processes underlie this effect. In detail, theories posit that those who self-harm suffer from chronically low levels of the endogenous opioid ß-endorphin and use NSSI to temporarily increase ß-endorphin levels. Consequently, we hypothesized that NSSI momentarily decreases negative affect and increases ß-endorphin levels. To test this hypothesis, we conducted a two-week ambulatory assessment study with 51 participants who self-harm at least once a week. Participants reported momentary affect and urge for NSSI at five random time-points daily. Additionally, they self-initiated the app whenever they self-harmed and then received three follow-up prompts every 10 minutes. At initial and follow-up NSSI prompts, participants provided saliva samples, which we used to determine ß-endorphin levels. As a control condition, participants also received follow-up prompts and provided saliva samples at time-points where they reported a high urge for NSSI (but no engagement in NSSI). Growth-curve analyses supported an affect reducing function of NSSI, showing that negative affect and aversive inner tension declined following NSSI and that this decline

was significantly steeper than in the control condition. Beta-endorphin levels are currently still being extracted from the saliva samples but analyses will be completed at the time of the conference. In addition to implications for NSSI research and treatment, we will also discuss opportunities and challenges of collecting endocrinological markers in daily life.

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Lisa M. Störkel MSc, Central Institute of Mental Health, Mannheim, Germany
Christian Schmahl Prof., MD, Central Institute of Mental Health, Mannheim, Germany
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Natural language use and social processes

Chair: Andrea B. Horn Dr., University of Zurich

Description: Natural Language use is a behavioral manifestation that not only reflects psychologically meaningful characteristics of the person producing the language. Moreover, as an important communication channel, language is genuinely social and represents a great medium for the investigation of social processes in daily life. In this symposium, three studies examining language use in daily life will be presented. The romantic relationship is the closest relationship in adulthood and thus represents a highly relevant feature of the social reality of adults. In the first study, Timmons and colleagues present data from an audio sensing study in which couples' conversations were recorded in daily life over a period of 24h; results indicate a predictive value of dyadic patterns of pronoun use in these couples with reference to tendencies towards aggression. The second study by Robbins and colleagues is also based on daily language in couples. In this EAR study, daily language use is compared between gay, lesbian, and heterosexual couples reflecting differences in pronoun and emotion word use between these groups. In the last study, Meier et al. presents a study investigating language use in TED talks and its translations. They investigate whether gender-specific patterns of language prevail when the talk is translated by a translator from the opposite gender, and whether they are predictive for public ratings of the talks. A general discussion about the opportunities for investigating social processes through natural language use, and the chances and implications for ambulatory assessment and interventions in daily life with all participants will finish the symposium.

Abstract 1: Fluctuations in Pronoun Use in Couples' Everyday Conversations: Links with Dating Aggression

Everyday language use, including the pronouns people use when speaking to others, may reflect underlying aspects of relationship functioning and have implications for understanding couple conflict and dating aggression. The current study measures couples' hour-to-hour use of pronouns in daily life and examines symmetry in pronoun use, or the extent to which partners mirror each other in the frequency of the pronouns they use. Specifically, we test how patterns of pronoun use change when dating partners are annoyed with each other and whether such patterns relate to overall levels of dating aggression in the relationship. Fifty young-adult dating couples (M age = 22.7, SD = 2.8; M relationship length = 29.8 months, SD = 24.2) carried smartphones that recorded their conversations for a 24-hour period. Couples also completed concurrent hourly reports of feelings of annoyance toward each other and completed questionnaires assessing general levels of aggression in the current relationship. Audio recordings were transcribed and processed via LIWC to obtain estimates of pronoun use per hour. Results of multilevel models showed that males' "we" speech (b = -.26, p < .05) and symmetry in couples' "I" speech (b = -.61, p < .05) were associated with lower levels of aggression in the relationship. Additionally, dating aggression moderated the association between hourly reports of annoyance and symmetry in "you" speech (b = .46, p < .01), such that couples with high levels of aggression evidenced heightened symmetry in "you" speech when feeling annoyed. These findings demonstrate how everyday language use relates to couples' tendencies toward aggression and how these patterns are linked to ongoing fluctuations in the emotional tone of the relationship.

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Abstract 2: A Comparison of Everyday Word Use of People in Lesbian, Gay, and Heterosexual Couples

Word use is associated with relationship initiation, satisfaction, and interdependence among partners in romantic relationships. However, this has almost exclusively been examined among heterosexual couples. The present study examined similarities and differences among lesbian, gay, and heterosexual partners' word use in everyday conversations with each other. Lesbian (n = 17), gay (n = 17), and heterosexual couples (n = 27) wore the Electronically Activated Recorder (EAR) over two weekends separated by one month to sample their naturally-occurring word use. Participants also completed self-report measures of personal (demographics) and relationship characteristics. When examining which characteristics were most indicative of

word use, multilevel models accounting for partners' interdependence revealed that couple type (lesbian, gay, or heterosexual) was most indicative of pronoun use. Heterosexual couples used more "you" words and fewer "we" words than lesbian or gay couples. There were no meaningful differences among the couple types for positive emotion words, but heterosexual couples did tend to use more negative emotion words than homosexual couples. When accounting for personal characteristics, this association was reduced and younger age was most robustly associated with use of negative emotion words. These findings are consistent with past in-lab evidence that homosexual couples tend to be less negative and more collaborative in their conversations with each other, and extends them by adding evidence from everyday word use. The pronoun findings add further evidence that heterosexual couples tend to engage in more conflict (i.e., "you" can indicate blame) and refer to themselves less often as a unit ("we" words) than homosexual couples.

Megan L. Robbins PhD, University of California, Riverside, California, USA
Alexander Karan M.A., University of California, Riverside, California, USA

Abstract 3: Lost in Translation? How Psychological Signatures in Language Use are Morphed by Gender during Translation

Modern internet platforms, such as the TED website are a rich source of real life language data. TED talks are highly popular and have been translated into several languages. Previously, differences in audience reactions for male and female TED speakers were found. In another line of research, there is evidence for gender differences in word use. In the present study, we investigate whether the original gender-specific language style of the speaker is maintained in translated TED-talks, even in case of an opposite-gender translator. Secondly, we study how speakers' genders in interaction with their language style relate to audience evaluations.

From the 1,648 collected English TED talks with a German translation, we coded genders of speakers and translators from the videos and personal profiles. For the first analysis, N=544 talks were included so that each translator was represented once, and non-independencies controlled. We used the full sample of N=1,648 speakers to link gender-specific language style with their talk ratings.

Our results replicated previous findings of gender differences in word use. In opposite-gender dyads, word use in the translated talks was more representative of the gender of the original speaker than of the translator, even though a gender-specific language style was evident in the translations. Gender and gender-related language features were associated with different talk ratings by the online audience.

These results contribute to a scientific understanding of gender differences in

word use, by expanding previous findings onto the context of translations. Furthermore, they open the door for further research of how a speaker's gender and language use impacts audience evaluations.

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Examining robust associations between affect dynamics and psychopathology.

Chair: Marlies Houben PhD, KU Leuven

Discussant: Marlies Houben PhD

A surge of research has shown that various measures of affect dynamics, reflecting affective variability, instability and inertia are consistently related to poor psychological health and psychopathology. Such associations have been demonstrated both on the between-person level, and recently also on the within-person level, showing that changes in affect dynamics might be predictive of changes in psychological well-being/psychopathology. Still, the different affect dynamic measures and mean affect levels are all statistically related, implying that an association between one pattern of affect dynamics and psychopathology could be driven by relationships with other dynamic measures or mean affect. In this symposium, we present 3 talks that specifically focus on the robustness of associations between affect dynamics and psychopathology. First, Helmich examined whether negative affect dynamics can predict the rate of depressive symptom reduction during treatment, in which affect dynamics and mean affect are examined as simultaneous predictors. Houben explored the specificity (in comparison to mood disorders and healthy controls) and the robustness of the association between affective instability and borderline personality disorder, if mean affect and variability is taken into account. Last, using data from 15 different studies, Dejonckheere examined how different affect dynamic measures empirically interrelate, and what their incremental value is in the prediction of psychological well-being. As such, in our symposium we demonstrate the necessity of accounting for the statistical interdependence of the different affect dynamic measures and mean affect when examining the nature of the association between affect dynamics and psychopathology.

Abstract 1: Can negative affect dynamics predict rate of response to treatment in depression?

Background: As more instability (MSSD) and variability (SD) of negative affect (NA) have been related to current and future depressive symptoms, these emotion dynamics may also be indicators of the likelihood of early treatment response and long-term presence of symptoms. We investigated whether MSSD and SD of NA were predictive of the rate of 1) depressive symptom reduction during treatment and 2) of time-to-remission over 18 months.
Methods: 41 participants with major depressive disorder completed six days of experience sampling, with 10 semi-random beeps per day before starting treatment. During and after treatment, depressive symptom severity was assessed monthly for 18 months with the Hamilton Depression Rating Scale (HDRS). Rate of depressive symptom reduction was modelled as a log-linear decrease in monthly HDRS in a multilevel model, controlled for baseline HDRS. Candidate predictors were individual SD, MSSD, and mean NA, and several patient characteristics. Predictors were first tested in univariate models, significant predictors were entered in a multivariate model. Regression analyses with the same predictor variables were performed to predict individual time-to-remission (N months to HDRS of <8).
Results: Preliminary results show that NA dynamics before treatment have no predictive value for the course of depressive symptoms over 5 months beyond baseline symptom severity. Analyses for time-to-remission are yet to be completed.
Conclusions: Preliminarily, our results suggest that instability and variability in NA may be not as indicative of an upcoming reduction of depressive symptoms as they are for the onset of depressive symptoms.

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F. Peeters Prof, Maastricht University, Maastricht, The Netherlands
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Abstract 2: Emotional instability in borderline personality disorder: An examination of the specificity and robustness of this relationship

Emotion dysregulation is assumed to be a core feature of borderline personality disorder (BPD). In line with this proposition, many studies have shown that persons with BPD experience highly unstable emotions in daily life, characterized by abrupt changes in the intensity of emotions, and abrupt shifts between positive and negative emotional states. However, first, despite the proposed centrality for BPD, inconsistent results have been found regarding the specificity for these findings for BPD, in comparison to other clinical groups.

Second, recent research is showing that measures of instability are strongly influenced by mean and variance. Therefore, it is necessary to examine the robustness of the association between BPD and emotional instability, if the effect of mean affect and variance is taken into account. Forty persons with a diagnosis of BPD, 38 persons with a mood disorder, and 40 healthy controls participated in a week of experience sampling, and rated the intensity of their emotions 10 times a day. Findings showed that, compared to persons with a mood disorder or healthy controls, persons with BPD exhibited stronger changes from one moment to the next, including changes between positive and negative emotional states and changes within the positive or negative range. These results were robust after correction for mean affect. However, when correcting for the difference between groups in within-person variance, no significant differences in instability measures were found. This indicates that instability is specifically linked to BPD, but is probably driven by larger within-person variance in the BPD group, implying that BPD is characterized by larger fluctuations around mean affect levels that do not necessarily occur abruptly for one moment to the next.

Marlies Houben PhD, KU Leuven, Leuven, Belgium
Egon Dejonckheere MSc, KU Leuven, Leuven, Belgium
Peter Kuppens Prof, KU Leuven, Leuven, Belgium

Abstract 3: Can we beat the mean? Bringing parsimony to the field of emotion dynamics.

Over the years, increasing attention has been paid to the relation between emotion dynamics and psychological well-being. Because our emotional life is inherently time dynamic, it has been argued that, next to how positive or negative we feel on average, patterns of emotional change too, may convey important information about our mental health. This growing interest came with a surge in new affect dynamic measures, each claiming to capture a unique dynamical aspect of our emotional life that is crucial for understanding well-being. Although this accumulation of new measures may suggest scientific progress, researchers have not always evaluated (a) how different affect dynamic measures empirically interrelate, and (b) what their incremental value is in the prediction of psychological well-being. Here, we address these central questions by analysing combined affective time series data from 15 different studies (N = 1,777). The results (a) map the considerable empirical interdependencies that exist between 16 commonly studied affect dynamic measures, indicating that single measures often do not convey unique information, and (b) show that dynamic measures have little incremental value over mean levels of positive and negative affect (and variance in these affective states), when predicting individual differences in three prominent indicators of

human well-being (life satisfaction, depressive and borderline symptoms). Although affect dynamic measures may adequately summarize individual differences in emotional time series, our findings indicate that conventional emotion research is currently unable to demonstrate meaningful and independent relations between affect dynamics and psychological well-being or psychopathology.

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The Promise and Perils of Integrating Wearable Sensors into Research on Suicidal Thoughts, Behaviors, and their Risk Factors

Chair: Evan M Kleiman PhD, Rutgers University

Suicidal thoughts, behaviors, and their risk factors are complex and heterogenous phenomenon that vary rapidly and dynamically across time and context. Prior static methods have struggled to capture these rapid, dynamic changes across time and context. Wearable sensors that can continuously measure physiology and behavior offer great promise to explore suicidal thoughts, behaviors, and their risk factors in ways not possible before with minimal participant burden. Despite their promises, wearable sensors also come with a new set of statistical challenges and ethical dilemmas. This symposium will explore from theoretical and applied perspectives both the promising new dimensions and the potential pitfalls of using wearable sensors to measure suicidal thoughts, behaviors, and their risk factors. First, Dempsey et al. will discuss the analytic methods and statistical challenges involved in integrating multiple streams of sensor data (skin conductance and accelerometer) to detect self-report distress. Second, Coppersmith et al. will present data showing how skin conductance can be used to detect self-reported suicidal thinking among suicidal adult inpatients. Third, Kleiman et al. will present data showing how increases in skin conductance are associated with periods of self-reported distress among suicidal adolescent inpatients. Although this symposium focuses on factors relating to suicide, the findings discussed will be of interest to researchers in many related mental healthcare topics. This symposium will be unique in that it will offer an overview of statistical approaches that can be used to integrate wearable devices into mental health research and results from studies that use these approaches.

Abstract 1: Analytical methods for making sense of mobile health data in suicide research

Mobile sensor technologies that allow for the continuous monitoring of physiological signals can provide the opportunity to predict the onset of behavioral changes relevant to emotional or mental distress. Identifying these states of vulnerability can be used to indicate potential moments for providing support to individuals managing a mental illness. One barrier to understanding how to leverage these signals in the context of mental health is identifying relevant features of physiological changes that predict behavioral events where support might be provided. Additional considerations include how sensors can be sustainably integrated into individuals' everyday lives to collect sufficient amounts and quality of data without unnecessary burden. We will discuss methods for addressing these challenges in adolescents at risk for attempting suicide. 50 patients age 12-19 hospitalized for risk of self-harm wore a mobile sensor (Empatica E4) which continuously recorded physiological signals including skin conductance and movement. Participants were instructed to press a button when they felt intense distress (defined as feeling so distressed that they might do something to hurt themselves, others, or property). Analytical methods will be employed to understand if changes in skin conductance and accelerometer data can be used to predict participants' button presses. We will discuss approaches to data pre-processing that account for individual variability and explore the different timescales at which these signals predict the onset of button presses. Future work will use predictions of individuals' risk of suicide ideation to trigger the delivery of mHealth interventions aimed at increasing proximal social interaction in order to reduce suicidal thoughts and behaviors.

Walter Dempsey PhD, Harvard University, Cambridge, MA USA
Ashley Walton PhD, Harvard University, Cambridge, MA USA
Evan M. Kleiman PhD, Rutgers University, Piscataway, NJ USA
Susan Murphy PhD, Harvard University, Cambridge, MA USA
Matthew K. Nock PhD, Harvard University, Cambridge, MA USA

Abstract 2: Can Biosensors Provide New Insights into The Functions of Suicidal Thinking?

A puzzling and robust phenomenon is that people think about intentionally ending their own lives. Approximately 9.2% of people globally report lifetime suicidal thoughts (Nock et al., 2009) and suicidal thoughts appear across different countries, populations, and psychological disorders. Despite suicidal thoughts being a focus of research for over 50 years, but we still don't know

their fundamental properties. A basic question we lack an answer to is why do people think about suicide? One explanation for the existence and persistence of suicidal thoughts is that some people may experience relief after thinking about suicide. Capturing this potential function of suicidal thinking is challenging because it is not ethical to induce suicidal thoughts in a laboratory. Biosensors, however, allow for the continuous, ecological, and passive measurement of physiology during suicidal thinking. I will discuss a study which seeks to explore the potential reinforcing nature of suicidal thinking. 100 adults who were hospitalized at a psychiatric inpatient unit for a recent suicidal attempt or severe suicidal thoughts wore a mobile biosensor wristband (Empatica E4). Participants engaged in event-driven self-report where they were instructed to press a button on the biosensor whenever they were thinking about suicide. The analysis will consist of a multilevel unconditional growth curve model. The model will test for changes in electrodermal activity as a function of time relative to the report of suicidal thoughts. I will discuss preliminary results and how biosensors have the potential to track other affective and behavioral phenomena that occur before, during, and after episodes of suicidal thinking.

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Evan M. Kleiman PhD, Rutgers University, Piscataway, NJ USA
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Szymon Fedor PhD, MIT, Cambridge, MA USA
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Abstract 3: Using Wearable Monitors to Detect Distress among Suicidal Adolescent Inpatients

Harmful behaviors (e.g., harm to self or others) resulting from rapidly increasing distress are unfortunately common experiences on adolescent psychiatric inpatient units and often lead to undesirable "interventions of last resort" like seclusion and restraint, rather than more proactive methods that might have been effective before the distress escalated. This may be a reflection of limitations in the current standard of care in adolescent inpatient psychiatry units: continual or near-continual physical observation. Distress is not often physically observable in its early stages and could be missed during routine physical observation. Moreover, adolescents may not be aware of their distress, making them unable to seek help in the early stages of their distress. The goal of this study was to use a wearable physiological monitor to use physiological correlates of distress (skin conductance) to identify the early stages of distress that lead to harmful behaviors, which is not easily detectable by clinical

observation alone. 75 adolescent inpatients wore a biosensor (Empatica E4) for the duration of their inpatient stay and were asked to press the event marker on the wearable whenever they felt intense distress. We hypothesized that compared to a control period (a 20-minute block of time during the same time of day on a day when the button was not pressed), skin conductance would increase in the 20 minutes before self-reported distress. Results of a conditional growth curve model supported this hypothesis. This study is the initial step towards creating a tool that can be used on inpatient units to help clinical staff make decisions about managing harmful behaviors and help patients better identify their distress, ultimately leading to more effective inpatient care.

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Making the black box transparent: Open Science practices in ESM research

Chair: Ginette Lafit PhD, KU Leuven

Discussant: Evan Kleiman PhD

New methodological developments and a need for increased replicability emerging from previous Experience Sampling Method (ESM) studies, has generated considerable debate on how ESM researchers can improve their practices to promote openness, integrity and reproducibility. Open Science practices aim to make research more transparent by improving the access to data and materials and by pre-registering study designs, protocols and analysis plans. Currently, adoption of open science practices in ESM research is in its infancy. To this end, this symposium highlights a selection of innovative projects that implement open science practices into clinical psychological ESM research. We address the challenges of using open science practices and provide a series of practical recommendations that will help to improve openness in ESM research. Eeske Van Roekel discusses new guidelines for increasing replicability and reproducibilty of adolescent ESM research, arising from her recent systematic review. Ginette Lafit then discusses her work on best practices for power calculations for pre-registered ESM research. Vera E. Heininga will illustrate how she used the Open Science Framework (OSF), PsychArxiv, and Rmarkdown to produce her Pre-Registration Challenge Prize-winning paper. Finally, Olivia Kirtley presents ongoing work on the Experience Sampling Item Repository (ESIR), an international collaborative project producing an open-

source collection of ESM items. Evan Kleiman, a leading figure in the use of ESM and increasing replicability in suicide research, is the discussant.

Abstract 1: Best practices to stimulate open science in ambulatory assessment studies

The use of ambulatory assessment (AA) and related methods (experience sampling, ecological momentary assessment) has greatly increased in recent years, but despite this, there are no existing guidelines regarding best practice for AA research. We recently conducted a systematic review on AA studies in adolescent samples, to provide an overview of the current state-of-the-art and to provide practical recommendations for conducting AA studies (van Roekel, Keijsers, Chung; in press). In our review of recent studies, we noticed that many of the current studies on AA in youth, lack details about the practicalities of data collection, (e.g., how participants were instructed, how many items the total questionnaire comprised, how data were monitored). Apart from limiting the reproducibility of studies this information is essential to derive firm conclusions on which practices are effective. In this presentation, I will elaborate on challenges we encountered, and our solutions to these issues. These solutions entail (1) a checklist we compiled on how to report on AA studies, and (2) suggestions for methodological research that is needed. We also discuss how increased transparency through adoption of open science practices can address some of these issues. We hope that these solutions will help to improve AA research and fine tune best practices recommendations.

Eeske van Roekel PhD, Tilburg University, Department of Developmental Psychology, Tilburg, Netherlands
Loes Keijsers PhD, Tilburg University, Department of Developmental Psychology, Tilburg, Netherlands
Joanne Chung PhD, Tilburg University, Department of Developmental Psychology, Tilburg, Netherlands

Abstract 2: Challenges in conducting power analysis in Experience Sampling Studies

Researchers that are interested in using the Experience Sampling Method (ESM) or pre-registering a study based on data collected using ESM, need to determine the number of participants in order to maximize the likelihood of detecting a hypothesized effect. This can be achieved by performing a power analysis. A study with low statistical power reduces the probability that a detected effect is true in the population as well as limiting reproducibility of results. The data obtained from an ESM study have a multilevel structure, in which repeated observations over consecutive days are nested within an

individual. Power calculations in ESM studies are challenging because of this nested data structure. To conduct a power analysis for ESM studies, the investigator has to take into account the number of occasions the ESM is conducted, the between subject variability and the serial correlation between observations within an individual. Power calculations are a crucial component of high quality pre-registrations- a cornerstone of open science practices- and aid the reproducibility of results. In this presentation, we are going to present general guidelines to perform power analysis in ESM studies using a simulation based approach when we want to test a hypothesized effect and we assume we can model this effect with a multilevel regression model. We present a case in which power analysis is required and there is uncertainty about the model parameters used to test the hypothesized effect. Finally, we will discuss the importance of considering the consequences that model misspecification has on determining the number of participants in an ESM study.

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Janne Adolf PhD, Research Group on Quantitative Psychology and Individual Differences, KU Leuven, Leuven, Belgium
Wolfgang Viechtbauer PhD, Psychiatry & Neuropsychology, School for Mental Health and Neuroscience, Fac. Health, Medicine and Life Sciences, Maastricht University, Maastricht, Netherlands
Inez Myin-Germeys PhD, Center for Contextual Psychiatry, KU Leuven, Leuven, Belgium Eva Ceulemans PhD, Research Group on Quantitative Psychology and Individual Differences, KU Leuven, Leuven, Belgium

Abstract 3: Open science in practice: The dynamical signature of anhedonia in Major Depressive Disorder (MDD)

This presentation will be a practical illustration of open science in practice. This article was largely a replication study, and won a pre-registration challenge prize. We will show how the Ecological Momentary Assessment (EMA) analyses were pre-registered on the Open Science Framework (OSF), entered into the Pre-Registration Challenge, written in a fully reproducible Rmarkdown script, and published as a pre-print on OSF and PsychArxiv. The topic of the paper is anhedonia in Major Depressive Disorder (MDD). MDD is the leading cause of disability worldwide, and its characteristic features are depressed mood and anhedonia. Anhedonia is defined as a "markedly diminished interest or pleasure in all, or almost all, activities of the day", and has generally been investigated on the group-level using retrospective questionnaires and interviews). Methods: We sampled Positive Affect (PA) and reward experiences at 10 semi-random time points a day, for seven days in the daily lives of 47 MDD patients with anhedonia, and 40 controls. Results: Multilevel models showed that anhedonia was associated with low PA, but not with differences in PA dynamics, or reward

frequency in daily life. In reaction to rewards, MDD patients with anhedonia showed no difference in their increase in PA (i.e., PA reactivity), and showed no signs of a faster return to baseline thereafter (i.e., PA recovery). Conclusions: Our results suggest that the dynamical signature of anhedonia in MDD can be described best as a lower average level of PA, and "normal" in terms of PA dynamics, daily reward reactivity and reward recovery.

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Abstract 4: The Experience Sampling Item Repository: Open materials for more open ESM research

Research into dynamic daily-life psychological processes using the Experience Sampling Method (ESM) is burgeoning, and with this comes a proliferation of new items and constructs being assessed. Unlike many of the measures used in psychology and psychiatry research, items used in ESM studies are rarely openly available, significantly limiting the transparency and reproducibility of ESM research. Furthermore, there are currently no gold standards regarding which items optimally measure particular constructs and few items used in ESM research have undergone rigorous psychometric evaluation. Here we present an ongoing international collaborative project designed to address these issues and increase transparency and reproducibility in ESM research. The Experience Sampling Item Repository (ESIR) is a growing, open-source collection of items used in ESM research, that will then be used as a basis for conducting further psychometric investigation of these items. The current presentation will focus on Phase I of the project (repository population) and will discuss the structure and organisation of ESIR, including recruitment of contributors and item compilation. ESIR is an exciting, international collaborative project that applies

open science practices to ESM research, with the aim of creating a more robust, transparent and reproducible science of ESM for the future.

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It's all about time. A dynamic systems perspective on human change processes.

Chair: Anna Lichtwarck-Aschoff PhD, Radboud University, Behavioral Science Institute

Discussant: Niall Bolger PhD, Columbia University, Department of Psychology

Ambulatory assessment data allow us to investigate how moment-to-moment, day-to-day experiences relate to emergent structures of behavior (e.g., psychopathology). Studying those "raw materials" of development reveals that change does not happen linearly or evenly within and across individuals. Non-linear dynamic systems theories offer a powerful framework to conceptualize and analyze these idiosyncratic and dynamic processes at interacting time-scales. This symposium combines four projects investigating micro-level dynamics in relation to clinical change trajectories.
de Barbaro presents mother-infant interaction data, showing that depressed mothers are less likely to contingently respond to infants' distress as a function of the effectiveness of previous soothing attempts. Ongoing efforts to use wearable sensors to measure longitudinal impacts of micro-dynamic transactions will be highlighted. Lichtwarck-Aschoff presents studies examining longitudinal patterns of therapeutic change in different populations and treatment settings. Results demonstrate that successful psychotherapy involves a cascade of transitions preceded by destabilization (i.e., temporary increases in variability) of existing rigid patterns. Aas introduces Idiographic Systems Modelling; a collaborative case conceptualization that leads to personalized daily assessments. Application of this approach with real-world clinical care data illustrate how monitoring these personalized process data can enhance

clinical decision making. Schiepek fits daily diary data of patients' change dynamics to a mathematical model and shows how parametrization of a single case allows for short-term predictions and the estimation of intervention effects. Niall Bolger will end the session with a critical reflection.

Abstract 1: Micro-transactive effects in depressed mother-infant interactions: When you soothe, I soothe

Cycles of distress and contingent soothing during infancy are widely held to lay a foundation for emotion regulation. Maternal depression can disrupt these cycles; a key mechanism for inter-generational transmission of depression. While theoretical accounts describe transactions in moment-to-moment mother-infant activity—most transactional analyses are conducted on the longitudinal timescale, with data collected across sessions often months apart. This paper showcases transactional micro-dynamics in mother-infant distress and soothing cycles. Additionally, it highlights the unique potential of wearable sensors to allow unprecedented access to the processes by which such micro-interactions shape longitudinal trajectories.

Face-to-face mother-infant interactions were annotated for all changes in positive and negative affect at 10Hz (N=200 mothers with depression history; Goodman et al, 2017). Across all participants, all instances (in.) of infant distress were identified and classified according to infants' rate of soothing (return to positive or neutral affect within 10sec) in response to maternal contingent response (change in affect within 3sec) in the prior distress episode (1-back; N=239 in.), two prior (2-back; N=82 in.) or three prior episodes (3-back; N=34 in.). Considering 1- 2- and 3- prior distress instances, the higher the rate of prior successful soothing, the more likely mothers are to contingently respond at the current (time =0) distress instance.

We will frame these analyses in the context of ongoing data collection in our lab where we are leveraging mobile sensors and activity recognition algorithms to capture high-density objective daily markers of infant distress and maternal soothing via continuous audio recordings from an infant-worn device.

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Priyanka Khante MSc, The University of Texas at Austin, Electrical and Computer Engineering, Austin, Texas, US
Meeka Halperin MSc, Emory University, Department of Psychology, Atlanta, Georgia, US
Mckensey Johnson MSc, The University of Texas at Austin, Department of Psychology, Austin, Texas, US
Sherryl Goodman PhD, Emory University, Department of Psychology, Atlanta, Georgia, US

Abstract 2: Destabilization within treatment processes – a window on personalized care.

Psychopathology is a state of tight configurations of affect, cognition, behavior and somatic functioning that has evolved over the course of an individual's life. Unifying across disorders this state can be defined as rigid, a jailhouse with little movement, which is called an attractor in dynamic systems terms. The general goal of therapy is to break this rigid state and shake loose old patterns, to trigger a qualitative shift towards more healthy and flexible patterns of functioning. This destabilization is called a phase transition in dynamic systems terms. Here, a set of studies is presented that studied destabilization in various target groups, treatment contexts, and using different intensive longitudinal data.

The first study examined profiles of change in repeated mother-child interactions over the course of treatment for childhood aggression. A destabilization pattern in real-time affective behaviors was related to better outcomes. Second, in a study with anxious children following CBT, destabilization in therapist-client turn-taking patterns was associated with better outcomes. Third, in a large-scale study with mood disordered adult patients, higher destabilization based on daily self-ratings, was predictive of better outcomes. In the last study, we found that critical fluctuations in daily self-ratings predicted an increased risk for sudden gains / losses in depressive symptoms in the upcoming 4 days.

Together, these results suggest that successful therapy can be seen as a (cascade of) phase transitions preceded by destabilization of existing rigid behavioral patterns. Using ambulatory assessments to detect destabilization periods maybe highly relevant for practice because they signify windows of opportunity in which clients are more susceptible to change.

Anna Lichtwarck-Aschoff PhD, University of Nijmegen, Behavioral Science Institute, Nijmegen, The Netherlands

Abstract 3: Bridging the gap: Concept and results of Idiographic System Modelling

Most psychotherapy research rests on aggregated group means and their subsequent statistical inference. Group-based aggregates, however, do not inform clinicians how to adapt therapeutic decisions to individual patients. The problem of generalizing group-based results to individual patients has been described and proven mathematically with the ergodicity theorem (Molenaar, 2007). Human change processes, including therapeutic change, are by definition non-ergodic, meaning that "the structure of inter-individual variation at the

population level is not equivalent to the structure of intra-individual variation at the single-subject level". Psychotherapy concerns single subjects, hence there needs to be a shift from group-based science to idiographic science.

This paper presents the concept of idiographic systems modelling; with this approach patients are offered semi-structured interviews, gathering relevant (bio-)psycho-social aspects of their life. Relating the most relevant aspects, a network model is drawn in collaboration of patient and therapist. Based on this network, individual questionnaires are being created and subsequently edited and administered daily via an online monitoring tool. Visualizations of the accumulating timeseries are being used by therapists for feedback sessions to inform individualized therapeutic hypotheses. Data will be presented (N>75; mean timeseries length >30) of these idiographic system models, highlighting differences and similarities in content and structure. It will be discussed how ambulatory assessment techniques, personalized monitoring and feedback fit into a dynamical systems approach, which can allow for the empirical study of the individual and bridging the gap between science and practice.

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Abstract 4: Are Psychotherapies Moving on Standard Tracks? A Data-based Discussion and a window to Artificial Intelligence in Psychotherapy

Current approaches of routine outcome monitoring (session by session measures) assume that trajectories of change should move on a standard track. Patients moving out of standard tracks are assumed to be at risk of deterioration. From a nonlinear dynamic systems perspective, it is not assumed that trajectories should follow any specific track. They should be more complex than averaged tracks, highly individual, and characterized by pattern transitions. We tested if high-frequency (daily) trajectories of change are moving on standard tracks, if there are different complexity levels of high- vs low-frequency time series, if "not on track" dynamics will be correlated with poor outcome, and if complexity peaks representing the critical instabilities of a process will be correlated with the outcome. The patients included in the data analysis (N=88) were treated in two hospitals. They used the Therapy Process Questionnaire-Revised (TPQ-R) for daily self-assessments and the ICD-10 based Symptom Rating (ISR) for treatment evaluation. The data reveal that high-frequency trajectories are not running on standard tracks and are not necessarily correlated with poor outcome. Locally increased complexity may be

associated with good outcome. The conclusion is that routine feedback should use the information which is given by the nonlinear dynamics of multiple change criteria. Actually, it is also possible to link this information of a patient's individual dynamics to a nomothetic mathematical model of change dynamics. Using the parametrization of a single case could allow for short term predictions and the estimation of intervention effects which opens psychotherapy to artificial intelligence.

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Understanding health behavior and well-being in everyday life: Intensive longitudinal studies in dyads and individuals

Chair: Janina Lüscher PhD, University of Zurich

Discussant: Patrick E. Shrout PhD, New York University

This symposium presents intensive longitudinal studies aiming to better understand within-person processes of health behavior and well-being in dyads and individuals. While theories of affect and behavior change propose within-person processes these are rarely tested with adequate designs, including the dynamics of individual regulation within the social context. The first three presentations observe mother-child dyads' and romantic couples' experiences and behaviors while the fourth presentation reports the findings of a within-person field experiment in individuals.
First, Lüscher and colleagues will discuss how children's daily media consumption in the evening affect their sleep and alertness based on daily diary data reported from children and their mothers using a dyadic approach. Next, Horn and colleagues will discuss the interplay between intra- and interpersonal emotion regulation in couple's everyday life based on an actor-partner interdependence model. Subsequently, Stadler and colleagues will present findings on daily association between companionship, relationship satisfaction, positive and negative affect and smoking in single-smoker and dual-smoker couples using a dyadic score model. Finally, Inauen and colleagues will report findings from a micro-randomized trial to reduce sugar-sweetened beverage

intake. The individual presentations will be followed by a discussion of implications and future directions by Patrick Shrout.

Abstract 1: How does children's daily media consumption in the evening affect their sleep and alertness?

Children regularly use electronic media, such as smartphones. Several cross-sectional studies showed that media use is negatively associated with sleep. However, children's media consumption has not been investigated in daily life, from a dyadic perspective (children's self-perspective and their mother's perspective), and for different media types separately. Therefore, this study aimed to examine the association between children's daily media consumption, sleep duration and alertness reported by the children themselves and their mothers. 105 mother-child dyads (child: Mage = 11.7, SDage =.85; mother: Mage = 43.8, SDage = 4.46) participated. Children and mothers reported in daily diaries for 14 consecutive days children's daily media consumption in the evening for different media types, sleep and alertness. Multilevel analyses revealed that at the between- and within-person level media consumption in the evening was negatively associated with sleep duration (self- and mothers' report). No associations were found for media consumption in the evening and alertness. The comparison of children's and mother's reports illustrated that there were significant differences. Mothers reported less media consumption in the evening, higher sleep duration and alertness of their children than the children themselves. Moreover, different media types displayed differed in effect sizes of associations with sleep duration, but not with alertness. Results suggest that it is important to investigate children's media use on a daily basis, from a dyadic perspective and for different media types separately. Future interventions should strengthen children's media use competencies and parent's competencies regarding the monitoring of their children's media consumption, especially in the evening.

Janina Lüscher PhD, University of Zurich, Zurich, Switzerland
Theda Radkte PhD, University of Zurich, Zurich Switzerland
Urte Scholz PhD, University of Zurich, Zurich, Switzerland

Abstract 2: The interplay between intra- and interpersonal emotion regulation in couples' in daily life: results from dyadic ambulatory assessment

There is rising evidence that also in adulthood emotion regulation is not an exclusively intrapersonal but does also involve interpersonal processes. Less is known, however, about the interplay between intrapersonal and interpersonal emotion regulation strategies. In the current study, the interplay of intra- and interpersonal regulation strategies was investigated during the daily life of

couples facing the transition to retirement. Furthermore, intrapersonal emotion regulation was support by an online expressive writing task in the middle of the assessment period, which allowed capturing possible changes in the impact of certain interpersonal strategies. N=50 couples reported in this dyadic online-diary study twice a day over 14 days affective wellbeing and relationship quality in the morning and evening. In the evening report, they additionally reported intra- and interpersonal emotion regulation and adjustment symptoms (failure to adapt, preoccupation). After one week, all participants were asked to write their deepest thoughts and feelings about the current transition in an online expressive writing task. Results of multilevel Actor Partner Interdependence Models reveal correlated change in intra- and interpersonal strategies of emotion regulation, and momentary affect and relationship quality. Disclosure as an interpersonal emotion regulation, was associated with more positive affect only after the writing task. Results suggest a significant interdependency between intra- and interpersonal regulation strategies. Improved intrapersonal cognitive-affective regulation seems to be associated with more beneficial ways of co-regulation via social sharing.

Andrea B. Horn PhD, University of Zurich, Zurich, Switzerland
Vanessa Rosenberger BSc, University of Zurich, Zurich, Switzerland
Sarah Holzgang MSc, University of Zurich, Zurich, Switzerland

Abstract 3: Companionship is associated with better affect and relationship satisfaction, but links with health behavior depend on partner behavior in couples

One form of social interaction is companionship (i.e., enjoyable shared activities). Social support has been studied extensively while companionship has received far less attention. In cross-sectional studies companionship was related to higher relationship satisfaction and less negative affect. However, companionship has not been investigated in daily life, from a dyadic perspective, and in the context of health behavior change. Therefore, this study aimed to examine associations between companionship, relationship satisfaction, affect and health behavior change in single- and dual-smoker couples. Couples with one smoker and a non-smoking partner (N = 100) or two smokers (N=83) reported in daily smartphone-based diaries for 32 consecutive days around a self-set quit date number of cigarettes smoked, relationship satisfaction, positive and negative affect and companionship. Data were analyzed with dyadic multilevel analyses using a dyadic score model. On days with higher companionship, couples reported more relationship satisfaction, more positive affect and less negative affect in both couple constellations. On days with higher companionship differences, couples reported more differences

in relationship satisfaction and affect. Smokers with non-smoking partners reported less smoking with higher companionship whereas smokers with smoking partners reported more smoking with higher companionship. A novel dyadic intensive longitudinal approach was applied to analyze companionship in romantic couples' everyday life around a self-set quit date. The findings show that companionship is associated with more relationship satisfaction and better affect, but ambivalent effects for smokers' health behavior, depending on partner behavior.

Gertraud Stadler PhD, University of Aberdeen, Aberdeen, Schottland
Janina Lüscher PhD, University of Zurich, Zurich, Switerzland
Urte Scholz PhD, University of Zurich, Zurich, Switzerland

Abstract 4: Within-person effects of goal setting: A micro-randomized trial to reduce sugar-sweetened beverage intake

Although health behavior change is a within-person phenomenon, it has mostly been studied using between-person methods. Intensive observational studies of daily health behavior change are greatly advancing our understanding of within person processes. However, they do not allow for causal conclusions. Our objective was to provide a within-person experimental test of a standard behavior change technique, goal setting. In this micro-randomized trial (N = 140, 28 days), participants reported their sugar-sweetened beverage consumption and related cognitions twice daily. Sequences of goal days and non-goal days were randomized within participants. On goal days, participants were prompted to set a realistic yet challenging goal to reduce their sugar-sweetened beverage consumption. We analyzed the data using linear mixed modeling. The results indicated a main effect of goal setting within persons. On goal days, persons consumed on average 25 ml less sugar-sweetened beverages than on non-goal days (SE = 12, p = 0.039), when they consumed 340 ml (SE = 24). No carryover effects were observed. There was substantial between-person heterogeneity in treatment effects, indicating that the within-person effect of goal setting ranged from a decrease of -145 ml to an increase of 95 ml in daily sugar-sweetened beverage consumption. For the first time, our study showed the within-person effect of goal setting in a fully powered micro-randomized trial. Consistent with between-person studies, the effect of goal setting was small, but significant, confirming this to be a potential technique to promote health behavior. Our investigation did not show any carryover of the goal-setting intervention to non-goal days, indicating the suitability of goal setting for within-person trials.

Jennifer Inauen PhD, University of Bern, Bern, Switzerland
Urte Scholz PhD, University of Zurich, Zurich, Switzerland

Niall Bolger PhD, Columbia University, New York, USA

Experience Sampling Studies of Psychopathology across the Schizophrenia Spectrum

Chair: Inez Myin-Germeys PhD, Center for Contextual psychiatry, Department of Neurosciences, KU Leuven, Leuven, Belgium

Discussant: Inez Myin-Germeys PhD, Center for Contextual psychiatry, Department of Neurosciences, KU Leuven, Leuven, Belgium

It is well-established that stressful life events can exacerbate clinical symptoms across the schizophrenia spectrum. Furthermore, deficits in hedonic experience and motivation have been linked to reduced reactivity to pleasant life events. Nonetheless, assessments of clinical symptoms and functional deficits in schizophrenia and related disorders have historically been cross-sectional and made independently from documentation of life events that may contribute to the severity of symptoms. The Experience Sampling Method (ESM) involves obtaining numerous reports of clinical symptoms and life events both within and across days, enabling researchers to investigate how life events influence clinical symptoms longitudinally. This, in turn, allows researchers to study the origins of symptoms such as delusions, hallucinations, anhedonia, and avolition, in terms of reactivity to real-life events. The research described in this symposium will describe applications of the ESM technique to the study of diverse phenomena in schizophrenia and related disorders.
First, Prof. Dr. Ulrich Reininghaus will discuss mechanisms of momentary self-esteem, elevated stress reactivity, aberrant salience, and enhanced threat anticipation in early psychosis (EP) individuals. Next, Dr. Thomas Vaessen will share findings on affective and symptomatic recovery from daily life stressors in EP and chronic psychosis (CP) populations. Dr. James Waltz will then discuss reward-processing abilities in EP and combine neuroimaging data with ESM data on reward sensivity in everyday life. Finally, Dr. Zuzana Kasanova will show results of an ESM study on social reward sensitivity in CP and its consequences for daily functioning.

Abstract 1: Putative psychological mechanisms in early psychosis

While contemporary models of psychosis have proposed several putative psychological mechanisms, how these impact on individuals to increase intensity of psychotic experiences in real life remains unclear. We aimed to investigate whether reduced momentary self-esteem, elevated stress reactivity, experiences of aberrant novelty and salience, and enhanced anticipation of threat contribute to the development of psychotic experiences in daily life. We

used Ecological Momentary Assessment (EMA) to measure momentary self-esteem, stress reactivity, aberrant salience, threat anticipation, and psychotic experiences in individuals with First-Episode Psychosis (FEP), individuals with an Ultra-High-Risk state for psychosis (UHR), and controls with no personal or family history of psychosis. Linear mixed models were used to account for the multilevel structure of EMA data. In all three groups, reduced momentary self-esteem, elevated stress reactivity, aberrant salience, and enhanced threat anticipation were associated with an increased intensity of psychotic experiences. Reduced momentary self-esteem, elevated emotional reactivity to outsider status, and aberrantly salient experiences were more strongly associated with psychotic experiences in UHR individuals than controls. Elevated emotional reactivity to minor stressful events, activities and areas, and enhanced threat anticipation were associated with more intense psychotic experiences in FEP individuals than controls. Our findings suggest that momentary self-esteem, stress reactivity, aberrant salience, and threat anticipation are putative psychological mechanisms that may be targeted by novel ecological momentary interventions in the development of psychotic experiences in daily life in the early stages of the disorder.

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Abstract 2: Recovery from daily-life stressors in early and chronic psychosis

Initial affective and psychotic reactivity to daily stressors is altered in psychosis, and most notably in early psychosis. In addition to altered initial stress reactivity, results from studies using experience sampling methodology (ESM) and psychophysiological measures indicate that impaired recovery from mild stressors may also be a risk factor for mental illness. I will present results on an ESM study investigating affective recovery from daily stressors in chronic psychosis (CP; n=162), early psychosis (EP; n=127), and healthy volunteers (HV; n=220) assessing fluctuations in negative affect (NA), tension, and suspiciousness ten times a day on six consecutive days. In this study, recovery was operationalized for all three variables as the return to baseline (i.e. level at t-1) following the first stressful event of a day (i.e. t0). The EP group showed a delayed recovery of NA (t1 – t3; on average 270 minutes) and suspiciousness (t1; on average 90 minutes) compared to HV and CP. Delayed recovery was detected for tension as well (t1 – t2; on average 180 min), but contrary to both other momentary states, this effect disappeared when controlling for subsequent stressful events. There were no significant differences in recovery between HV and CP. These results suggest that in EP stressful daily events have

longer-lasting effects on overall negative affect and subclinical psychotic-like experiences. These observations may have important consequences for ecological momentary intervention strategies aiming to assist EP individuals in coping with everyday stressful situations.

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Abstract 3: Reinforcement-Learning-related Neural Signals Predict Reward-Oriented Behavior in the Daily Lives of Individuals at Early Stages of Psychosis

Motivational deficits are thought to be an integral feature of the psychotic disorders and are even believed to precede its onset and predict worse outcome. Extrapolating from chronic psychosis, it has been hypothesized that impaired aspects of reinforcement learning (RL) accompany and contribute to motivational deficits in adolescents and young adults experiencing attenuated psychotic symptoms, even if those individuals have not manifested a full-blown psychotic illness. A critical aspect of successful reinforcement learning is the signaling of mismatches between expected and obtained rewards, called

reward prediction errors (RPEs). In 26 individuals in early stages of psychosis, we explored the link between neural signaling of RPEs and the tendency to engage in reward-oriented behavior in daily life, by having participants undergo functional Magnetic Resonance Imaging (fMRI) scanning as well as 6 days of ecological momentary assessment (EMA). We observed that RPE signals in the striatum predicted daily-life reward-oriented behavior in the entire sample of participants. These findings indicate that RL-associated neural signals relate systematically to measures of real-world reinforcement learning patterns, which themselves have been found to relate to the severity of motivational deficits in individuals on the psychosis continuum. This finding connects, for the first time, neural reward processing to its correlates in daily life, thus offering a crucial ecological validity to the neurobiology of motivational impairments in psychosis.

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Abstract 4: Social reward-oriented behavior in psychosis. An experience sampling study

Asociality in psychosis has long been considered an integral part of the negative symptomatology of the disorder, and believed to be manifested through diminished enjoyment of and pursuit of social rewards. The DSM-5 appended the conceptualization of asociality in psychotic disorders, however, as diminished interest in social interactions, but it also admitted that it might merely be the result of limited opportunities for social interactions. In an effort to investigate this apparent dichotomy, we used experience sampling data from 149 patients with psychotic disorder and 143 controls, and divided their social interactions into those occurring in the context of work and other structured activities that patients have limited access to, and those occurring in the context of unstructured activities such as visits and conversations that both groups can choose relatively more freely. Patients spent significantly smaller proportion of their time in structured social context, but matched the controls in the time spent in unstructured social contexts, and endorsed intact hedonic experience of both social contexts. Moreover, employment and living situation, in addition to the severity of symptoms of avolition, predicted the proportion of time patients spent in structured and unstructured social contexts, supporting

the notion that both lifestyle as well as disease-specific factors contribute to real-life social reward-oriented behavior in psychosis.

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On a personal level: personalized ESM in clinical practice

Chair: Inez Myin-Germeys PhD, Center for Contextual psychiatry, Department of Neurosciences, KU Leuven, Leuven, Belgium

Experience sampling methodology (ESM) has been used now for several decades to monitor life experiences in an ecologically valid way. To improve on diagnostics and treatment, in many medical disciplines patients are asked to monitor, for example, their own blood glucose levels or blood pressure by repeated ambulatory assessments. Also in psychiatry, diagnosis, intervention selection and treatment focus can be improved when patients monitor their own daily symptoms, stressful experiences, social context and activities. However, earlier research also indicated that in order to become an effective and acceptable add-on tool, ESM needs to be personalized for each individual patient. Although this is technically possible nowadays, the challenge will be to develop an intuitive and time efficient tool that can be used in clinical practice by both patients and clinicians. In this symposium, we aim to update you on recent innovative developments of implementation of ESM in clinical practice. In this symposium, Harriëtte Riese will introduce the topic in more detail by presenting the background of scientific evidence and practical applications of ESM in clinical care. Next, Fionneke Bos will present the flexible interface tool (PErsonalized Treatment Real-time Assessment, PETRA) that is currently developed at the psychiatry department she is affiliated. With PETRA, a therapist can initiate a personalized ESM assessment during a regular treatment session, including only the items that are relevant for the specific patient who is going to fill-out the diary. After data collection is finalized, personalized feedback can be generated. Next, Zuzana Kasanova and Laura Bringmann will elaborate on possible feedback modules. Zuzana Kasanova will highlight end-users input on ways to lever.

Abstract 1: Introduction on personalized ESM in clinical practice

In this introduction, a rationale is given why we should consider a scientific method as ESM, designed for data collection, as a tool in mental health care. In our opinion, one of the main goals of a diagnostic system should be that it

improves on the matching of the right patients to the right treatment. It is becoming increasingly clear that our current (e.g. DSM) diagnostic classification does not represent clinical reality, as patients with the same diagnosis are highly heterogeneous in terms of symptomatology, underlying pathophysiological mechanisms and clinical course. Also, comorbidity is high and patients with different diagnoses may show overlapping symptom profiles. This heterogeneity likely plays a role in the overall modest efficacy of current treatments. A recent refinement is the addition of dimensional measures, assessed with questionnaires, which allow patients to score differently on different dimensions of symptoms. However, ideally, we would need another level of refinement to improve diagnostic assessment, as the use of dimensional symptom measures is still not optimal. These are outlined in the current presentation, arguing that personalized ESM before, during and after treatment may be useful to monitor symptoms and potentially predict relapses.

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Abstract 2: PErsonalized Treatment Real-time Assessment (PETRA): a flexible interface to generate a personalized diary

The experience sampling method (ESM, electronic diary), which involves asking patients to record their experiences several times a day, may be highly relevant for mental health care. Research in our group (Bos et al., submitted) revealed that clinicians and patients believe ESM could be relevant in every phase of care to increase patients' awareness, insight, self-management, personalize interventions, and alert patients to rising symptoms. Based on these studies and subsequent focus groups with patients, clinicians, researchers, ICT- and data storage experts, a blueprint for a flexible interface to generate a personalized diary was developed. We are currently implementing this blueprint, named PErsonalized Treatment Real-time Assessment (PETRA) in clinical practice. PETRA has four core features. First, it is a tool to initiate personalized EMA for including only the relevant items for the specific patient who is going to fill-out the dairy. Second, diary initiation and feedback generation is fast and thus feasible during a regular treatment session. Third, PETRA is equipped with a scientific decision support, which concerns, among others, the duration of the assessment, the measurement frequency, momentary or retrospective assessment and random or fixed assessment. Forth, data handling is performed in the Electronic Patient Dossier on our hospital server, which meets all current privacy and safety regulations. During the presentation, the procedure of initiating a personalized diary is shown and the blueprint of the feedback

module will be elaborated on. With PETRA we intent to generate reliable visual feedback of personalized data. Ultimately, we aim to create a tool that helps to improve the patient-clinician relationship and increases efficiency of care.

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Abstract 3: Leveraging ESM-based feedback in mental health care: end-user perspectives and long-term sustainability

Digital mental health (DMH) interventions incorporating the Experience Sampling Method (ESM) have revolutionized clinical research, the commercial health and wellbeing marketplace, as well as the daily lives of the end user. In particular, the ESM self-monitoring data that reveal the psychosocial individuality of each patient have shown to have the greatest therapeutic potential, and yet have not been sustainably implemented in clinical settings on a large scale. A major obstacle is the traditional clinical scientific approach of discovery, pilot, efficacy and effectiveness testing that omits critical implementation science principles. The first stepping stone includes devising strategies, together with the end users, to leverage new affordances of digital technologies and ESM in novel DMH interventions. This talk will offer empirical evidence from two sets of focus groups with the end users i) individuals with psychosis provide their input on ways to better capture their symptoms, mental states and experiences using ESM, and how to fit this assessment method into

their daily lives; ii) psychologists and psychiatrist inform us on ways to leverage ESM-based DMH interventions in real-life mental health care settings. Specifically, ways to increase the clinical uptake of ESM-based DMH interventions, as well as their long-term sustainability in the existing pathways of care will be highlighted.

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Abstract 4: Personalized feedback: the movie

In an effort to bridge the gap between clinical research and practice, more and more clinicians and researchers are using some form of experience sampling method to monitor, for example, individuals with depression in their normal daily life by repeated assessments on patients' smartphones. These kinds of intensive longitudinal time-series data give a wealth of information, but also lead to many new methodological challenges. These challenges, such as the typical nonstationary nature of these data, limit the use of statistical techniques. We argue that a first step would be to visualize the data more insightfully, as it is lived, as a movie. In this presentation, we will highlight a new visualization technique that we have recently developed in the free software R. With this technique, one can visualize the time-series data in a dynamic way, revealing when and in what contexts an individual is heading towards, for example, a relapse. The possibility for feedback and interventions with this visualization technique are showcased through a case study.

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Innovative statistical approaches for empirical researchers working with intensive longitudinal data

Chair: Andreas B. Neubauer PhD, DIPF | Leibniz Institute for Research and Information in Education

The almost exponential growth in the utilization of intensive longitudinal data over the last decade has been paralleled by an equally impressive growth in the development and refinement of approaches to analyze these data. Often, however, advanced statistical methods and empirical research questions co-evolve without too much overlap between these two fields. With this symposium, we aim at bridging the gap between the development of new data analytic techniques and empirical research. All four talks of this symposium will present a novel / underutilized statistical approach alongside an empirical example demonstrating its application to address substantive empirical research questions. Neubauer et al. will introduce a within-person latent change score model to investigate within-person fluctuations in true within-person change; these models are applied to examine day-to-day fluctuations in morning-to-evening change of affect in children. Schuurman et al. present genetic twin models in a dynamic SEM framework targeting the heritability of dynamic features of states. They demonstrate the application of these models in a study examining heritability of mood dynamics in twins. Schmiedek et al. present an approach to examine causal effects (via encouragements) in everyday settings when perfect adherence to the treatment is not to be expected. This approach is demonstrated in a sample of medical students, investigating the effect of implementation intentions on learning goal achievement. Bolger et al. target heterogeneity in causal effects by employing Bayesian mixed models. They demonstrate the application of these models in two intensive longitudinal studies and four experimental studies.

Abstract 1: The changes they are a-changin': Assessing within-person fluctuations in within-person change using multilevel latent change score models

Change is of central interest to almost all disciplines of psychology. From a psychometric perspective, the assessment of change has been heatedly debated, which has spawned an impressive volume of models aiming to investigate true ("error-free") change. Most of these approaches target between-person differences in change ("Do some people change more than others?") and comparatively little attention has been paid to assessing within-person differences in change ("Do the same people sometimes change less and sometimes more?"). In this talk, we present an extension of latent change score models for intensive longitudinal data which, under most conditions, are better suited to investigate within-person fluctuations in within-person change than common alternative approaches (e.g., difference scores). We will demonstrate

the application of these models to ambulatory assessment data collected among children (N = 119, 9-12 years), examining day-to-day fluctuations in morning-to-evening change in well-being. In this study, we aim to examine whether children show more decrease (increase) in affective well-being from morning to evening on days when they experienced greater competence dissatisfaction (satisfaction) in school than usual (i.e., we examine the within-person association of competence (dis)satisfaction and morning-to-evening change in affect). Results showed that day-to-day fluctuations in success and failure experienced in school were associated with true morning-to-evening change in affect, with competence satisfaction being associated with an increase in well-being, and competence dissatisfaction being associated with a decrease in well-being.

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Andrea Schmidt M.Sc., DIPF | Leibniz Institute for Research and Information in Education, Frankfurt, Germany
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Abstract 2: Multilevel dynamic twin modeling

Genetic twin models have traditionally been used to investigate what part of the variance of certain cross-sectional variables is due to genetic influences and what part is due to environmental influences. This is done by making use of data supplied by monozygotic and dizygotic twins – if the monozygotic twins are more similar than dizygotic twins this can reveal something about the variable's heritability. Typically, these twin models are applied to cross-sectional data to investigate the heritability of interindividual differences between persons for certain stable traits, for instance, the heritability of IQ, or overall experienced positive affect. By making use of intensive longitudinal data collected with twins it is possible to fit dynamic statistical twin models, to investigate the heritability of states, the fluctuations in a variable within persons over time. A recently developed model for this purpose, for single twins, is the Iface model (Molenaar, Smit, Boomsma & Nesselroade, 2012). In this presentation we will discuss a multilevel extension of this model that allows for making both population level inferences, as well as twin level inferences. The model will be illustrated with an empirical data set on the experienced 'zenn-ness' of the twins.

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Marieke Wichers Ph.D., University of Groningen, Groningen, Netherlands
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Abstract 3: Experiments in the wild: The within-person encouragement design

Evaluating causal effects of interventions targeting real-life behaviors is central to many research fields, including health, clinical, and educational psychology. To this end, experimental approaches using manipulations of behavior at the within-person level are to be preferred, yet challenging due to little control over treatment implementation. Here, a within-person encouragement design is proposed, which combines (a) the analysis of within-person couplings using multilevel models, (b) the experimental manipulation of a treatment variable at the within-person level, and (c) the use of random encouragements to induce exogenous experimental variation when strict treatment adherence is unrealistic. We introduce this new design together with a corresponding data analysis framework: instrumental variable estimation with two-level structural equation models. Using simulations, we show that the approach is applicable with feasible design dimensions (numbers of measurement occasions and participants) and realistic assumptions about adherence to the encouragement conditions. The approach is illustrated with an online experience sampling study with 357 medical students (251 female; Mean age = 26.11 yrs) during a phase (up to 30 out of 40 days) of preparing for an important exam. Of these students, 239 were randomly assigned to receive encouragements on randomly selected days to make implementation plans how to deal with a lack of motivation before reaching their self-set goals (number of questions worked on) for the day. Preliminary results revealed a rather low adherence to encouragements. The effect of making implementation intentions (after being encouraged to do so) on goal achievement was weak and critically depended on the operationalization of goal achievement.

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Jasmin Breitwieser M.Sc., DIPF | Leibniz Institute for Research and Information in Education, Frankfurt, Germany
Garvin Brod Ph.D., DIPF | Leibniz Institute for Research and Information in Education, Frankfurt, Germany

Abstract 4: Causal heterogeneity in experimental and intensive longitudinal data

Given the units studied in the social and biological sciences are complex and dynamic entities, it makes sense that each person (or animal or group) has unique qualities that distinguish them from others in a population. The goal of this talk is to show that causal theories must allow for such intrinsic heterogeneity. We do so using six datasets, four of which involve repeated measures experiments and two of which are intensive longitudinal studies. For each dataset, we demonstrate how Bayesian mixed models allow one to document the existence, extent and the sources of causal heterogeneity.

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Katherine S. Zee, M.Phil., Columbia University, New York City, New York, USA
Maya Rossignac-Milon M.Phil., Columbia University, New York City, New York, USA
Megan Goldring B.A., Columbia University, New York City, New York, USA
Ran R. Hassin Ph.D., Hebrew University, Jerusalem, Israel

Beyond stressor exposure: Exploring anticipation of and recovery from stressors experienced in daily life

Chair: Andreas Neubauer Ph.D., DIPF | Leibniz Institute for Research and Information in Education

Experiencing minor stressor (often referred to as hassles) in everyday life has been found to be frequent and to impact on individuals' affect, health, and cognition. Previous studies using ambulatory assessment have, however, often restricted their attention to the bivariate association of stressor occurrence and indicators of affective well-being (e.g., negative affect), thereby neglecting the temporal space before and after the occurrence of the stressor (stressor anticipation and recovery). This symposium aims at filling this gap in the literature. Three talks target the temporal space of stressor anticipation: Neupert et al. investigate whether anticipatory coping (efforts to prepare for the consequence of an upcoming stressor) moderates the effects of anticipatory stress in a daily diary study surrounding the 2018 U.S. midterm elections. Dickens et al. investigate the predictive validity of anticipated stress on the occurrence of daily hassles. Utilizing an EMA design, they show that anticipated stress in the morning (but not in the prior evening) predicts the occurrence of daily hassles. Kramer et al. investigate perseverative thoughts as a potential mediator of the association between stressor forecasting and negative affect in an EMA via dynamic structural equation models. The fourth talk examines the processes after stressor occurrence: Pasquini et al. examine inter-individual differences in the speed of recovery from daily hassles in a sample of breast cancer survivors. Their results show that (person-level) cancer related distress was associated with a more persistent effect of daily hassles on

negative affect. Together these four talks expand our knowledge of the psychological response to daily hassles and pave the way for future studies in this area.

Abstract 1: Daily anticipatory coping with election stress

Elections are associated with activation of the stress response (Stanton, LaBar, Saini, Kuhn, & Beehner, 2010) and function like other major life event stressors (Bhugra & Ram Gupta, 1996). Interestingly, stress responses may be the most pronounced prior to the outcome, with voters reporting higher levels of positive and negative affect at the ballot box compared to the night when results are announced (Waismel-Manor, Ifergane, & Cohen, 2011). We know from our past work that national elections can alter the ways in which participants respond to their own personally-relevant daily stressors that are unrelated to politics. We found within-person increases in negative emotional responses to daily stressors from before to after the 2016 U.S. Presidential election (Neupert, Bellingtier, & Smith, 2018). In the present study, we leverage the shared experience of elections to expand the utility of anticipatory coping. Once a future stressor is perceived as unavoidable, anticipatory coping processes may be initiated. Anticipatory coping involves efforts to prepare for the stressful consequence of an upcoming event that is likely to happen (Feldman & Hayes, 2005). We collected 1,197 daily reports from 138 people across 35 states who began the study on October 15, 2018 and completed online surveys each day until November 13, 2018. The U.S. midterm election was November 6, 2018. Results from multilevel models indicated significant within- and between-person variability in anticipatory stress (expected feelings of stress) and coping with next-day election stressors. Daily anticipatory coping with election stress consistently interacted with daily anticipatory stress to predict both daily negative affect and intention to participate in political activities.

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Emily L. Smith B.A., North Carolina State University
Jennifer A. Bellingtier Ph.D., Friedrich Schiller University Jena

Abstract 2: Morning predictions about today's subjective stress prospectively predict reporting of stressors

Prior studies have established associations between forecasted stressors (i.e., "Will something stressful happen?") and stressor occurrence (i.e., "Did something stressful happen?") and between anticipated (i.e., "How stressed will you feel?") and experienced subjective stress (i.e., "How stressed do you feel?"). We extend this research to evaluate the relation between anticipated stress and stressor occurrence. For 14 consecutive days, participants (Npersons=260, age=25-65) rated each evening how stressful they anticipated

the next day would be and each morning rated how stressful they anticipated that day would be. Participants also completed five surveys throughout the day on which they reported occurrences of stressful events. Within and between persons, greater anticipated stress in the morning predicted greater odds of reporting a stressor, even after controlling for demographics. Within-persons, on days when participants anticipated greater stress levels for the day, they were more likely to report a stressor later that day. The between-person effect indicates that individuals who on average across the study tended to anticipate greater subjective stress were more likely to report stressors on any given day. Stress anticipation from the prior evening did not significantly predict odds of reporting stressors either between- or within-persons, and age did not moderate the association between anticipated stress and reporting of stressors. These results demonstrate that morning anticipated subjective stress prospectively predicts stressor occurrence and suggest that proximal anticipation is a better predictor of experienced stressors than distal anticipation.

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Andreas B. NeubauerPh.D., DIPF | Leibniz Institute for Research and Information in Education
Martin J. Sliwinski Ph.D., Pennsylvania State University

Abstract 3: Can't get them out of my head: The role of perseverative thoughts in the association of anticipatory stress and affect

Anticipatory stress can have detrimental effects on cognitive performance and emotional well-being (Hyun et al., 2018; Neubauer et al., 2018). It has been suggested that perseverative or repetitive thoughts during the anticipation period (i.e., in absence of a concrete stressor) constitute a key mechanism driving these effects (Brosschot et al., 2006). The aim of the present paper was to investigate this hypothesized mechanism on the within-person level and to examine fine-grained temporal dynamics. To that end, we analyzed data from an intensive longitudinal study (N = 243, 25-65 year olds; 14 days, 5 measurement occasions per day). Using dynamic structural equation models, we investigated the effect of forecasting a stressor within the next hours (assessed at time t-1) on affect at the subsequent measurement occasion (at time t). Additionally, we included the effect of stressor forecasting on recent perseverative thoughts (measured at time t) as well as the effect of recent perseverative thoughts on affect (at time t) in the model. Effects on negative affect (NA) and positive affect (PA) were estimated separately. Both models revealed an indirect effect through perseverative thoughts, which is in line with the assumption that perseverative thoughts mediate the effect of stressor forecasting on NA (point estimate and 95% Credible Interval: 0.15 [0.07, 0.24])

and PA (point estimate and 95% Credible Interval: 0.05 [0.09, 0.02]), respectively. These effects remained after controlling for stressor exposure, current stressor forecasting, and lagged affect. Taken together, these findings suggest that perseverative thoughts may play an important role in explaining the detrimental effects of stress anticipation on emotional well-being.

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Abstract 4: Identifying the time course of emotional responding and recovery to everyday stressors in breast cancer survivors

Breast cancer diagnosis and treatment can result in considerable psychological distress. Surprisingly little research has examined stress processes in the survivorship period, when some women continue to struggle with negative emotions related to their cancer experience. Using ecological momentary assessment (EMA), we examined within-person variation in negative affect (NA) following daily stressors and the potential moderating effects of individual differences in cancer-related distress. Female breast cancer survivors (N=47, mean age=52.87, 6-36 months post-treatment) were enrolled in a 14-day EMA study. Prior to EMA, participants reported their level of cancer-related distress using a modified version of the Impacts of Events Scale (Weiss, 2007). Participants completed up to 5 EMA each day, reporting on current NA and whether a stressor had occurred. If a stressor was reported, participants reported time since stressor (0-5, 5-10, 10-30, 30-60, ≥60 minutes). Multi-level models tested the relationship between stressor recency and NA. As a test of differential reactivity or recovery, we tested whether survivors higher in cancer-related distress reported higher NA to temporally proximal or distal stressors. NA was higher at all post-stressor intervals than non-stressor times (p's<.001). Survivors higher in cancer-related distress had higher NA at non-stressor observations (p<.04), a shallower increase in NA for proximal stressors (0-5 mins) (p<.01) and a steeper increase in NA for distal stressors (≥60 mins) (p<.01). Cancer-related distress was unrelated to differences in stressor-NA slope for all other post-stressor time intervals. In sum, greater cancer-related distress is related to higher NA in the absence of stressors and persistently elevated NA after stressors.

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From evidence on relationships of diet and physical behavior with mood towards tailored Smartphone-interventions in human everyday life

Chair: Markus Reichert MSc, Mental mHealth Lab, Department of Sports and Sports Science, Karlsruhe Institute of Technology (KIT), Department of Psychiatry and Psychotherapy, Central Institute of Mental Health (CIMH), University of Heidelberg, Medical Faculty Mannheim

Discussant: Genevieve F. Dunton PhD, MPH, Departments of Preventive Medicine & Psychology, University of Southern California, Los Angeles, California, USA

Diet, physical activity, and sedentary behavior shape human health and thus they are central intervention targets to counteract non-communicable health issues. Fortunately, digital progress allows to intervene on these behaviors in everyday life using Smartphones, a cost efficient way to provide support in situations where it is needed most. Accordingly, tailored Smartphone-Interventions offer many chances, but there is a large gap between technical feasibility and knowledge about effects in everyday life. To close this gap, our symposia tackles the complex bi-directional relationships between diet, physical activity, sedentary behavior and mood. In particular, Chih-Hsiang (Jason) Yang will present day-level associations between EMA-measured affect and novel accelerometer-derived physical behavior metrics in children. Tyler B. Mason will show how diet, physical activity, and sedentary behavior are associated with varying affect in pregnancy. Marco Giurgiu will present a study among healthy adults using a novel sedentary triggered algorithm to demonstrate that sedentary behavior influences mood negatively. Elena Koch will introduce a mobile-health exercise intervention targeting the prevention of comorbidities in individuals with ADHD. She will initiate the discussion how combining knowledge from health behavioral theories with upcoming evidence on real-life interventions can help to improve health behaviors. In the following interactive scientific exchange, we will develop ideas how to translate the current findings on relationships of diet, physical activity, and sedentary behavior with mood into evidence-based Smartphone-Interventions, thus taking a tiny step to pave the way for tailored mobile-health approaches.

Abstract 1: Exploring the Association Between Momentary Affective Variability and Daily Activity Pattern Metrics in Children

The prevalent inactivity level among children has become a global health issue. Emerging evidence shows that variations in affect may impact everyday activity patterns. Novel activity pattern metrics such as sporadic (i.e., intermittent) moderate-to-vigorous physical activity (MVPA) and sedentary breaks may provide health benefits and prevent chronic disease. It is unclear whether children's variability in momentary affect predicts their everyday activity pattern metrics independent of mean affective levels. The current Ecological Momentary Assessment (EMA) study examined the associations between variability in momentary affective states and daily activity pattern metrics as well as potential moderation effects (i.e., sex, Hispanic). Children (N=192, baseline age=8-12) completed 6-burst EMA across 3 years. Momentary positive and negative affect were assessed by 7 days of randomly-prompted EMA surveys at each burst. Averaged daily number sporadic MVPA events (i.e., bursts lasting <10 min) and sedentary breaks were derived from ActiGraph accelerometers across 6 EMA bursts. A novel analytic approach using MixWILD software tested how children's variability in momentary positive and negative affect predicted their overall daily activity patterns. High mean levels and low variability in positive affect were associated with more sporadic MVPA events (b=-1.22, p<.05). Lower variability in positive affect (b=2.83, p<.05) and greater variability in negative affect (b=-3.06, p<.05) predicted more sporadic MVPA events for girls than boys. Variability in momentary affective states did not predict sedentary breaks. Examining novel features of both affect and accelerometry data in EMA studies may advance tailored interventions to promote healthier behavioral patterns among children.

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Abstract 2: Bi-directional associations of affective states and energy balance behaviors among pregnant women using ecological Momentary Assessment

Energy balance behaviors (EBBs; e.g., diet, physical activity, and sedentary screen behavior) are important for preventing excess weight gain in pregnancy. The current analyses examined the acute bidirectional relationships between affective states and EBBs in pregnant women using ecological momentary assessment (EMA). Pregnant women (N=63) from Project 2 of the Maternal and Developmental Risks from Environmental and Social Stressors (MADRES) study completed two waves (i.e., first and third trimester) of four-day EMA bursts and responded to five random prompts per day about their current affective states and recent EBBs (n=1599 complete prompts). Multilevel models tested the within-subjects and between-subjects associations of affective states at one prompt predicting EBBs at the next prompt and associations between past two-hour EBBs and current affective state. Affective states did not predict subsequent EBBs. Sedentary behavior and pastry/sweet consumption in the past two hours were associated with less negative affect, and exercise in the past two hours was associated with greater positive affect. Pastry/sweet consumption in the past two hours was related to feeling more energetic. Results show that EBBs may be associated with varying affective states after engaging in the behaviors but affective states did not predict EBBs. Affect after behaviors may be a factor that maintains the behaviors in pregnancy, which could be associated with long-term behavior change.

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Abstract 3: Sedentary behavior is negatively associated with mood: An ambulatory assessment study among healthy adults

Introduction: Physical behavior is a key factor for human health. There is growing evidence that physical activity and sedentary behavior have independent and distinct effects on somatic health. However, whether this differentiation is also relevant for mood dimensions is so far largely unknown. To investigate whether sedentary behaviors influence mood dimensions, we conducted an Ambulatory Assessment (AA) study in the everyday life of 92 university employees over 5 days. Methods:. We used accelerometers to measured sedentary behavior and smartphone-diaries to assess mood repeatedly in everyday life. We applied a sophisticated sedentary-triggered algorithm and used multilevel statistics to model the within-subject effects of sedentary behavior on mood. Results: 15-min intervals of sedentary time (prior to each smartphone-assessment) and 30-min intervals of uninterrupted sedentary behavior ('sedentary bouts') were negatively related to affective valence and energetic arousal. Translated to practice these results show that the more participants were sedentary, the less they felt well and energized. Discussion: Sedentary behavior, independently from physical activity, seems to be a risk factor because it is negatively associated with both somatic and mental health. Thus, future intervention studies should consider the two sides of the physical behavior coin: How should physical activity be promoted? and How can sedentary behavior be reduced?

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Abstract 4: Using mobile-health approaches to provide video-based exercise instructions and real-time feedback – an Ambulatory Assessment Intervention

Introduction: Since ecological momentary interventions (EMI) became present, new technological opportunities have opened up, e.g., providing video clips by smartphones, connecting accelerometers via blue tooth low energy to smartphones, and providing automated feedback to participants. However, studies leveraging all these potential advantages are rare.
Methods: We aimed to establish an exercise mobile-health (m-health)

intervention in a randomized-controlled trial targeting the prevention of comorbid obesity and depression in N=219 individuals with ADHD aged 14-50 years. Participants are monitored and supported in executing the exercise intervention across twelve weeks, using the m-health system.

Results: The m-health system, comprising a smartphone app and an accelerometer, provides exercise videos, goals of the week, and feedback on target parameters. A blue tooth low energy connection between accelerometer and smartphone enables an automated real-time feedback of both, accelerometer parameters (physical activity across the day) and app parameters (progress in the exercise intervention across the week). The feedback is generated by a server that receives the data via WIFI-connection, processes it in real time and sends it back to the smartphone every evening.

Conclusion: We will present a pilot study proving the feasibility of the system and technical challenges on the way to the implementation of the m-health exercise intervention into the everyday life of participants. Most importantly, we will focus our discussion on potential improvements of the m-health system by incorporating knowledge from health behavioral theories and upcoming evidence on real-life interventions fostering physical activity to pave the way for future AAIs.

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The Potential and Challenges of Person-Specific Models in Psychiatry

Chair: Harriette Riese PhD, Interdisciplinary Center Psychopathology and Emotion regulation, University Medical Center Groningen, University of Groningen

Using ecological momentary assessment (EMA), it is nowadays relatively easy to collect intensive time-series data of individuals' symptoms and daily life contexts. Such data allows us to create person-specific models of individuals' pathology. These models overcome the limitations of group-based models that are concerned with the "average" patient – which may not exist.

Person-specific models bear great potential for clinical practice, as they allow us to learn about individual patients. Further, their ability to distinguish what is unique to the individual from what is shared across individuals makes them an essential tool in investigating the mechanisms of psychopathology. Despite their potential, there are also methodological challenges, such as how to obtain generalizable results based on individual models, and how to select variables to include in the model.

We present four innovative studies in which person-specific models are central, but which use different approaches to gain insight in individual-specific and shared dynamic processes. Robin Groen will present findings on whether comorbid depression and anxiety is characterized by different dynamics as compared to stand-alone depression or anxiety, and whether group dynamics apply to individuals. William Woods will discuss Group Iterative Multiple Model Estimation (GIMME), a novel method which estimates (sub)group and individual level models applied within a mixed-diagnosis sample. Alberto Jover Martinez will show the predictive potential of individual networks on development of depression using a reward system model. Lino von Klipstein will outline how person-specific network models can be employed to help clinicians and patients in understanding the patient's pathology.

Abstract 1: Comorbidity Between Anxiety and Depression: The Role of Bridge Mental states in the Dynamic Network Structure.

In 2010, Cramer and colleagues introduced the network approach to psychopathology, which conceptualizes psychiatric disorders as a network of symptoms that are causally interacting. According to this approach, comorbidity arises due to direct interplay between symptoms of two separate disorders via overlapping (bridge) symptoms between two disorders. We test this hypothesis in the context of comorbidity between depression and anxiety, by comparing the dynamics of momentary mental states between individuals with comorbidity to individuals with either of the two diagnoses. We expect that the dynamics in the comorbidity group are characterized by stronger bridge momentary mental states (e.g., 'feeling irritable') as compared to the single disorder groups. Data come from The Netherlands Study of Depression and Anxiety (NESDA) in which 384 participants completed ecological momentary assessments of depressive, anxious and bridge mental states, five times a day, for two weeks. Of this sample 144 participants met criteria for comorbid depression and anxiety, 44 participants met criteria for depression-only, and 38

for anxiety-only. Coefficients from multilevel vector autoregressive models fitted within each group are used to compute the strength of bridge mental states. Group differences in the strength of bridge mental states are tested with permutation tests. To evaluate the generalizability of these group-level analyses to the individual, we will present person-specific dynamic mental state networks for individuals in each diagnostic group. In this manner, we provide insight into a prominent hypothesis of the network approach, and comment on the importance of person-specific models to gain insight into mechanisms underlying co-occurring disorders.

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Abstract 2: Integration of Nomothetic and Idiographic Approaches to Modeling Psychopathological Processes

Clinical psychological research is moving away from static, discrete diagnoses and toward process-based, transdiagnostic models of psychopathology. This transition has largely relied on nomothetic research principles which focus on the "average" case. Yet, practitioners and clinical theory typically conceptualize psychopathology as person-specific—rarely will the "average" case walk into a therapist's consulting room. We present an analytic technique, group iterative multiple model estimation, which incorporates both nomothetic and idiographic research methods to generate person-specific models which capture features shared across individuals as well as individual-specific features. We will use data from a mixed-diagnosis sample (N=79) who reported on their social interactions and affect several times per day over 21 days to highlight the

extent to which psychopathology is idiographic while discussing features that are shared across groups of individuals within the sample. We will then attempt to link these features to traditional measures of psychopathology and DSM diagnoses and discuss the contrast in information being collected in traditional nomothetic assessments and that presented using idiographic, dynamic processes. Finally, we will conclude with a case vignette to emphasize the incremental value in adding idiographic information to our understanding of psychopathological processes.

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Abstract 3: Can Individualized Reward System Networks Predict Depressive Symptomatology in Adolescents?

The reward system is an important mechanism in the etiology of depression and recently, reward dynamics have been translated to constructs that can be monitored in daily life, by examining the dynamics between positive affect, reward anticipation, and active behavior in a network model1. However, no study yet examined individual network models and their network characteristics to predict future course of depressive symptoms. That is the aim of this study, which we perform in a sample of 45 subclinically depressed adolescents between 16 and 25 years old with a Montgomery-Åsberg Depression Rating Scale score (MADRS) score over 10. We selected those that participated in an experience sampling procedure and provided at least 100 observations (with up to 10 assessments a day). Vector-autoregression models are used to model individual networks of the dynamics between positive affect, reward anticipation, and active behavior. The resulting individual network centrality indices and connectivity are used to predict course of depressive symptoms over 3 months, as measured with the MADRS. Given previous work, we hypothesized that higher ingoing centrality on positive affect as well intact reward dynamics, i.e. that positive reinforcement cycles can occur in the individual network model, predict better outcome.

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Abstract 4: Using Individual Networks in Clinical Practice: A Collaborative Approach

The network approach to psychopathology proposes that pathology arises from the direct causal interaction of symptoms. It has enjoyed much popularity in the field of psychiatry because this reasoning matches a lot of clinical theory and thereby rings intuitively true to researchers and clinicians. The introduction of methods to estimate relationships between symptoms and construct a network from the time series of an individual patient, has attached a practical promise to the network approach: creating a networks for an individual patient may allow us to understand that patient's pathological patterns and help select the right treatment target. The only efforts to practically implement this promise have been data-driven, implementing algorithms that create suggestions for the treatment. In my talk, I want to propose an alternative route to implementing the promise of individual networks – a collaborative approach. The basic premise of this approach is to involve the patient and their therapist in the creation of the ESM-based electronic diary that forms the basis for the individual network and later also involve them in the interpretation of the estimated network. I propose that this approach is able to adequately deal with the diversity of patients' pathologies and deal with the fact that networks are difficult to interpret without having detailed insight into the patient's life. Further, this approach can be well integrated into the clinical practice of case conceptualization. I will shortly introduce the Therap-i project, a randomized controlled trial our group is currently conducting to test this approach, and share case studies from this trial.

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Keeping pace with Actigraphy research: Recent innovations in actigraphy based time-series of depressed, bipolar, or schizophrenic patients

Chair: Harriëtte Riese PhD, Interdisciplinary Center Psychopathology and Emotion regulation (ICPE), Department of Psychiatry, University of Groningen, University Medical Center Groningen

The past few years have seen increased academic interest in actigraphy as a way to monitor physical activity. This interest was sparked by the unique advantages of actigraphy, which facilitates easy and ecological valid measurements while minimizing risks of social desirability and recall bias. Given the current academic interest in actigraphy, this symposium aims to present and elucidate recent developments in innovative statistical approaches of actigraphy based time-series of depressed, bipolar, or schizophrenic patients. The first presentation will focus on the technical aspects of handling large actigraphy datasets by introducing an automatisation solution for preprocessing steps and analysis of raw actigraphy data into sleep and circadian rhythms outcome variables. The second presentation will then introduce a large cohort study including individuals with and without a clinical diagnosis for depression, wherein actigraphy is used to compare levels of activity, amplitudes of 24 hour activity profiles, and timing of daytime activities, between depressed and non-depressed groups. The third presentation then focusses on actigraphy as a possible measure for apathy in patients with schizophrenia, as such apathy is associated with a decrease in goal-directed behaviour. This presentation furthermore elucidates the association of activity variability, quantity, and initiation with apathy severity. Lastly, the fourth presentation will demonstrate the feasibility of augmenting actigraphy with Ecological Momentary Assessment data by providing extensive and relevant information on regulatory variables such as mood, exercise, and life events. This research thereby provides innovative solutions for assessing complex human homeostatic networks.

Abstract 1: Automated management and analysis of physical activity data: Facilitating convenient sleep and circadian rhythm preprocessing and analysis

Actigraphy is a non-invasive technique to monitor gross motor movement. From the data provided by actigraphs, various indicators of sleep, activity, and diurnal rhythm can be calculated. The last years have seen an increased interest in the use of actigraphy, especially since actigraphy was validated against the golden standard of polysomnography for sleep outcome measures, and was found to be non-invasive, easy to use, and relatively cheap. However, there are a number of constraints in the current way of performing actigraphy research, which diminish its feasibility in handling the ever larger datasets and thereby general scalability of actigraphy research. We propose a solution in the form of the innovative ACTman (ACTigraphy MANager) R-package. ACTman is open-source and therefore free and easy to use by researchers, while supporting ongoing development and offering transparency in calculation and preprocessing steps. Thereby, ACTman allows actigraphy researchers to investigate larger samples and datasets, while decreasing chances of human error and increasing reproducibility. Moreover, we will present results indicating that ACTman substantially reduces analysis runtimes by automating data preprocessing steps, while offering analysis quality that is on par with proprietary software suites.

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Abstract 2: Diurnal patterns of physical activity during daily life in depressed and non-depressed individuals

Engaging in physical activity is known for reducing depressive symptoms. However, little is known about underlying mechanisms, and how patterns of

activity change during depressive episodes. We expected that compared to controls, depressed individuals would have lower level of activity, more damped amplitude of 24h actigraphy profiles and start their daytime activities later. We used 14-day continuous-actigraphy data from participants in the Netherlands Study of Depression and Anxiety (NESDA). Participants with a depression diagnosis in the past 6 months (n=58) or its subsample with acute depression (DSM diagnosis in the past 1 month, n=43) were compared to controls without diagnoses (n=63). Depression was diagnosed with a diagnostic interview. Actigraphy-derived variables were activity mean levels (MESOR), the difference between peak and mean level (amplitude) and the timing of the activity peak (acrophase), which were estimated with cosinor analysis. Compared to the control group, both depression groups (total: B=-0.003, p=0.033; acute: B=-0.004, p=0.005) had lower mean levels of activity. Amplitude was also damped, but in the acute depression group only (total: B=-0.002, p=0.065; acute: B=-0.003, p=0.011). Similarly, the timing of activity was marginally significant towards a later timing of activity in the acute, but not total depression group (total: B=0.206, p=0.398; acute: B=0.405, p=0.084). Concluding, our findings may be clinically relevant for understanding how changes in diurnal patterns of activity contribute to depression. Further prospective research is needed to disentangle the direction of the association between depression and daily rest-activity rhythms.

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Abstract 3: Actigraphy as an objective measure for apathy in schizophrenia

Apathy is regarded as a core negative symptom of schizophrenia and is associated with a loss of motivation, goal-directed cognitive activity and goal-directed behavior. Currently, apathy is measured with clinician-rated, performance-based and self-reported motivational measures. Despite being widely used, they have their limitations such as subjectivity. Hence, measuring apathy is still considered a challenge. Alternatively, actigraphy has been proposed as a measure of interest, since apathy is associated with a reduction

in goal-directed behavior. To investigate the potential of actigraphy as an objective measure for apathy, we investigated the association between motor activity and apathy in patients with schizophrenia. To this end, three groups were included: a healthy control group (HC; n=36), a group of patients with schizophrenia and lower levels of apathy (SZ-; n=29) and a group of patients with schizophrenia and clinical levels of apathy (SZ+; n=38). The Apathy Evaluation Scale was filled in and participants wore an actigraph for two full weekend days. Activity quantity (sum of activity counts), activity variability (root of the Mean Squared Successive Difference) and initiation of motor behavior (quantification of the number of times that steps were taken after 1 minute of no steps) were calculated. Significant group differences were found between all pairs of groups in activity quantity and activity variability (SZ+<SZ-<HC), but not activity initiation. Furthermore, reduced activity variability, but not activity quantity and activity initiation, was significantly associated with apathy severity. To conclude, actigraphy, particularly variability in activity, can yield valuable information on the presence and severity of apathy in patients with schizophrenia.

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Abstract 4: Mobile Assessment of Homeostatic Regulation in Activity, Sleep and Emotional States in the Motor Activity Research Consortium for Health (mMARCH)

There is now a growing number of studies that have employed ambulatory assessments to study mood regulation and disorders, particularly actigraphy and Ecological Momentary Assessment (EMA). However, there are many methodologic and substantive challenges involved in combining data across different platforms and domains of assessment. This presentation will describe the goals and progress of a collaborative international consortium, the Motor Activity Research Consortium for Health, mMARCH), that was established to harmonize research on actigraphy and EMA of mood disorders, particularly bipolar disorder (BPD). The collaboration includes a broad network of studies of BPD, related health conditions, and naturalistic developmental population samples. Combining data across studies will enable us to study the generalizability of our findings with respect to state versus trait, sex differences, subgroups of mood disorders, and geographic and seasonal variation, as well as to extend this work to other mental and general health conditions. Data from a community family study of mood spectrum disorders will be presented to demonstrate the feasibility of combining mobile electronic diaries with actigraphy, along with tracking of other domains including salivary cortisol and light exposure in community samples across the life span. This approach has shown that there may be broader cross-domain reactivity rather than differences in the level and variability in any one domain in people with bipolar disorder. The implications of these findings for future studies and interventions will be discussed.

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The daily effect of social interactions on well-being across contexts: Findings from childhood to college age

Chair: Andrea Schmidt MSc, DIPF | Leibniz Institute for Research and Information in Education

There is ample evidence for a human need to feel related to others (Baumeister & Leary, 1995; Deci & Ryan, 2000). However, there are still open questions on this matter: Is social inclusion simply the opposite pole of exclusion or do these two experiences qualitatively differ in their effects? Does the strength of the effect of social experiences on well-being differ across contexts (classroom vs. leisure time, peer conflict vs. family conflict)? Are there spillover effects across contexts (e.g., from school to home) and is it possible to intervene in this spillover effect on a daily basis? This symposium tackles these questions and aims to deepen our understanding of how social interactions affect well-being from childhood to college age and across contexts. All studies comprise intensive longitudinal designs with differing numbers of assessments per day, all allowing for the assessment of associations and changes within participants. Schmidt et al. demonstrate differential effects of the satisfaction and frustration of the need for relatedness on positive and negative affect in fourth graders. Zurbriggen et al. examine changes of affective well-being from sixth to ninth grade and compare affective states experienced during peer interactions at school with those during leisure time. Bernstein et al. explore the effect of social inclusion and exclusion on mood and basic psychological needs (i.e., belonging, self-esteem, control, meaningful existence) in College students. Finally, Bai et al. investigate the influence of family- and peer-related stress on daily mood and academic stress while further discussing the effect of an implemented mindfulness intervention on the daily spillover of stress. Our symposium thus covers the full range from observation to intervention.

Abstract 1: Exploring the Need for Relatedness in Children: Differential Effects of Relatedness Satisfaction and Frustration on Affective Well-Being

The need for relatedness is described as one of three fundamental human needs in self-determination theory (Deci & Ryan, 2000). The satisfaction of this need refers to feeling included and valued, whereas its frustration refers to feeling excluded or ostracized. Recent research has shown that the fulfillment of the need for relatedness is not a unidimensional construct, but that relatedness satisfaction and relatedness frustration represent two separate dimensions (Chen et al., 2015). Furthermore, it has been demonstrated that relatedness satisfaction and frustration show differential effects on well-being (e.g., Neubauer & Voss, 2018). Extending previous research based on studies with adults, we focused on children and their relatedness to peers at school. We hypothesized relatedness satisfaction to be uniquely associated with positive affect (PA) and relatedness frustration to be uniquely associated with negative affect (NA).

In a smartphone-based experience sampling study, 90 fourth graders (50 girls) reported their PA and NA, and their relatedness satisfaction and frustration over four weeks. Multilevel confirmatory factor analyses showed that a two-

factor solution had the best fit and thus supported the psychometric separation of relatedness satisfaction and frustration. Multilevel analyses showed differential effects within and between persons: Relatedness satisfaction significantly predicted PA, but not NA, whereas relatedness frustration significantly predicted NA, but not PA. We will further present results from a similar experience sampling study (108 fifth graders) aiming to replicate these results. The present findings emphasize the importance of considering both social inclusion and social exclusion for our understanding of well-being in children.

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Abstract 2: Peer interactions in everyday school life versus leisure time of adolescents and their emotional experience

Early adolescence is known as a period of less positive emotional states and relative instability. In addition, many teenagers are less likely to go to school than in the first years of primary school. At the same time, social interactions and get-togethers with peers become more important. Pair work or group activities in classroom can thus be considered as a source for academic motivation.
This study sought to examine first the change of students' emotional experience in the classroom in early adolescence. A second aim was to investigate students' affective responses while interacting with peers in the classroom as compared to leisure time or to being alone.
The first survey (t1) took place in classroom at grade 6, the second (t2) three years later in classroom and in leisure time at grade 9. By means of the experience sampling method, 116 adolescents (Mage = 12.4 years) reported their current activity, the social context and their emotional experience on M = 12.3 (t1) and M = 31.3 (t2) randomly selected occasions during one week each. Emotional experience was assessed with four items each on two scales, positive activation (PA) and negative activation (NA).
A multilevel latent difference analysis indicated, as expected, that students experienced much less positive emotional states (PA-, NA+) in classroom at the age of 15 than three years before. Furthermore, results of multilevel models showed that interactions with peers had a positive effect on students' affective states. This positive effect was more pronounced in leisure time than in

classroom.

This study provides evidence of positive influences on young adolescents' emotional experience while working with their peers. The significance of peer interactions at school will be discussed.

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Carmen L. A. Zurbriggen PhD, University of Bielefeld
Chantal Hinni, MA, University of Fribourg
Martin Venetz PhD, University of Applied Sciences of Special Needs Education Zurich

Abstract 3: The fundamental, every-day nature of the experience of exclusion: Using ecological momentary assessment to understand social ostracism

Social ostracism has been a hotly studied topic within social psychology for the past two decades. Nonetheless, debate over fundamental issues exist such as whether exclusion causes distress or whether differences between exclusion and inclusion are driven by inclusion feeling relatively good (e.g., Blackhart, et al., 2009; Gerber & Williams, 2009). We used EMA to examine how social exclusion, relative to no social interactions or experiences of inclusion, changed people's mood and basic psychological needs. 156 individuals (114 Female) were assessed for 7 days with 6 waves per day. Participants were asked to identify if they experienced a social interaction since the last wave and then to select words that best described the interaction (inclusionary words such as accepted, included; exclusionary words such as rejected, ignored). All participants completed items assessing their current mood and basic needs (i.e., belonging, self-esteem, control, meaningful existence). We used MLM to account for the nested data structure with observations (Level 1) nested within days (Level 2), nested within individuals (Level 3). On the within-person level, participants reported more positive outcomes (higher need fulfillment, higher positive mood, less negative mood) when they experienced inclusion and less when they reported an exclusion episode. On the between-person level, participants with more inclusion episodes reported more positive outcomes as well. The between-person effect for exclusion was significant for three of the four needs (and the combined need scale) and for positive mood, indicating that participants who, on average, experienced more exclusion, reported on average reduced belonging, control, and meaningful existence (but not self-esteem) and less positive mood.

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Abstract 4: Daily family and peer conflict in first-year college students: results from a randomized mindfulness intervention

The transition to college is accompanied by disruptions in the family system, as emerging adults gain new levels of autonomy (Baete Kenyon et al., 2009). Still, youths remain digitally connected with family members (Hofer, 2008), and high family conflict is linked to poorer adjustment (Johnson et al., 2018). Using ecological momentary assessments (EMA), this study examines daily interpersonal and academic stress in first-year college students. We hypothesize that college youths continue to experience family conflict, and that this predicts more peer conflict and academic stress. Comparing the two types of interpersonal conflict, we hypothesize that family conflict will have greater impact on mood and academic stress. Participants were 52 first-year students, enrolled in a randomized mindfulness intervention trial. During the trial, they completed four random EMAs per day, across three 8-day long bursts spaced three weeks apart. EMAs assessed mood, conflict with family and peers, and academic stress. In total, 3457 EMAs were completed. The frequencies of family (41%) and peer conflict (46%) were comparable. Academic stress was most frequently endorsed (85%). Preliminary multilevel regressions showed bivariate cross-sectional associations between family and peer conflict (B=0.64, SE=0.06, t=9.85, p<.001), and with academic stress (B=0.14, SE=0.06, t=2.28, p<.05). Additional analyses will test spillover of stress from one time point to the next, across domains, as well as the relative influences of family and peer conflict on academic stress. We will also evaluate the effects of the intervention on spillover patterns. Findings will extend our understanding of the stress during this developmental period, and identify specific targets of future interventions.

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Moé Kishida PhD, College of Health Solutions, Arizona State University
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Changes in ESM data: innovations in detecting change over time

Chair: Evelien Snippe PhD, University of Groningen, University Medical Center Groningen

The increased use of smartphones and wearables has made it feasible to monitor individuals for longer periods of time. Longer series of data open up new possibilities to capture the change in daily life experiences when people transition to an alternative state, e.g. to a depressed state or out of a depressed

state. However, most commonly used statistical techniques to analyze ambulatory data cannot detect such changes.

This symposium will present innovations to be able to study personalized change over time in ambulatory assessments. These techniques can form the basis for idiographic tools to signal changes in someone's mental or physical state.

The first and second presentation focus on techniques to detect structural changes in the mean and outliers in ambulatory data: change point analyses and statistical process control (SPC). Arnout Smit will demonstrate how SPC can be used to detect small shifts in ambulatory data in real-time and a deterioration of someone's mental state. Evelien Snippe presents a study on the application of change point analyses and SPC to examine whether sleep disturbances precede mood disturbances and can signal an upcoming manic or depressive episode.

The third and fourth presentation focus on ways to examine whether the dynamics among ambulatory data change over time. Eeske van Roekel presents a study on the impact of a personalized lifestyle advice on the change in dynamic associations among mental states. Laura Bringmann will present a method to examine gradual and abrupt changes in dynamics in ambulatory data: a time-varying change point autoregressive model.

Abstract 1: Real-time detection of prodromes using ESM data and Statistical Process Control

The field of Statistical Process Control (SPC) is the industry standard for real-time detection of changes in the functioning of some system or process (e.g. an airplane or a manufacturing process). One of the main goals is to detect (and potentially solve) small problems that may lead to more serious problems in the future. The presentation will provide the first demonstration of SPC in ESM data and illustrate the potential of SPC in a study examining whether an increase in restlessness may be an early sign of return of depressive symptoms. Seven patients with a history of depression answered the question 'I feel restless' three times a day in one continuous period during and after tapering of their antidepressants (an average of over 350 data points per patient). Using an SPC method, we evaluated after each data point if the running mean level of restlessness had significantly increased compared to a reference period. For the five patients that tapered without an increase in depressive symptoms, the running mean level did not increase significantly during the research period. The running mean level did increase significantly in the two patients who experienced an increase of their depressive symptom levels two months later. Using SPC, the increase in restlessness could have been detected in real-time, more than two months before depressive symptoms increased. SPC thus provides methods that allow early detection of a deteriorating mental state in

real-time, using individual patients' ESM data. In the future, SPC could potentially be applied in clinical practice to detect prodromes before the onset of a disorder, and may assist with clinical decision making aimed at prevention.

Arnout C. Smit, MSc, University of Groningen, University Medical Center Groningen, Department of Psychiatry

Abstract 2: The timing of sleep disturbances and mood shifts in the transition to a mood episode in bipolar disorder

Patients with bipolar disorder suffer from sleep disturbances during mood episodes. It is unclear whether sleep disturbances can signal an upcoming mood episode and whether they precede mood disturbances. This study shows how change point analyses and statistical process control (SPC) can be used to gain insight into this for individual patients. Thirteen patients with bipolar disorder were monitored for 180 days with continuous actigraphy and a daily mood diary. Sleep measures (sleep duration, timing of sleep onset, timing of sleep offset, sleep onset latency, sleep efficiency, composite phase delay) were calculated from actigraphy. Mood (positive affect, mania, agitation, dysphoria,) was assessed in the daily diary. Structural disturbances in sleep and mood were examined using change point analyses. Single nights of disturbed sleep were examined using SPC. The two weeks before and the week of the start of a mood episode were investigated in eight patients with both stable and mood episodes. In seven out of eight patients, both structural disturbances in sleep and single nights of disturbed sleep were observed before or at the start of a mood episode. There was no uniformity in the type of sleep disturbances. Sleep disturbances occurred both before structural shifts in mood, around the same time, and after structural mood shifts. Using change point analyses and SPC, we were able to detect both structural sleep disturbances and single nights of disturbed sleep before and during the transition to a mood episode. Individual differences were observed in the type of sleep disturbances. Sleep disturbances do not seem to be a unique trigger of a mood episode as shifts in mood occurred around the same time or before sleep disturbances.

Evelien Snippe PhD, University of Groningen, University Medical Center Groningen

Abstract 3: An exploration of changes in network dynamics after personalized lifestyle advice in anhedonic young adults

According to the network perspective on mental disorders, psychiatric symptoms affect each other in a dynamic way. However, little is known about whether such dynamics also change due to an intervention. The main goal of the present paper is to investigate how the network dynamics of depressive

symptoms change in a subclinical sample of anhedonic individuals who received a personalized lifestyle advice. We examined (1) the change in overall connectivity of the network of symptoms of depression and (2) the influence that different types of mental states (positive vs. negative) exert within the network (i.e., outstrength). 69 anhedonic young adults (aged 18-24) filled out ESM data 3x per day for one month before the intervention and 3x per day for one month after the intervention. Participants were randomly assigned to the control group (n=22), and the treatment group (N=47). The intervention consisted of personalized lifestyle advice, based on the observed patterns between lifestyle factors and pleasure in the pre-intervention month. Temporal networks were estimated using multilevel autoregressive models. We investigated changes in total network connectivity and outstrength of positive versus negative mental states by using permutation tests in R. The results showed no significant impact of personalized lifestyle advice on the network connectivity between mental states, nor on the relative effect of positive versus negative mental states within the network. Whereas previous research showed that personalized lifestyle advice increased mean levels of certain positive mental states (pleasure and PA), it did not change the network connectivity, nor did it affect the outstrength of positive mental states relative to the change in outstrength of the negative mental states.

Eeske van Roekel PhD, Tilburg University, Department of Developmental Psychology

Abstract 4: Detecting gradual and abrupt changes in dynamic processes

Recent research has described psychopathology as a complex dynamic system in which warning signals, such as an increase in the autocorrelation, precede getting into a depressive episode. Importantly, the type of change plays a key role in hypotheses about how individuals develop psychiatric disorders. Specifically, a gradual increase in the autocorrelation is thought to precede an abrupt change in which an individual transitions into depression. Current statistical developments, however, can model only one type of change; either gradual or abrupt change. Thus, a model that assumes gradual change will not be able to detect or represent abrupt changes, and vice versa. This will leave researchers and practitioners in the dark regarding when and how the change occurred and thus what would be the right timing to intervene. Therefore, it is crucial to be able to model both change processes, gradual and abrupt. In this talk I present such a model. More specifically I will use the time-varying vector-autoregressive (TV-VAR) model that is based on generalized additive models and will augment this model with a change point technique, leading to a TVCP-AR that can model both gradual and abrupt changes.

Laura Bringmann PhD, University of Groningen, Psychometrics and Statistics department

New methods and analytical approaches in ambulatory assessment research

Chair: Timothy Trull PhD, University of Missouri

This symposium will highlight new methods and analytical approaches in ambulatory assessment research. First, two studies will demonstrate the integration of laboratory measures and momentary assessment in daily life. Vebares et al. will present a study of the relations between cue-elicited (alcohol stimuli) reactivity in respiratory sinus arrhythmia (RSA) and both craving and drinking in daily life. Results suggest that greater RSA reactivity in the lab was significantly related to drinking in the moment. This suggests that elevated cue-elicited RSA may indicate an attempt to regulate stress and the failure to effectively do so may increase one's susceptibility to drinking. Next, Fleming et al. examined whether and how rumination in daily life is related to heightened resting state functional connectivity (rs-FC) between the ventromedial prefrontal cortex (vmPFC) and amygdala. Results indicate that vmPFC-amygdala rs-FC was significantly correlated with sadness and rumination at the momentary level. In the third talk, Freeman et al. collected EMA data on impulsivity and drinking in BPD and community alcohol drinkers to study the bi-direction associations between momentary impulsivity and drinking. Results reveal that momentary impulsivity significantly predicted alcohol consumption, and in addition number of drinks reported at a given moment and at the previous moment predicted rises in momentary impulsivity ratings. Finally, Griffin et al. examined differential patterns of association between momentary impulsivity facets and drinking behavior in daily life, accounting for intentionality of drinking that day. Results demonstrate differential patterns of prediction for individual facets of momentary impulsivity on planned versus unplanned drinking days.

Abstract 1: An Examination of the Effects of Cue-Elicited Respiratory Sinus Arrhythmia on Drinking in Daily Life

As defined by the DSM-5, craving is a preoccupation and strong desire to consume alcohol. Craving is an important focus for the treatment of addiction, given its strong association with alcohol dependence and relapse. The effects of craving can be long lasting and result in nervous system hyper-reactivity to drinking-related cues (e.g., images of alcohol, location, day of week, time of day, presence of others). Individuals who suffer from addiction commonly exhibit elevated cue-elicited parasympathetic activity, as indexed by respiratory sinus arrhythmia (RSA). Interventions that alleviate craving appear to decrease

RSA reactivity. Few studies have observed how cue-elicited reactivity assessed in the lab is related to drinking in daily life. It is hypothesized that individuals who exhibit greater RSA reactivity in the lab will be more likely to report drinking in daily life, as assessed via ecological momentary assessment (EMA). The sample included 29 individuals who reported drinking at least twice a week. Participants, primarily Caucasian women, who reported drinking at least twice a week completed an alcohol cue-reactivity task and rated craving using the Alcohol Urge Questionnaire, while electrocardiography signals were continuously collected. Participants were then asked to report on their craving and drinking behaviors, as well as who they were with and where they were at, in daily life for up to three weeks of EMA. Results from a logistic multilevel model suggest that greater RSA reactivity in the lab was significantly related to drinking in the moment, even after accounting for covariates (time, context). Elevated cue-elicited RSA may indicate an attempt to regulate stress and the failure to effectively do so may increase one's susceptibility to drinking.

Tayler Vebares BS, University of Missouri
Ashley Helle PhD, University of Missouri
Andrea Wycoff MA, University of Missouri
Lindsey Freeman BS, University of Missouri
Timothy Trull PhD, University of Missouri

Abstract 2: Evaluation of vmPFC-Amygdala Resting State Functional Connectivity as a Transdiagnostic Moderator of Momentary Rumination and Sadness

Rumination has been identified as a transdiagnostic feature of emotional distress disorders that exacerbates symptoms of anxiety and depression. It is thought that rumination may be due in part to heightened resting state functional connectivity (rs-FC) between the ventromedial prefrontal cortex (vmPFC) and amygdala. Though past fMRI research has demonstrated associations between laboratory self-report measures of emotional distress and vmPFC-amygdala rs-FC, few have examined its relation to symptoms of distress in daily life. The proposed study will use ecological momentary assessment (EMA) to examine vmPFC-amygdala rs-FC as a potential moderator of daily-life momentary rumination and sadness. The sample consists of 27 women who met criteria for anxiety, depression, and/or borderline personality disorder. Participants completed a 6-minute resting state scan and then completed multiple EMA reports per day for 14 days. Preliminary results suggest that rumination and sadness are moderately correlated at the momentary ($r=.55$, $n=1811$, $p<.0001$), day ($r=.56$, $n=398$, $p<.0001$), and person levels ($r=.62$, $n=27$, $p<.001$). While vmPFC-amygdala rs-FC was not significantly correlated with sadness or rumination at the day or person levels, it was significantly correlated with sadness ($r=.065$, $n=2170$, $p=.003$) and rumination ($r=-0.069$, $n=1811$,

p=.003) at the momentary level, highlighting the importance of assessing these distress symptoms in the moment, in individuals' daily lives. Subsequent analyses will use multilevel models to clarify the associations of daily life sadness and rumination, with vmPFC-amygdala rs-FC as a person-level moderator.

Megan Fleming BS, University of Missouri
John Kerns PhD, University of Missouri
Timothy Trull PhD, University of Missouri

Abstract 3: Bi-directional Associations Between Momentary Impulsivity and Alcohol Consumption

Historically, research has focused on self-reported impulsive traits and alcohol consumption at the person level (e.g. Coskunpinar et al., 2013). However, recent findings suggest that there are intra-individual fluctuations in impulsivity, and that it should also be conceptualized as a dynamic construct (Tomko et al., 2014). For instance, laboratory studies have shown that impulsivity tends to increase while drinking (e.g. Reynolds et al., 2006). Thus, the current study sought to examine the momentary associations between impulsivity and alcohol use in daily life.

We used EMA to study these associations in individuals with borderline personality disorder (n = 26) and a group of community individuals (n = 27). Impulsivity and alcohol consumption were assessed multiple times per day for 21 days. Impulsivity was measured using 4 items representing each of the subscales of the UPPS Impulsive Behavior Scale (Whiteside & Lynam, 2001). Multilevel models were conducted to predict the likelihood of a person reporting having had a drink at any given moment and to predict momentary impulsivity ratings.

Across participant groups, momentary self-reported impulsivity significantly predicted alcohol consumption (OR = 1.43, p < .0001, 95% CI [1.21, 1.69]), above and beyond positive and negative affect at each level as well as baseline UPPS score. Additionally, number of drinks reported at a given moment (b = 0.11, SE = 0.01, p < .0001) and at the previous moment (b = 0.02, SE = 0.01, p < .05) predicted rises in momentary impulsivity ratings, whereas the concurrent and lagged binary alcohol consumption variables were not significant predictors of momentary impulsivity. Subsequent analyses will further investigate these relationships over the course of a drinking episode.

Lindsey Freeman BS, University of Missouri
Sarah Griffin PhD, University of Missouri
Andrea Wycoff MA, University of Missouri
Timothy Trull PhD, University of Missouri

Abstract 4: Facets of Impulsivity and Drinking in Daily Life: Methodological and Statistical Considerations

Impulsivity is a key factor in trying to understand and predict drinking behavior in daily life. While impulsivity has historically been considered a homogeneous construct, the literature increasingly suggests impulsivity is more accurate conceptualized as consisting of multiple distinct facets. Facets of the UPPS model of impulsivity (Whiteside & Lynam, 2001) have been found to differentially relate to specific alcohol-related outcomes and behaviors prospectively (Stevens et al., 2018). Recent research also suggests that impulsivity fluctuates over the course of the day, warranting measurement of impulsivity at a momentary level (e.g., Tomko et al., 2014). This presentation focuses on a project investigating the potential of momentary impulsivity facets in predicting drinking behavior in daily life, accounting for intentionality. Results demonstrate differential patterns of prediction for individual facets of momentary impulsivity on planned versus unplanned drinking days, emphasizing the importance of assessing impulsivity as a multi-faceted construct and accounting for intentionality of behavior. Findings also highlight the utility of novel statistical and computational methods, specifically moving average and mean squared successive differences (MSSDs), for understanding drinking behavior in daily life. Implications and suggestions for future work and ambulatory assessment methods will be discussed.

Sarah Griffin PhD, University of Missouri
Lindsey Freeman BS, University of Missouri
Timothy Trull PhD, University of Missouri

Methodological issues in ambulatory assessment: Compliance, attrition, delayed responding, recall bias, and changes in response behavior over time

Chair: Wolfgang Viechtbauer PhD, Center for Contextual Psychiatry, Department of Neuroscience, KU Leuven; Department of Psychiatry and Neuropsychology, School for Mental Health and Neuroscience, Maastricht University

Use of ambulatory assessment methods such as ESM (Larson & Csikszentmihalyi, 1983) and EMA (Stone & Shiffman, 1994) has increased exponentially over the past two decades in various fields of research. However, this increase in applications has not been accompanied by analogous methodological developments. Many of the choices researchers face when designing and analyzing ESM/EMA studies are guided by the extensive experience of experts in the field instead of solid empirical evidence (Janssens et al., 2018). Although these experience-based guidelines are very useful, decisions about the design and analysis can have considerable consequences

for the quality of the data collection procedures and the conclusions that can be drawn. Therefore, there is an urgent need to assess potential threats and to identify their determinants and consequences in order to optimize this methodological framework. In this symposium, we provide an empirically-based discussion around several phenomena unfolding across ambulatory studies and consider their potential implications for current practice. First, Hugo Vachon and Aki Rintala will present the results of two studies focusing, at different levels of analysis, on predictors of compliance and attrition in ESM/EMA studies. Next, Gudrun Eisele will explore the issue of delayed responding and underlying mechanisms thereof, while Marta Walentynowicz will describe an examination of recall bias by comparing ESM assessments with 7-day recall ratings. Finally, Wolfgang Viechtbauer will conclude this symposium by presenting evidence for changes in response behavior over time in ESM/EMA studies (e.g., decreases in within-person variability over time) and consider its implications for the validity of ESM/EMA research.

Abstract 1: Compliance and retention with the Experience Sampling Method over the continuum of severe mental disorders: A systematic review and meta-analysis

Background: Despite the growing interest in the Experience Sampling Method (ESM) as a data collection tool for mental health research, the absence of methodological guidelines related to its use has resulted in a large heterogeneity of designs. Concomitantly, the potential effects of the design on the response behavior of the participants remain largely unknown. The objectives of this meta-analysis were to investigate the associations between various sample and design characteristics and the compliance and retention rates of studies relying on ESM in mental health research. Methods: ESM studies investigating major depressive disorder, bipolar disorder, and/or psychotic disorder were considered for inclusion. Besides the compliance and retention rates, a number of sample and design characteristics of the selected studies were collected to assess their potential relationships with the compliance and retention rates. Multilevel random/mixed-effects models were used for the analyses. Results: Compliance and retention was lower for studies with higher proportions of male participants and individuals suffering from a psychotic disorder. Compliance was positively associated with the use of fixed sampling schemes, higher incentives, higher time intervals between successive evaluations, and less evaluations per day, but no association was observed with regard to age, the study duration, or other design characteristics. Discussion: The findings demonstrate that ESM studies can be carried out in mental health research but the quality of the data collection depends upon a number of factors related to the design of ESM studies and the samples under study that need to be considered when designing such protocols.

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Wolfgang Viechtbauer PhD, Center for Contextual psychiatry, Department of Neurosciences, KU Leuven; Department of Psychiatry and Neuropsychology, School for Mental Health and Neuroscience, Maastricht University
Aki Rintala MSc, Center for Contextual psychiatry, Department of Neurosciences, KU Leuven
Inez Myin-Germeys PhD, Center for Contextual psychiatry, Department of Neurosciences, KU Leuven

Abstract 2: Predictors of compliance in studies using the experience sampling method (ESM) with high-frequency random sampling

Background: Missing data (i.e., non-compliance) in momentary assessment studies is typically assumed to occur at random, but this has not yet been extensively investigated in ESM research. The purpose of this study was to investigate to what extent compliance to a diary signal (i.e., beep) can be predicted based on various variables (indicative of the emotional/physical state and context) collected at the prior beep. Methods: Lagged-analyses were conducted using a pooled dataset of 6 ESM studies encompassing data from 1,175 individuals falling into four different mental health status groups (psychosis, at-risk psychosis, depression, or healthy controls). All studies used an ESM design of 10 beeps per day over a 4 to 6 day period. A variety of lagged characteristics were examined using multilevel mixed-effects logistic regression models with between- and within-subject (BS/WS) levels, controlling for a number of covariates (e.g., mental health status, study day, beep number within a day). Results: Persons who reported positive affect or tobacco use were more likely to be compliant at the next beep. On the other hand, persons who were disturbed by the beep, outside their home, or had used alcohol were more likely to be non-compliant at the next beep. Longer prompt time between the prior and the next beep also increased the chances of non-compliance. While subjects with depression had higher compliance, we saw a general decrease in compliance over study days and the beep number within a day. When more beeps were missed consecutively, the likelihood to miss the next beep also increased. Discussion: The findings suggest that some characteristics can predict compliance at a subsequent beep. However, most of the daily life experiences did not influence compliance.

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Martien Wampers PhD, Center for Contextual psychiatry, Department of Neurosciences, KU Leuven

Inez Myin-Germeys PhD, Center for Contextual psychiatry, Department of Neurosciences, KU Leuven
Wolfgang Viechtbauer PhD, Center for Contextual psychiatry, Department of Neurosciences, KU Leuven; Department of Psychiatry and Neuropsychology, School for Mental Health and Neuroscience, Maastricht University

Abstract 3: The association between response delay and reported affect in a pooled dataset of experience sampling studies

Background: Delayed responses are common in experience sampling studies. Yet no consensus exists on whether they should be excluded from the analysis and if yes, what the threshold for exclusion should be. Researchers have argued that delayed responses could introduce bias, but the few investigations of systematic differences between delayed and timely responses have offered unclear results. Additionally, the effect of delay could depend on the population being studied, an option that has never been investigated. Differences in mean and (within-person) variance of affect ratings and in the relationships between affect and contextual stress as a function of delay were investigated in a dataset comprising nine studies carried out in individuals with depression, psychosis, high risk for developing a psychosis, and without a psychiatric condition. Methods: Multilevel mixed-effects regression analyses were conducted with delay and its interaction with contextual variables as main predictors of interest. In addition, changes in the within-person variance were modeled as a function of delay with multilevel location-scale models. Results: There were significant changes in positive and negative affect as a function of delay. In addition, delayed answers showed differences in their variance and in the relationships between contextual stress and affect. Significant heterogeneity in the effects between different mental health status groups could be detected. Discussion: Further research is needed to clarify the reasons for the observed differences and their practical implications. The extent to which responses vary with longer delays seems to differ between mental health status groups.

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Wolfgang Viechtbauer PhD, Center for Contextual psychiatry, Department of Neurosciences, KU Leuven; Department of Psychiatry and Neuropsychology, School for Mental Health and Neuroscience, Maastricht University

Abstract 4: Recall bias for pain and emotions: Consistency, stability, and predictors

Background: When asked to report on their experiences in the past week, patients often recall them as more intense than initially reported. However, until now the cross-domain consistency and temporal stability of recall bias have not been investigated. This study addresses this gap by exploring recall bias for pain, negative affect (NA), and positive affect (PA) in chronic pain patients. Methods: Secondary analyses included two ecological momentary assessment studies. Chronic pain patients (Study 1, n=116; Study 2, n=68) rated the intensity of momentary pain, PA, and NA several times a day for two weekly periods. Recall ratings were collected at the end of each week. Recall bias was defined as the discrepancy between the 7-day recall and the mean real-time ratings. Results: On average, the 7-day recall was higher than the mean momentary ratings for pain, PA, and NA. The recall bias was moderately stable over time, with test-retest reliabilities over 3 months of .53 (pain), .53 (PA), and .31 (NA). The correlations between recall bias for pain, PA, and NA were mostly not significant. Variability, peak experience, and state at the moment of recall predicted recall bias for pain and NA. Recall bias for PA and NA, but not for pain, was related to trait anxiety and depression in Study 1. Discussion: This study provides evidence for recall bias for both pain and affect ratings in chronic pain patients. Individual differences in recall bias were not consistent across domains suggesting that recall bias is not a general phenomenon. Thus, it cannot be assumed that patients who retrospectively overreport pain will also overreport other experiences. The current study opens important avenues for future research regarding mechanisms underlying recall bias.

Marta Walentynowicz PhD, Psychological Sciences Research Institute, Université catholique de Louvain
Stefan Schneider PhD, Dornsife Center for Self-Report Science, University of Southern California, Los Angeles
Arthur Stone PhD, Dornsife Center for Self-Report Science, University of Southern California, Los Angeles; Department of Psychology, University of Southern California, Los Angeles

Abstract 5: Changes in response behavior over time in ESM studies: Is there reason for concern?

Background: Intensive longitudinal data collection methods such as ESM place a considerable burden on research participants. As a result, participants may engage in strategies to reduce this burden (Fuller-Tyszkiewicz et al., 2013), for example by choosing standard responses when completing the assessments or by responding randomly. At the same time, it has also been argued that ESM can lead to increased self-focused attention, self-awareness, and hence higher accuracy (e.g., Brandstätter, 1983; Hormuth, 1985). Changes in the response

behavior of participants over the course on an ESM study may provide evidence for the occurrence of such phenomena. Methods: We analyzed data from the first four days from a pooled dataset of 9 ESM studies, each using an identical design with 10 semi-random signals per day. The 1438 subjects included in the dataset fell into four different groups reflecting differences in mental health status and provided a total of 37505 assessments. We focused on positive and negative affect as outcomes and the (un)pleasant of events as the predictor of interest. Mixed-effects models allowing for changes in the mean, within- and between-person variances, autocorrelation, and within-person associations (between affect and event (un)pleasantness) across the assessment days were used to detect changes in response behavior.

Results: Changes in the mean, within- and between-person variances, and autocorrelations were found across all groups. Within-person variances generally decreased, autocorrelations increased, while between-person variances showed mixed patterns. On the other hand, evidence for changes in within-person associations was weaker. Discussion: We discuss how the pattern of results can be reconciled with possible response behavior mechanisms.

Wolfgang Viechtbauer PhD, Center for Contextual psychiatry, Department of Neurosciences, KU Leuven; Department of Psychiatry and Neuropsychology, School for Mental Health and Neuroscience, Maastricht University
Hugo Vachon PhD, Center for Contextual psychiatry, Department of Neurosciences, KU Leuven

Timely challenges in innovative experience sampling (ESM) research to solve psychopathology problems

Chair: Marieke Wichers PhD, University Medical Center Groningen

Discussant: Laura F. Bringmann PhD, University of Groningen

In the past decade technological advances have created a multitude of novel possibilities for daily life monitoring of mood, symptoms, behavior and physiological parameters. These novel developments can majorly extend opportunities for daily life research in psychopathology and significantly contribute to finding novel answers to improve mental health. Currently, researchers are at the start of a new era in which we have the responsibility to explore the benefits and challenges of these novel opportunities. These include intensive monitoring over extended periods of time, combining ESM with other novel technology for objective measurements and new statistical models to obtain patient-specific clinical insights. In this symposium we want to discuss the challenges of these novel research approaches. First, Marieke Wichers will discuss the feasibility of performing long-term intensive daily life sampling in

people with psychiatric problems and whether this can be used to capture important symptom transitions. Second, besides novel opportunities for data collection, combining self-report and objective measures may yield important insights. Thomas Vaessen will discuss the challenges and decisions to be made for combining these two types of research data. A third novel opportunity is the clinical implementation of ESM research with use of statistical techniques that provide patient-specific insights. Jojanneke Bastiaansen will discuss to what extent such an approach will yield consistent and valid information and whether these novel possibilities are currently ready for use in the clinic. In this symposium we want to have ample opportunity for discussion. Therefore, we will reserve the final part for discussion which will be moderated by Laura Bringmann (discussant).

Abstract 1: Capturing periods of important symptom transitions: novel opportunities and challenges that come with long-term intensive daily life monitoring

Experience sampling (ESM) has been extensively used to study psychopathology. However, most of these studies used very short periods of sampling (< 7 days). However, as technology progresses novel sampling opportunities have become available and feasible. This justifies the urge to explore and test cutting-edge applications of daily life monitoring to extend our current scientific boundaries. Urgent scientific aims include capturing the precise process of symptom change and identify what changes in mood, behavior and physiology take place over time precisely before symptom transitions occur. As this requires intensive sampling over periods of months, this opportunity has only recently become available. I will present the first results of the TRANS-ID study, in which we followed patients at several phases of their psychiatric symptoms over a period 4 months or longer with intensive ESM monitoring, actigraphy and heart rate monitoring. So far, we followed 50 patients who tapered their antidepressant medication, 36 patients who were currently depressed and started psychotherapy and 120 young adults that are familiar with psychiatric symptoms. Whereas drop-out depended on the study population, compliance appeared consistently high (around 80%). Furthermore, most participants indicated that it helped them with dealing with their symptoms. I will further discuss challenges that came with such intensive long-term data sampling based on the TRANS-ID data. Also, I will discuss to what extent we were indeed able to capture important symptom transitions during the intensive monitoring period. Feasibility of long-term intensive monitoring maybe crucial for novel and urgent insights into the process contributing to the development and the disappearance of psychiatric symptoms.

Marieke WichersPhD, University Medical Center Groningen

Evelien Snippe PhD, University Medical Center Groningen
*Arnout C. Smit MSc, University Medical Center Groningen
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Yoram K. Kunkels MSc, University Medical Center Groningen
Marieke J. Schreuder MSc, University Medical Center Groningen
Robin N. Groen MSc, University Medical Center Groningen
Harriette Riese PhD, University Medical Center Groningen
Johanna T.W. Wigman PhD, University Medical Center Groningen
Catharina A. Hartman PhD, University Medical Center Groningen

Abstract 2: Combining active and passive monitoring techniques in mental health research: opportunities and challenges

During the past decade, advances in mobile technology have provided many opportunities for the integration of passive remote monitoring approaches in mental health research. Data from mobile phones and wearable sensors are used to infer an individual's location, motion, social interaction, mood, symptoms, and physiology. Applications range from digital phenotyping to intervention strategies. In order to make sense out of these vast amounts of data, machine learning and data mining techniques have been used to discover behavioral patterns holding predictive value. Other approaches have tried to combine passive remote monitoring techniques with active data collection methods, such as experience sampling. Combining passive and active monitoring data comes with challenges related to timing. I will discuss these challenges based on data collected for the SMILE project. SMILE is a study on stress reactivity including physiological and experience sampling data in a sample of 50 volunteers for the duration of one week. I will discuss how to tackle challenges related to combining these types of data and how decisions related to timing will affect results and conclusions. Specifically, I will show the consequences of decisions on 1) length of time-windows of physiological data, 2) the timing of this window relative to the surveys (i.e. before, during, or after), 3) different physiological features used, 4) time-contingent vs event-contingent experience sampling schemes, and 5) phrasing of the survey items (i.e. retrospectively vs momentary). Finally, I will compare the results from ambulatory data with results based on data collected under controlled circumstances in a lab. I will give examples of effects of each decision on a subject-level, and discuss possible guidelines.

Thomas Vaessen PhD, Catholic University of Leuven
Joana Velozo MSc, Catholic University of Leuven
Stephan Claes PhD, Catholic University of Leuven
Inez Myin-Germeys PhD, Catholic University of Leuven

Abstract 3: The impact of researchers' choices on the selection of treatment targets using experience sampling methodology: challenges for clinical implementation

The experience sampling methodology (ESM) has been positioned as a promising opportunity for personalized medicine in psychiatry. A requisite for moving ESM towards clinical practice is that outcomes of person-centered analyses are not contingent on the researcher. In this study, we crowdsourced the analysis of one individual patient's ESM data to 12 prominent research teams. The dataset was from a 25-year old male with a primary diagnosis of major depressive disorder and comorbid generalized anxiety disorder, who filled out momentary assessments related to depression and anxiety psychopathology prior to psychotherapy. Teams addressed the same research question: "what symptom(s) would you advise the treating clinician to target subsequent treatment on, based on a person-centered analysis of this particular patient's ESM data?" Variation was evident at different stages of the analysis, from preprocessing steps (e.g., variable selection, clustering, handling of missing data) to the type of statistics. Most teams did include at least one type of vector autoregressive model, which examine relations between variables (e.g., symptoms) over time. Although most teams were confident their selected targets would provide useful information to the clinician, not one advice was similar: both the number (0-16) and nature of reported targets varied widely. This study makes transparent that the selection of intervention targets based on ESM is currently highly conditional on subjective analytical choices and highlights key issues that need to be addressed in moving toward clinical implementation.

Jojanneke A. Bastiaansen PhD, University Medical Center Groningen
Yoram K. Kunkels MSc, University Medical Center Groningen
Casper J. Albers PhD, University of Groningen
Laura F. Bringmann PhD, University of Groningen

Papers (in alphabetical order by first author last name)

1. **Assessing and Enhancing Emotional Competence for Well-Being (ECoWeB) in the Young: Concept and first pilot results**

   There is growing global concern about the trend for ever earlier onset of mental disorders that severely affect the life chances of young people at key formative periods, leading to an urgent need for effective prevention. There is a strong need for robust evidence on resilience factors, for more effective interventions, and for approaches that can be scalable and accessible at a population level. To tackle these challenges and move beyond the state-of-the-art, the Horizon2020 funded project ECoWeB uniquely integrates three multi-disciplinary approaches:
   - Theoretical framework: An established theoretical model of normal emotional functioning (Emotional Competence Process) guiding the identification and targeting of mechanisms strongly implicated in well-being and psychopathology in young people;
   - Personalized medicine approach: Systematic assessment of personal Emotional Competence (EC) profiles, identifying risk factors and selecting targeted interventions to promote well-being;
   - Mobile application: Smartphone based delivery of 4 intervention packages, allowing to achieve scalability, accessibility, and acceptability in young people. In this paper, the general outline of the ECoWeB project will be discussed, describing the development, evaluation, and dissemination of a comprehensive mobile application (app). Results from 2 pilot studies will be presented, which – first – found an EMA-protocol of 5 daily assessments and a period of 10 days to yield the best trade-off between participant burden and statistical information (N=150; baseline=8 triggers for 14 days). Second, the effectiveness and acceptability of a smartphone adapted version of cognitive bias modification targeting interpretation biases will be presented.

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2.   A multi-informant experience sampling approach to the effects of vitality and sleep on teachers' dynamic job performance

Research suggests that levels of vitality and sleep affect employees' job performance (e.g., Schmitt, Belschak, & Den Hartog, 2017). Job performance and vitality are dynamic constructs, and hence should be examined using ambulatory assessment methods with the inclusion of informant-ratings to avoid common method bias. Many researchers argue, however, that it is almost impossible to obtain informant-ratings in experience sampling designs (e.g., Binnewies, Sonnentag, & Mojza, 2017). The teacher-in-training context, where a teacher is continuously observed by a supervisor and the students, seems to be an exception to this. Using a multi-rater approach, we examined 1) how teachers' levels of vitality relate to their momentary job performance and to their job performance at the next assessment that same day, and 2) how sleep quantity predicts daily job performance. We conducted a 14-day experience sampling study with 76 teachers-in-training, their supervisors (n = 49), and their 5th/6th grade students (41 classes with 753 students) during an internship. Twice daily (at 12 PM and 3 PM) teachers rated their levels of vitality and all participants rated the teacher's job performance. In addition, teachers reported their hours of sleep and levels of vitality upon waking up in the morning (7 AM). Preliminary multilevel analyses suggest that there is a small, but significant effect of vitality on momentary job performance (teacher-, supervisor-, and student-rated). Analyses regarding the effects of sleep quantity and morning vitality on subsequent vitality and job performance provided mixed results. Additional data collection (in a new cohort of pre-service teachers) and analysis is scheduled for Spring 2019.

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3.   Methods to Assess Social Comparisons Within Persons Over Time: A Rapid Review

Self-evaluations relative to others (i.e., social comparisons) are inherently dynamic and contextual. The default assessment of comparisons via global recall forces aggregation across contexts, limiting its utility. Assessment of comparisons in daily life (at the day/moment level) is increasing, but with little consensus about how to conduct such assessment. In particular, (1) whether differences in population, number of assessments per day, or signal method generate distinct estimates of comparison frequency, and (2) which aspects of comparison are critical for intensive assessment. Articles published in English were included in this review if they described 3+ comparison assessments spaced <24 hours apart; 15 studies met criteria, which assessed comparisons 1-10 times per day. Eight studies assessed body/weight-related comparisons (vs. other dimensions); 12 used signal-contingent (vs. event-contingent) recording. Across approaches, comparisons were reported 0.44-3.96 times per person per day (M=1.72) and were more frequent among participants with (vs. without) weight concerns. Aspects assessed were direction (upward/downward; 11/15), target (friend/family; 7/15), and dimension (weight/attitude; 5/15); 8 studies captured these for the "most recent" comparison. Findings indicate that the frequency of comparisons may not differ by number of assessments or recording method, and show heterogeneity in the aspects of comparison considered critical for assessment. Yet as many studies focused on young adults (7/15) and specific groups (e.g., women with body concerns; 8/15), conclusions

about best practices for intensive assessment of comparisons are limited to these subgroups. Future work should expand to other groups in order to inform more generalizable recommendations.

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4. **Lowering Burden in Ecological Momentary Assessment: Measurement Approaches and Real-Time Methods to Reduce Participant Burden**

Ambulatory survey tools such as smartphone-delivered surveys provide an excellent window into the momentary experiences of participants as they go about their lives. As researchers become interested in changes and transitions at smaller and smaller timescales, increasingly dense longitudinal data is required to capture the processes at work. Yet this dense measurement comes at cost—active assessment tools like surveys place a burden on participants in terms of the time, attention, effort, and disruption of daily activities that they induce.

In this talk, we present two different approaches to limiting the burden on participants based on EMA studies. In studies tied to passive and wearable sensors, or in which real-time models are capable of predicting the values under study, surveys can be adaptively triggered based on the expected predictive accuracy. In cases where survey tools compute correlated factor structures, synthetic aperture approaches from the world of personality can be adapted to subselect questionnaire items. We present evidence from simulation and empirical results to highlight the utility of these approaches.

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5. **Non-Specific skin conductance responses in a daily life setting**

We investigated whether nonspecific skin conductance responses (ns.SCRs) can be used to quantify sympathetic nervous system (SNS) activity in daily life settings. To validate ns.SCR we used experimental manipulations of SNS activity in a lab setting, and parallel recording of two often used measures of SNS activity, the pre-ejection period (PEP) and skin conductance level (SCL).

Data was collected on 115 healthy adults (mean age = 23.38 years, age range = 18 − 48 years, 49 males) during both a ±2 hour laboratory and ±24 hour ambulatory section. Of these 115 adults, 62 participants consented on wearing the skin conductance electrodes during the ambulatory measurement (mean age = 22.77 years, age range = 18 − 48 years, 26 males). Stress was induced in the laboratory setting by administering 5 mental stressors, 1 social stressor, 1 physical stressor and various physical activity tasks. Compared to pre-test resting baseline recordings significant decreases in PEP and parallel increases in the number of ns.SCRs and the SCL were found for stressors known to increase SNS activity. Multilevel

analysis including a random intercept and random slope showed a significant association between PEP and ns.SCRs and SCL and ns.SCR (p < .001 for both comparisons). The observed associations were in the expected direction with a negative relation between PEP and ns.SCR/SCL and positive relation between ns.SCR and SCL. The results for the ambulatory recording showed a similar pattern, even if variation in ns.SCR was less strong as in the lab setting.

We conclude that variation in SNS activity is reflected similarly in the heart and the skin, and that this applies to standardized lab settings as well as daily life ambulatory recording.

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6. **Actigraphy-based sleep, circadian rhythm and physical activity patterns in depressive and anxiety disorders: results from the NESDA study**

Actigraphy provides objective estimates of sleep, circadian rhythm (CR) and physical activity (PA), and is valuable in research in people with depression/anxiety whose self-reports may be biased. We examined the association between actigraphy measures of sleep, CR and PA with depression/anxiety, using traditional actigraphy variables and functional data analysis (FDA).

Fourteen-day actigraphy data of 359 participants with current (n=93), remitted (n=176) or no (n=90) DSM-IV depression/anxiety disorders was obtained from the Netherlands Study of Depression and Anxiety. Extracted measures were sleep duration, sleep efficiency, relative amplitude between day- and night-time activity (RA), sleep midpoint on free-days, gross motor activity (GMA), and moderate-to-vigorous PA (MVPA). We also applied FDA (i.e., Functional Principal Component Analysis [fPCA], Function-on-Scalar Regression [FoSR]) to extract activity patterns and examine timing of activity. Reduced PA and CR were consistently observed in the presence of current – but not remitted - depression/anxiety using traditional actigraphy measures (p<0.05); GMA (23.83 vs 27.4 milli-gravity/day), MVPA (35.32 vs 47.64 min/day), RA (0.82 vs 0.83). In fPCA, 4 components explained 77% of variability in the data. The first two components represented daily activity level and morningness/eveningness, respectively, and yielded similar associations with depression/anxiety as the more traditional actigraphy measures. FoSR analyses are currently underway and will be presented in June. Actigraphy is an ecologically valid method to assess sleep, CR and PA. While traditional measures and fPCA show similar associations with depression/anxiety, FDA may improve our understanding of complex data with an intuitive interpretation.

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7. **Within-person associations of lagged optimism with subsequent stress occurrence, stress appraisals, and ambulatory blood pressure**

Background: Optimism may lead to better health by helping people manage stressors more effectively. Although these associations have been established between-persons, little is known about more dynamic within-person processes of optimism and stress. Therefore, this study investigated how moments of optimism were associated with stress and ambulatory blood pressure (ABP) using ecological momentary assessment (EMA) in everyday life.
Methods: A diverse sample of adults recruited through the North Texas Heart Study (N = 300; 150 women; 60% non-Hispanic white; Mage = 42.4 years, SD¬ = 12.8) completed ABP monitoring at roughly 45-minute intervals over a 2-day/1-night period. Participants completed EMA in response to each ABP sampling that included whether a stressor had occurred since the last prompt and its severity, current subjective stress, and positive future outlook (i.e., optimism). A series of multilevel models estimated lagged (lag 1) associations of (person-centered) optimism with stress and ABP. Results: Reports with greater than typical (for a person) optimism were associated with a lower probability of reporting a subsequent stressor (b = -0.173, p < .0001), and lower subsequent subjective stress (b = -0.057, p < .0001), but not with ratings of stressor severity (b = -0.062, p =.124) or ABP (b = 0.057, p = .783). Discussion: Within-person variation in momentary optimism micro-prospectively predicted whether a stressor was reported and subjective stress, but not ABP directly. These findings suggest that optimism may impact more upstream appraisals in the stress process in everyday life. The cumulation of these stress appraisal and response processes may, over time, result in better physiological health (such as reduced BP) that is observed between persons.

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8. **First evidence on the feasibility of an experience sampling study investigating patients with an acquired brain injury**

Patients with brain injuries experience various impairments and often lack awareness regarding illness-related symptoms. Due to this, single retrospective surveys regarding the acquisition of subjectively perceived deficiencies are particularly error-prone. Therefore, an Experience Sampling Method (ESM) design involving a high frequency sampling plan appears better suited to investigate symptom appearance and perceived burden, especially concerning deficits that vary over time. However, before associations between a diminished awareness and symptom occurrence in different situations are testable, survey feasibility for patients with severe cognitive and motor impairments should be determined.

This study aims at investigating 60 patients with different brain injuries in acute rehabilitation with a smartphone-based survey. The study comprises a one-week assessment, including eight surveys/day at random time points. Each survey addressed four sets of questions (activities, social context, mood, and abilities). In terms of feasibility, data of 15 patients were analyzed to determine whether they could handle the demands of this specific form of data collection. Furthermore, we analyzed if the answers varied sufficiently to justify such a high frequency sampling plan.

Patients received 51 prompts on average, of which 64% were completed in about 1.5 minutes. Further, answers varied sufficiently across surveys, so that associations between situations and self-assessments are testable. Preliminary results are presented revealing that awareness deficits are also reflected in real-time data.

In summary, results suggest that ESM is feasible in patients with brain injuries and associations between different situations, social contexts, and self-assessments are investigable.

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9. **Immediate and sustained symptom reduction for brief, app-based depression intervention**

    Many psychological conditions are characterized by symptoms that are discrete or variable in nature. Although an individual with one of these conditions may be more likely to exhibit these symptoms on a regular basis than other individuals, their symptom profile is likely to wax and wane throughout daily life. Brief, in-the-moment smartphone-based interventions (such as just-in-time interventions) may be helpful for alleviating these state-based symptoms as they arise and, ultimately, may produce sustained symptoms improvement. The present study explored this possibility for depressed mood using brief mindfulness-based techniques delivered via a smartphone app. In the present study, 224 adults were allocated to one of four conditions: (1) wait-list control, (2) self-monitoring of depressed mood, (3) self-monitoring + mindfulness audio content, or (4) self-monitoring + mindfulness content and prompts to use at time of elevated mood scores. Depressive symptoms, anxiety, and distorted thinking patterns were measured at baseline, post-intervention (4 weeks), and a one-month follow-up point. Those in the intervention groups experienced greater symptom reduction across outcome measures than the waitlist control group. Differences among the intervention groups were non-significant, yet in the anticipated direction (strongest effect for group 4, then group 3, then group 2). This presentation will discuss these results further, with particular emphasis on the role of brief interventions in an overall treatment plan, as well as explore reasons for why self-monitoring may be effective for symptom reduction.

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    Nicole Everitt B.S., Deakin University

    Jaclyn Broadbent Ph.D., Deakin University

    Ben Richardson Ph.D., Deakin University

10. **The additional heart rate saga: a new beginning**

    Changes in heart rate are predominantly driven by the energy consumption of our skeletal muscles, but also are reliably measured in response to psychological stressors in absence of any physical activities. With reliable and relatively non-invasive ways to continuously measure ambulatory heart rate at our disposal, increasing ubiquity of accelerometers carried and worn in daily life, and a leap in on-line and off-line computational capacity, now is the time to renew our efforts to separate the two in daily life recordings. If we can accurately predict metabolic heart rate then we can reliably derive a measure of psychological stress, the additional heart rate.

    In the current proof-of-principle study we collected 24 hour ambulatory and 2 hour laboratory electrocardiography and accelerometry recordings of 72 healthy adults (22 females, mean age = 22) with the VU-Ambulatory Monitoring System. We segmented the recordings in 1 minute sections, computed hierarchical models on a subsample of the data, and used those coefficients to predict heart rate in the full sample. Intra Class Correlations were computed between predicted and measured heart rate as a measure of prediction accuracy.

When predicting heart rate in the ambulatory data with coefficients from the laboratory data, we arrived at consistent overestimates of heart rate in daily life. Using a combination of ambulatory and laboratory data to estimate coefficients led to better predictions. Adding posture and lagged physical activity to the model also improved predictive accuracy. While using lab data is handy for calibrating posture recognition, sufficient ambulatory data under low-stress conditions is essential for generating useable heart rate predictions in daily life settings.

Martin Gevonden PhD, Vrije Universiteit

Eco de Geus PhD, Vrije Universiteit

11. **A comparison of Smartphone-based and Accelerometer-based physical activity measures in bipolar disorder**

Physical activity (PA) in ambulatory assessment (AA) settings can be mesured either with activity monitors (AM) or with smartphones, where both devices use the signal of integrated triaxial acceleration sensor chips. Both devices have different advantages and disadvantages, relying e.g. on wear position and on weartime compliance, whereas it is expected that the AM should outperform the smartphone. Furthermore the acceleration sensor signal provides only a rough estimation of the intensity of PA. Therefore a combination of both devices may increase the accuracy of PA measures. In an AA study, smartphone use was tracked from 27 outpatients with bipolar disorder for one year which, in addition, wore an AM to assess physical activity.

From the acceleration raw data of the AM we computed duration and intensity of PA (bandpass filtered Euclidean Norm - BFEN) as well as movement frequencies. Algorithms included in the smartphones Android OS used the acceleration sensor signal to compute steps and the duration, not intensity, of different activity classes (in a vehicle, on foot, on a bicycle, still). Furthermore distances moved and movement speeds were calculated from the GPS signal.

Due to technical dropouts and noncompliance AM activity data were available on average from 151 days/subject. The duration of assessed activity (larger than 50 milli-g or about 0.5 MET) was on average 6.6 h/day. In contrast, activity detected by the smartphone algorithm revealed on average 55 minutes of physical activity per day (3 min cycling, 26 min on foot, 26 min moving the smartphone) plus 41 min/day spent in a vehicle. Subsequent analysis were performed to differentiate into activity classes, sleep, and non wear time, and relate this to the smartphone data.

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Emanuel Severus MD, University of Dresden

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12. Investigating Race Differences in Body Dissatisfaction and Overeating: An Ecological Momentary Assessment Study

In the United States, previous research on disordered eating behaviors has largely used samples of young White women. However, cross-sectional research suggests disordered eating, such as overeating, is prevalent among Black Americans. Studies of race differences in the overeating literature have focused on whether or not Black and White women engage in overeating at differing rates, but have yet to consider differential factors associated with overeating between races in daily life. Body dissatisfaction may differentially influence overeating between races in real time. The aim of the current study was to assess body dissatisfaction and overeating in Black and White young women using ecological momentary assessment (EMA). Black (n=36) and White (n=37) college women (Mage=20.4 years) completed EMA measures of body dissatisfaction and overeating 4 times daily for 7 days. White women reported more body dissatisfaction but less overeating than Black women on a momentary basis (ps<.05). Greater momentary body dissatisfaction was associated with more overeating during the most recent eating event (in previous 2-3 hours), and race moderated this association such that it was stronger for White women (p<.05). Results suggest that although overeating and body dissatisfaction are associated in daily life, this association is stronger for White than Black young women. Our findings corroborate past research that although overeating is a pressing health concern for young women generally, Black women reported higher rates of overeating in our sample. Greater knowledge of correlates of overeating between races would assist in informing culturally sensitive prevention and treatment efforts, such as mobile health interventions tailored for racial minorities.

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13. Blood pressure responses to stress in everyday life: Exploring time-lagged associations and the role of perseverative cognition

Blood pressure (BP) typically increases in response to stress, and can remain elevated for minutes or hours. Most evidence linking stress and BP in daily life emerges from concurrent associations between stress and ambulatory BP, with few studies exploring time-lagged associations or potential moderators of stress-BP associations. This analysis examines how momentary stressor occurrence, magnitude, and subjective stress are associated with ambulatory BP responses, both concurrently and ~45 minutes later. As a secondary aim, we examined if trait perseverative cognition (PC) moderates these associations. A diverse sample of adults (N=300; 150 men; age M=42.4, SD=12.8; 60% non-Hispanic white; BMI M=29.3 kg/m2, SD=6.5; mean clinic BP=139/83; 15% on BP meds) completed ambulatory BP and ecological momentary assessment (EMA) reports at ~45-minute intervals over two consecutive days. The EMAs assessed stressor occurrence and magnitude, and current subjective stress. The association between momentary stress indicators and momentary and time-lagged mean arterial pressure (MAP) were examined using multi-level models. Trait PC was assessed at baseline and was included as a moderator. Covariates include age, sex, BMI, recent exercise, and momentary activity and posture. The

report of a recent stressor was concurrently associated with higher MAP (relative to non-stressor moments; p<.001). Higher stressor magnitude ratings (p<.001) and higher subjective stress (p<.001) were both concurrently associated with higher MAP (relative to lower stress ratings in each case). There were no significant associations between stress indicators and time-lagged MAP. PC did not moderate the association of concurrent or time-lagged stress and MAP. Implications and future analyses will be discussed.

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14. **Trapped in stress - The impacts of loneliness on emotional responses to everyday stressors**

The purpose of the study is to evaluate whether loneliness is related to how people experience and respond to everyday stressors. We addressed three research questions. First, we examine whether loneliness relates to a higher likelihood of reported stress. Second, we examine whether loneliness relates to greater increases in negative affects (NA) when the proximal stress occurs (Reactivity). Third, we examine whether loneliness is associated with greater prolonged emotional responses to distal stressors (Recovery). Stress responses are operationalized by the difference in negative affect between times when people report not having experienced a stressful event and time when a negative event was reported. A systematic probability sample of 255 adults (Mage=45.5, range=25-65) reported recent stressors and current emotion five times a day for 14 days. Within-person analyses using multilevel modeling indicated that the loneliest group showed a higher likelihood of experiencing everyday stressors than the least lonely group did (p<.05). Also, they showed higher levels of NA (p<.001) and larger lagged effects of experiencing stressors on NA than the others (p<.05). Taken together, it seems

that lonely people might find themselves more likely to encounter (or perceive) events as stressful and more difficulty recovering from the negative emotional states that follow. Based on these results, loneliness might contribute to the contexts where chronic stress and stress-associated health risks occur by inciting stress responses to happen too often and last longer so that they produce a sustained effect on biological systems and long-term health outcomes. Results will be discussed further regarding potential real-time interventions to enhance the emotional well-being of lonely people.

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15. **I can't stop ruminating. The role of inhibition in daily repetitive negative thinking.**

Introduction
Repetitive negative thinking (RNT) is a risk, maintain and recurrence factor in mood disorders (for a review see: Watkins, 2008). One of the main features of maladaptive RNT is lack of control over it. A recent meta-analysis suggests that RNT is linked to impaired inhibition (Yang et al., 2017). This link can potentially explain difficulties in controlling and stopping RNT. However, this hypothesis has never been previously explored in ecological settings. The main aim of the present study was twofold. First, we tested the link between RNT and emotional regulation in remitted depressive patients and healthy controls in ecologically valid settings. Second, we verified how inhibition affects that link.
Method
40 participants (20 remitted depressive patients and 20 healthy controls) participated in the study. First, they underwent an on-line assessment of depressive symptoms and trait rumination. Second, during 7 consecutive days they used an ecological momentary assessment (EMA) mobile phone application. Their mood and rumination level were assessed 5 times a day through short self-reported questions (Koster et al., 2015) and their inhibition efficiency level (Emotional Stroop Task) was assessed once a day.
Results
The 3-level models in multilevel modeling analysis (level 1–observation, level 2-days, level 3–persons) suggested that in both groups daily RNT predicted momentary negative affect. Moreover, daily inhibition impairment of negative material strengthened that link.
Conclusion
The present study is a first one to support the role of inhibition in RNT in ecologically valid settings. The results are promising in the perspective of developing, on mobile devices, an executive functions training addressing maladaptive RNT.

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16. **Under which circumstances does studying lead to stress? Explaining intraindividual differences by using the cortisol-awakening response as a moderator**

   Numerous studies have shown an association of the cortisol awakening response (CAR) with various health and risk factors. Some of those revealed a protective function of the CAR as a buffer of the subjective stress experience after stressful events. We investigated the moderating effect of the CAR on subjective stress ratings in students' daily lives using ambulatory assessment. We focused on the effect of time spent studying on subjective stress experience.

   Subjective stress experience and time spent studying were assessed hourly during the waking time of 77 undergraduate university students, one week at the beginning of semester and exactly one week before an exam in the exam period with e-diaries. In addition all participants provided CAR samples on two consecutive days at both assessment weeks. For the current analysis we used these two days of each assessment week. Multilevel analyses were computed using the cortisol markers, S1 (first assessment after awakening), AUCi (area under the curve with respect to increase) and AUCg (with respect to ground), while controlling for stress at the previous assessment, wakening time, age, gender and intake of oral contraceptives.

   There was a highly significant positive within subject association between time spent studying and the subjective stress ($p < .001$). The crosslevel interaction between the S1 ($p < 0.001$) and AUCg ($p < 0.05$) and time spent studying on stress was significant, while there was no significant interaction between AUCi and time studying on stress. The higher the S1 and the AUCg, the smaller the increase of stress after studying.

   The results are in line with research showing an alteration of the stress response as a function of the CAR and underscore the importance of the CAR in stress regulatory processes.

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17. **Is fibrofog related to pain? Differences in the association between momentary pain and cognitive functioning for those with and without fibromyalgia**

Cognitive dysfunction in fibromyalgia (FM), or "fibrofog", is highly prevalent but not well-understood. A prevailing theory is that cognitive functioning is disrupted by the occurrence of pain, which may divert cognitive resources away from the cognitive task at hand. Unexplored to date is the role of momentary fluctuations in pain on cognitive function in everyday life. To address these limitations, we conducted a study of ambulatory objective cognitive function in a sample of adults with FM and age-, sex-, and education-matched controls (non-FM) to test the hypotheses that: 1) momentary increases in pain will be associated with decreased cognitive performance; and 2) relative to the non-FM group, people with FM will show a steeper decrease in cognitive performance in the context of increased pain. Fifty adults with FM and 50 non-FM (N=100) completed ecological momentary assessments of pain intensity on a numerical rating scale of 0-100 and cognitive tests of processing speed (Symbol Search) and working memory (Dot Matrix) via a smartphone app, 5X/day for 8 consecutive days. Results of multilevel mixed effects models showed that across groups, momentary pain was not significantly associated with concomitant cognitive performance. However, group membership (FM/non-FM) significantly moderated the association between momentary pain and cognitive performance; as expected, the FM group demonstrated increased reaction time (RT), variability in RT, maximum memory errors, and variability in errors with increases in pain, but the non-FM group showed better performance across these facets of cognitive functioning when pain was high. Findings suggest that fluctuations in pain may play an important role in the real-world experience of fibrofog in persons with FM.

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18. **Considering the role of the time interval in time-lagged relationships (in meta-analysis)**

The emergence of devices, such as smartphones, led to an exponential increase in Ambulatory-Assessment (AA) data studies in the social and medical sciences. AA-data offer the unique opportunity to model everyday processes as they unfold over time and to investigate cross-lagged relationships, that is, the effects variables (say, Stress and Anxiety) have on each other. While lagged effects models can be viewed as simple SEM or regression models, they typically tend to ignore the well-known problem of time-interval dependency. That is, these models ignore that the parameter estimates change depending on the time that elapses between measurement waves. This means that studies that use different uniform time intervals between observations can come to very different parameter estimates, and conclusions, about the same underlying process. For example, the effect of current stress on anxiety one hour later differs from the effect of current stress on anxiety three hours later. Hence, to compare (standardized) lagged parameters or to aggregate them via a meta-analysis, one must explicitly model this time-interval dependency to avoid misleading or inconsistent conclusions.
In this presentation, I will describe a continuous-time approach (to meta-analysis), which explicitly

models lagged effects as a non-linear function of the time interval. I will also demonstrate novel tools which aid researchers in applying these (meta-analytic) techniques. Furthermore, I examine the performance of our new meta-analytic approach in relation to current best practice in the field: treating time-interval as a linear or step-wise moderator of the lagged effect.

Rebecca M. Kuiper, Assistant professor, Utrecht University, Department of Methodology & Statistics

Oisín Ryan, Utrecht University, Department of Methodology & Statistics

19. **"Buzzwords": Crowd-Sourcing Young Adult Language to Capture Momentary Feelings of Alcohol and Marijuana Intoxication**

Rates of heavy alcohol use remain high and daily marijuana use is at an all-time high in young adults. As perceptions of impairment may guide risky decision-making, understanding subjective feelings for alcohol and marijuana (MJ) use is critical. Existing diary metrics (0-100 rating of, "how drunk/high do you feel?") are problematic in differentiating levels of impairment. Measures incorporating contemporary language may better capture feelings of impairment in daily life. We developed sliding scales based on crowd-sourced and rank-ordered feelings of subjective alcohol intoxication and MJ impairment and compared use of these scales with standard scales in a daily diary study. In a first MTurk study, 323 alcohol and MJ users provided words to describe feelings of impairment from alcohol or MJ. In a second MTurk study, 289 users rank-ordered the most commonly generated terms. Sliding scales for alcohol and for MJ were incorporated in an ongoing diary study of 175 young adults. Each day participants report on subjective feelings from alcohol and/or MJ use. The sliding scale for alcohol impairment resulted in four anchors ranging from 0 to 100: slightly buzzed, tipsy/"happy", drunk, and wasted. The four-anchor MJ scale resulted in relaxed, calm/chill, high, and stoned/baked. Preliminary results show higher means and greater variances from the new scales (M=43.6, SD=28.5 for alcohol; M=51.0, SD=21.3 for MJ) compared to standard scales (M=38.2, SD=25.7 for alcohol; M=45.6, SD=17.9 for MJ). Our scales may better capture within- and between-person variability. Future work could pair sliding scales with measures of actual intoxication to understand individual covariation in subjective effects, actual impairment, and consequences to develop just-in-time interventions.

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Loren D Masters MPH, The Pennsylvania State University

Aaron C Luneke PhD, The Pennsylvania State University

Stephanie T Lanza PhD, The Pennsylvania State University

20. **An examination of the natural occurrence of upward body-focused comparison cognitive responses using an ecological momentary assessment study**

Upward body-focused social comparisons, or comparing one's body to those who are closer to one's body ideal, are prevalent among young women and associated with negative health outcomes (e.g., eating pathology, lowered self-esteem). However, less is known about distinguishing features of the comparisons themselves as they occur in daily life. One important feature is the comparer's cognitive response (i.e. emphasis on self-evaluation vs. self-improvement). The present study examined the

natural occurrence of these cognitive responses to comparisons in an ecological momentary assessment (EMA) study. Undergraduate women (N=74, ages 18-25) completed surveys four times daily for seven days via a smartphone survey app. EMA surveys included measures of body-focused comparisons, body dissatisfaction, and thoughts of exercise. Baseline tendency to engage in comparisons was examined as a moderator. Both self-evaluation and self-improvement cognitive responses occurred during most comparisons, with self-evaluation occurring more often. At the moment level, both self-evaluation and self-improvement responses were associated with greater thoughts of exercise (ps<.05), but not body dissatisfaction (ps>.05). Women with a greater overall tendency to compare had a stronger negative association between self-evaluation and thoughts of exercise than women with lower comparison tendency. Self-improvement was not moderated by comparison tendency. The findings suggest women's self-evaluation and self-improvement cognitive responses to body-focused social comparisons can be assessed in daily life, and are differentially associated with outcomes for some women. Further research on these cognitive responses may help identify the components of body comparisons that may be most deleterious.

Rachel MacIntyre MS, Virginia Consortium Program in Clinical Psychology

Kristin E Heron PhD, Old Dominion University

Danielle R Arigo PhD, Rowan University

Abby L Braitman PhD, Old Dominion University

21. **Momentary Assessment of Minority Older Adults' Physical Activity and Sedentary Behavior: Feasibility and Validity**

Minority older adults are understudied in health behavior research. Ecological Momentary Assessment (EMA) is a methodological tool that can provide novel insights into the prediction and modeling of health behaviors; however, EMA has not been used to study physical activity (PA) or sedentary behavior (SB) among minority older adults. The study objective was to determine the feasibility and validity of an EMA protocol to assess minority older adults' PA and SB. For 7 days, minority older adults (n=91; 89% African American; MAge=70 years) received 6 randomly-prompted, smartphone-based EMA questionnaires per day and wore an ActivPAL monitor to measure PA and SB. PA and SB were also self-reported through EMA. Minority older adults were compliant with the EMA and ActivPAL protocol on 92.4% of occasions. Participants were more likely to miss an EMA prompt in the afternoon compared to morning (OR=1.56, 95% CI: 1.10, 2.21) and on weekend days compared to weekdays (OR=2.09, 95% CI: 1.55, 2.79). Participants were less likely to miss an EMA prompt when engaged in more device-based SB in the 30-min window around the prompt (OR=0.97, 95% CI: 0.96, 0.99). When PA was reported through EMA, participants engaged in less device-based PA in the 15 min after compared to the 15 min before the EMA prompt (p<0.05), suggesting possible reactance or disruption of PA. EMA-reported PA and SB were positively associated with higher device-based PA and SB in the 30-min window around the prompt, respectively, supporting criterion validity (ps<0.05). Overall, the assessment of minority older adults' PA and SB through EMA is feasible and valid. Future research in this population should consider activity-related behaviors may influence EMA compliance and the possibility of reactance to EMA prompting.

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* Derek J Hevel MS, University of North Carolina Greensboro

Kourtney Sappenfield, University of North Carolina Greensboro

Heidi Scheer, University of North Carolina Greensboro

Christine Zecca, University of North Carolina Greensboro

Laurie Kennedy-Malone Ph.D., GNP-BC, University of North Carolina Greensboro

22. Conceptualizing and Defining Acceptability in mHealth Research

Evidence supports the efficacy of many mHealth interventions, however, there is a limited empirical base regarding the best practices for human-centered and process-oriented factors in mHealth implementation. Greater acceptability (e.g., willingness to engage in an intervention) is associated with efficacy-related processes (e.g., intervention adherence). There is not, however, a clear and consistent definition of acceptability, making its evaluation difficult. Objective: To generate an evidence-based definition of mHealth acceptability, and to examine patterns of acceptability conceptualization across the mHealth literature, via a narrative literature review. Methods: Articles (N=397) containing relevant terms (e.g., "mobile health", "acceptability") in the title/abstract were identified; articles (N=74) explicating a definition of acceptability or specific assessment constructs were reviewed. Results: We did not identify a standard definition of mHealth acceptability in the literature; moreover, other terms are used interchangeably with acceptability, further impeding clear use of the construct. We propose a definition based on common themes identified across articles that encompasses end-user's subjective and affective perceptions of, and measurable and sustained engagement with, a mobile health intervention system – including perceived satisfaction, willingness, and agreeability, as well as objective measures of intervention engagement (e.g., completion rates). We further note that acceptability, in the mHealth context, is different from feasibility and usability. We also discuss next steps for reaching a field-wide consensus on operationalizing acceptability in mobile health research and practice.

Frank Materia MS, MHS, Penn State University

Danielle Symons Downs PhD, Penn State University

Joshua M Smyth PhD, Distinguished Professor of Biobehavioral Health and Medicine, Penn State University

23. **Measuring Daily Minority Stress among Sexual and Gender Minority Adolescents: A Mixed Methods Approach**

Lesbian, gay, bisexual, and transgender (LGBT) adolescents are at greater risk for poor mental health compared to their heterosexual and cisgender peers. These health disparities are partly due to stress ("minority stress") specific to LGBT adolescents' stigmatized identities. Existing measures only examine lifetime or recent minority stress; none assess daily minority stress. Identifying measures to assess minority stress and understand its daily frequency is needed to inform prevention and intervention work. This study tested two methods of measuring minority stress using a daily diary study among LGBT adolescents.

Participants (N=90), ages 12 to 18 years, were recruited from the community. They completed an online survey nightly for 21 days. Minority stress was measured with a 9-item scale with Yes/No response options and then selected identities they attributed to their experience. They also responded to one open-ended response question ("What were your "lows" or negatives about being LGBTQ today and in the last 24 hours?"). Qualitative responses were reviewed and coded by two research assistants; coding disagreements were discussed until consensus was reached. Data were obtained for 1617 days (85.56% response rate). Preliminary results indicated that participants reported at least one minority stressor on 642 and 672 days using the 9-item scale and 1-item question, respectively. Of the 642 days, stressors were attributed to sexual orientation (417), gender identity (251), and gender expression (192).

LGBT adolescents experience a significant number of minority stressors each day. Both types of measures demonstrated similar reporting rates. Each provided unique data but differing strengths (e.g., in-depth detail) and weaknesses (e.g., burden).

Ethan Mereish PhD, American University

24. **Perseverative Cognition, Distracted Communication, and Well-Being in Everyday Social Interaction**

Research suggests that social isolation can negatively affect well-being. But it is not just the sheer lack of social interaction that poses a threat. Interaction of poor quality can also be harmful. One seemingly-common reason for poor-quality interaction is that communicators are distracted and unfocused on the interaction and interaction partner. A major culprit of distracted communication is individuals' own negative thought processes, which effectively leave them "out of the moment" and "in their own heads." Given the many stresses of everyday life, it is perhaps not surprising that people are often distracted by negative self-talk and imagery. Yet research on the incidence and consequences of negative thinking occurring during everyday social interaction is limited. The current research thus explores how distracted communication attributable to negative thinking operates in everyday interaction and is associated with well-being. This study examines two distinct forms of negative thinking: rumination and worry. We hypothesized that rumination/worry harms well-being in part because it causes communicators to become distracted and unfocused during communication episodes, thus undermining the benefits of social interaction. Specifically, we predicted that, during moments of interaction, the link between perseverative cognition and well-being is mediated by distracted communication. Hypotheses were tested using smartphone-based experience sampling data composed

of nearly four thousand moments from an adult sample (N = 127). Among other findings, results indicated that rumination/worry during interaction negatively predicted well-being and that that association was partially mediated (at the within-person level) by distracted communication.

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Jeffrey A Hall Ph.D, University of Kansas

Quinten Bernhold MA, University of California, Santa Barbara

25. **Is infant crying in the ear of the beholder? Examining the relationship between mothers' perceptions of daily infant crying and maternal depression**

This study compares mothers' estimates of daily infant crying time to a novel, objective method for detecting infant crying "in the wild", then determines if differences between estimates vary by maternal depressive symptoms.

Mother-infant pairs (N=22; expected N=40) were recruited to participate in a study leveraging wearable sensors to study behavioral mechanisms of transmission of depression from mothers to infants. At study consent, mothers completed the Edinburgh Postnatal Depression Scale (EPDS) and estimated minutes their infant cried each of the past 3 days. Minutes were averaged across days to obtain a single estimate of parent-report minutes crying per day. At home within the same week, infants (mean age 7.8(3.8) months) wore a wireless audio recorder. The device (LENA) captured audio within 10 feet of the infant and was secured into a custom-fit vest worn for one full day (mean 23.5(1.4) hours). Cry detection algorithms developed and used by our team improved accuracy of LENA-provided cry detection when compared to trained human coders (kappa = .72 vs .37). Difference scores equaled parent-report minus LENA-detected minutes crying per day. K means clustering of EPDS scores revealed 2 clusters (n=10; n=12), where marginal differences in maternal depressive symptoms (EPDS 8.1(2.0) vs 2.9(2.0), p = .053) were not significantly associated with mothers' reporting of crying relative to LENA (-5(38) vs +11(27) minutes, p = .126). Multiple regression analysis revealed that older infant age (p = .016), but not maternal depressive symptoms (p = .619), predicted mothers' underreporting of crying relative to LENA. Discussion will highlight insights from reported vs objective markers and situate results within the literature on reporting bias and maternal depression.

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26. **Implementing the Electronically Activated Recorder to Illustrate Real-world Social Dysfunction in Schizophrenia**

Social dysfunction is among the most disabling aspects of schizophrenia. Assessments of social dysfunction are frequently inaccurate due to the limitations of laboratory measures (e.g., retrospective reports, social desirability) and inherent challenges of the illness (e.g., cognitive impairment, poor insight). To overcome these barriers, this study implemented the Electronically Activated Recorder (EAR) to objectively measure social functioning. The EAR is a computer application that collects behavioral samples at pre-programmed intervals using audio recordings; it is combined with widely used smartphone devices (e.g., iPod Touch, iPhone, Android) to allow direct, real-world observation of social interactions. Despite the need for this approach, no previous study has tested the EAR in schizophrenia. Here, we tested the EAR's feasibility, acceptability, and discriminant validity in schizophrenia (n = 27) and healthy control groups (n = 20). Preliminary data showed good fidelity and acceptance of the EAR in the schizophrenia group. We also observed significant differences in social interactions and social engagement when comparing schizophrenia and control groups. This suggests that the EAR is a viable instrument for schizophrenia populations that can overcome barriers associated with widely-used measures. By providing a window into schizophrenia, it has potential to bridge innovative technology with naturalistic assessment and provide researchers and clinicians with interactions from their clients' daily life. This study represents an initial step toward this long-term goal.

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Kathryn L Hardin MS, Indiana University - Purdue University Indianapolis

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27. **Assessing daily subjective cognition: Distinguishing memory and attention problems from overall cognitive functioning**

Collecting perceptions of daily cognitive problems requires reporting on difficult to discriminate experiences. For example, losing your keys could be attributed to a lapse in memory (e.g., inability to recall the location), a lapse of attention (e.g., not paying attention when you set your keys down), or general perceptions about your cognitive functioning (e.g., my thinking is slow today). It is critical to establish that individuals are able to reliably discriminate among these different experiences. We examined this using data from an intensive longitudinal study that included separate self-reports of attentional control, memory lapses, and overall cognitive functioning in 256 individuals (ages 25-75). Participants completed these measures each day for 14 days at an end-of-day assessment. Using multilevel factor analysis, we explored the factor structures of these measures to identify the clustering of items within individuals over days, as well as across individuals. Results indicated a three-factor solution best fit the data at both levels (CFI=.993; TLI=.979; SRMRwithin=.007; SRMRbetween=.014). Structurally, factors were consistent across both levels. This suggests that the items discriminate different experiences of cognitive problems; however, the items assessing perceptions of overall cognitive functioning formed a factor that was separate from, and not highly correlated with, the other factors, particularly at the within-person level (rs=-.13 with memory, and -.14 with attention). This could

indicate that perceptions of overall cognitive functioning reflect something other than the experience of specific problems on a given day. Additional work is needed to understand the experiences that inform individuals' judgments about their cognition on a daily basis.

Jacqueline Mogle Ph.D., Pennsylvania State University

Nikki Hill Ph.D., Pennsylvania State University

Martin Sliwinski Ph.D., Pennsylvania State University

28. **Time Well Spent: The Efficacy of Interventions for More Intentional Smartphone Usage**

Smartphone ownership is nearly ubiquitous in America; 77% of adults and 94% of 18-29 year-olds now own a smartphone (Pew, 2018). Research on smartphones and their impact on individuals and societies has grown apace, however the vast majority of smartphone research fails to take advantage of the very device it studies (Ellis et al., 2018). The present study employed actual usage tracking via smartphone application to test smartphone settings interventions which have been reported to help users "live more intentionally" with their devices (Center for Humane Technology). We empirically examined the impact of a three-week intervention package (preceded by a three-week baseline) in a sample of university students (N=206). During the intervention, half of participants were randomly assigned to: 1) turn off all notifications except incoming calls and texts, (2) move all non-tool applications from the homescreen and put them in folders, and (3) turn the phone to grayscale. Relative to the control condition, participants in the intervention condition reported better physical health, $F(1,204)=8.33$, $p=.004$, better mental health $F(1,204)=4.35$, $p=.038$, and less automaticity of phone use, $F(1,204)=3.92$, $p=.049$. Notably, total usage was not impacted by the intervention. Reduced automaticity of use mediated improvements in mental health and reductions in addiction, anxious attachment, and distraction. During the intervention period, compared to baseline, participants in both the intervention and control conditions used their phones less and reported less stress, automaticity, addiction, anxious attachment, and distraction, as well as better physical and mental health; we hypothesize that usage tracking itself may decrease automaticity and contribute to more intentional use.

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29. **Ecological momentary assessment versus retrospective assessment for measuring change in health-related quality of life following cardiac intervention**

Background: Patients undergoing elective percutaneous coronary intervention (PCI) recover faster than patients receiving coronary artery bypass graft (CABG). It is unknown if momentary and retrospective measurements of health-related quality of life (mHRQoL and rHRQoL) equally detect such differences in recovery.
Objectives: To examine the validity of change in mHRQoL and rHRQOL on criterion measures of change (cHRQOL) between patients undergoing PCI (n=21) or CABG (n=8).
Study: mHRQoL levels of fatigue, pain, positive and negative mental state, and physical symptoms were assessed 9 times a day for 7 consecutive days at two assessment periods; one prior to and one after intervention. Each assessment period was followed by rHRQoL using the same questionnaire referring to

the past week. cHRQoL was assessed with the New York Heart Association (NYHA) and subjective significance change questionnaire (SSQ), the latter only administered after intervention.
Analysis: Multilevel regression with random intercept on patient level was used to examine the difference between PCI vs CABG on change in mHRQoL and rHRQoL, and the relationship between change in cHRQoL and change in mHRQoL and rHRQoL.
Results: All cHRQoL improved. Both mHRQoL and rHRQoL indicated a recovery in fatigue, physical symptoms, and positive mental state. No difference between PCI vs CABG on change in mHRQoL and rHRQoL was found. We found a relationship between SSQ and change in mHRQoL. There was no relationship between rHRQOL change and cHRQoL.
Conclusion: Both mHRQoL and rHRQoL indicated a recovery following cardiac intervention, albeit similarly between PCI and CABG. mHRQoL was more related to criterion measures of change than rHRQoL.

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30. The Role of Heart Rate Variability in the Job Demands-Resources Model: An Ambulatory Assessment Study on Psychophysiological Stress Reactions

According to the job demands-resources (JD-R) model, individual stress reactions are based on the level of job demands combined with the amount of stress-buffering job and personal resources. The authors propose that the model is not only applicable to specific but also to any types of demands, resources, and outcomes. However, research integrating heart rate variability (HRV), a stress-sensitive marker of cardiovascular health, into the JD-R framework is rare. Using a sample of school teachers, we conducted an ambulatory assessment study to investigate HRV as 1) a physiological outcome measure and 2) a physical resource. More specifically, we examined direct and moderating effects of job demands and resources on emotional exhaustion and / or HRV. After completing a paper-pencil questionnaire for personal resources (resistance toward stress, emotional well-being), the 108 participants wore an electrocardiogram device throughout two working days and repeatedly rated their job demands (workload, interpersonal conflicts), job resources (control, support), and the level of exhaustion six times a day. Based on a total of 1094 measurements, multilevel models were built for emotional exhaustion and for the 5-minute means of HRV preceding the ambulatory questionnaire. Results generally showed that many of the direct and moderating JD-R effects turned out to be statistically important for emotional exhaustion, but not for HRV. However, HRV as a trait-like moderator buffered the negative effects of both workload and interpersonal conflicts on emotional exhaustion. These findings highlight the differences between momentary psychological and physiological outcome measures and provide insight into the stress-buffering potential of physical (not only job and personal) resources.

Regina Franziska Riepl MSc, Catholic University of Eichstaett-Ingolstadt

Joachim Thomas PhD, Catholic University of Eichstaett-Ingolstadt

31. Affective Trends Prior to and After Drinking in an EMA Protocol: An Application of Three-Level Time-Varying Effect Modeling

Positive (PA) and negative affect (NA) are strong correlates of drinking behavior. However, few studies have measured affect intensively both before and after drinking is initiated in day-to-day life. Additionally, given its highly dynamic nature, methods that can elucidate non-linear change trajectories in affect are essential to a better understanding of affective shifts prior to and after drinking has begun. 404 adult drinkers completed 21 consecutive days of EMA, during which their PA, NA, and drinking were assessed 5 times daily with additional assessments during drinking episodes. Three-level TVEM was used to estimate non-linear change in affect as a function of time relative to the start of drinking while adjusting for person- and day-level clustering. Time-varying main and interaction effects of drinking, baseline drinking motivations (drinking to cope [DTC] or enhance PA [DTE]), and their 95% confidence intervals (used to determine significance at each time point) were also estimated. On days when

individuals engaged in drinking, PA was significantly higher and NA was significantly lower starting 5 hrs before drinking began. These differences peaked roughly 2 hrs into the episode and declined but remained significant thereafter. For individuals with higher DTE, drinking was associated with larger increases in PA both prior to and after drinking initiation, but not with larger decreases in NA. DTC did not moderate drinking effects. Our findings that (a) affective shifts were present prior to drinking initiation, and (b) these shifts were stronger for individuals with higher DTE may inform just-in-time interventions. Broader implications for research and theory will be discussed.

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Ashley N Linden-Carmichael PhD, Penn State University

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Thomas M Piasecki PhD, University of Missouri, Columbia

32. Using dynamic models to identify targets for intervention in psychology

The explosion in availability of intensive longitudinal data has promised to revolutionize how researchers devise personalized treatments for psychopathology. This goal is exemplified in the dynamical network approach, which treats these pathologies as systems of interacting symptoms. In this approach, subject-specific network structures are derived from parameter estimates, typically using the lagged effects from a first-order vector auto-regressive (VAR(1)) model. Intervention targets are typically identified by calculating centrality measures from these network structures. In this presentation we critically evaluate the use of centrality measures, and more generally dynamic models, for the identification of intervention targets. We identify two pressing needs which should be addressed for this practice to move forward: 1) a greater clarity in the nature of the interventions considered and 2) a great focus on the desired behavior of the dynamic system of interest. We evaluate how clarifications regarding the intervention type and target behavior can lead to dramatically different suggestions of intervention targets, with reference to a substantive example.

Oisín Ryan, Research Masters (PhD Candidate), Utrecht University

Ellen L Hamaker PhD, Utrecht University

33. A Comparison of Three Self-report Assessments of Cannabis Use in Recreational Users

Introduction: Research has shown that single retrospective assessments are subject to retrospective biases. Nonetheless, standard diagnostic procedures such as questionnaires and interviews ask subjects to retrospectively assess their substance use over the last week, the last month, or even as far back as 2 years prior to the interview date. It is critical that substance use research utilizes the most accurate methods to assess use to ensure sound results. In a large data set, we compared three different self-report methods (single assessment measure, SAM; timeline followback, TLFB; ecological momentary

assessment, EMA) to examine how they differ and consider their strengths and weaknesses. Method: Cannabis users (n=222) were recruited in the Syracuse area. Participants reported their quantity and frequency of use in a single interview (i.e, the SAM) at the intake appointment. They then completed three weeks of EMA, consisting of 8 assessments throughout the day, where they reported their use during each prompt, thus covering the entire 24 hours of each day. After the EMA period, participants completed a TLFB to retrospectively recall their use during EMA. We examined the correlations between all three methods regarding use days and quantity of use over a three-week period. The agreement between use days and quantity of use between the EMA and the retrospective TLFB reports were examined using Bland-Altman plots. Results: We found differences between all three methods of assessment. An in-depth analysis using the Bland-Altman plots revealed that EMA reports were greater than TLFB reports, both regarding use days and quantity of use. Thus, participants tended to under report the number of use days and the quantity of use per day on the TLFB. However, there was a large variability between the two methods with participants reporting more use on both. This variability increased with the amount of use. Therefore, heavy users saw the largest disagreement between methods. Discussion: Our findings suggest that the TLFB is not a reliable method of assessment for heavy cannabis use. Future research must decide between the cost effectiveness of single assessment measures versus the investment into more valid methods, such as EMA.

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Emily B. Ansell PhD, Syracuse University

34. **Real-Time Monitoring in Practice: How to Identify Pattern Transitions and Related Precursors in Human Change Processes**

Procedures of internet- and app-based ambulatory assessment have got part of routine practice in psychotherapy and by this a feature of good practice. Although many researchers agree on this there are big differences in how such procedures are realized. Indeed, these differences may designate different paradigms in psychological practice, like the linear-interventionist and the nonlinear dynamic systems paradigm. Although the mainstream prefers linear approaches (outcome monitoring and identification of standard tracks) recent innovations in information technology opened the way to monitor the nonlinear features of human change dynamics in real time. Especially the internet-based Synergetic Navigation System (SNS) was optimized for high-frequency assessment in real-world settings and for the nonlinear analysis of the collected time series data. The new technology also has an impact on the conceptualization of psychotherapy feedback, e.g., concerning measurement frequencies and sampling rates, the variables to be assessed, the methods of time series analysis, the way how to practically use the technology, and how to do feedback-based interviews. One important aim is to identify order transitions and their precursors in psychotherapy and counseling. The options available in the SNS for analyzing and visualizing non-stationarities and related precursors will be presented and illustrated by a case study of a patient diagnosed with dissociative identity disorder.

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Anna Lichtwarck-Aschoff PhD, Radboud University of Nijmegen, Behavioral Science Institute, Developmental Psychopathology

35. **Counseling-plus-ecological momentary intervention to reduce sexual and reproductive health risk in depressed young women: Pilot with 3-month follow-up**

Young women with depression have high risk of unintended pregnancy, HIV, and other sexually transmitted infections. We developed and piloted Momentary Affect Regulation–Safer Sex Intervention (MARSSI), a counseling-plus-Ecological Momentary Intervention (EMI). Depressed, high-risk female adolescent clinic patients age 15-24 met with a sexual health counselor for a manualized motivational interviewing and cognitive-behavioral session, personalized EMI message characteristics, and uploaded the study app on their smartphone. For 4 weeks, they completed signal-contingent reports 3x/day and a scheduled report 1x/day, and received messages prompting healthy behaviors and cognitive restructuring when they reported cognitions and affect related to sexual risk. After the 4 weeks, they had booster counseling. Participants completed assessments at baseline and 3 months post-intervention. Seventeen completed the counseling, 16 the EMI, 15 the booster, and 12 the follow-up (3 pending). App engagement was high (Mdn 6.5-7 days/week with >1 report across the 4 weeks). Post-intervention, most or all (80%-100%) agreed with each positive statement about EMI messages, reported "Excellent" MARSSI usefulness, and attributed improvements to MARSSI. PHQ-9 depressive symptoms were lower vs. baseline (Mdn 10 vs. 12, Z=-2.558, p=0.010). At 3 months, contraceptive knowledge was higher (Mdn score 11 vs. 10/12, Z=-1.998, p=0.046) and depressive symptoms remained lower vs. baseline (Mdn 6.5, Z=-2.945, p=0.003). MARSSI was acceptable and engaging to high-risk depressed young women, and associated with improved contraceptive knowledge and depressive symptoms. Future research is warranted to evaluate MARSSI's effects on motivation, skills, affect, and behaviors, as well as reproductive health outcomes.

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36. **The associations of job resources and challenge and hindrance demands with dedication in geriatric care: the mediating role of meaning and vigor**

> Based on the integration of the challenge-hindrance framework into the job-demands resources theory, the aim of this experience sampling study was to examine the role of state meaning and state vigor as mediators of the relationships of situational job resources and challenge and hindrance job demands with dedication. Regarding indirect associations via state meaning, we hypothesized positive paths for situational job resources and challenge demands and a negative path for situational hindrances. Considering indirect associations via vigor, we hypothesized negative paths for state challenge and hindrance demands and a positive path for state job resources. Ninety-five geriatric nurses took part in this study and provided 871 measurements. The data were analyzed by applying the SPSS macro MLmed while separating within- and between subject associations. Overall, the results were supportive for the hypotheses: While there were significant positive indirect associations of state job resources and challenge demands with dedication via meaning, for state hindrance demands in terms of role conflict a negative path was revealed. Furthermore, there were negative indirect associations of state challenge and hindrance demands with dedication via vigor, while the path for state job resources was positive. The differential relationships of challenge demands with meaning on the one hand and vigor on the other could explain, why the relationships between challenge job demands and work engagement often seem inconsistent. Furthermore, both paths may represent interesting starting points for intervention: it may be possible to strengthen the indirect path via meaning, for example by communicative means, and to reduce the indirect path via vigor, for example by providing rest breaks.

Joachim Thomas PhD, Catholic University of Eichstaett-Ingolstadt

Elisabeth Riedl MSc, Catholic University of Eichstaett-Ingolstadt

37. **Ambulatory Assessment in Psychopathology Research: A Review of Current Practices and Recommended Guidelines**

The use of ambulatory assessment (AA; Trull & Ebner-Priemer, 2013) in psychopathology research, which includes experience-sampling methods (ESM) as well as ecological momentary assessment (EMA), has increased dramatically over the last several decades. Previously, methodological and reporting guidelines have been presented to outline best practices and provide input on methodological issues and decisions that are faced when planning and conducting AA studies (e.g., Bolger & Laurenceau, 2013; Mehl & Conner, 2012; Stone & Shiffman, 2002). However, despite the publication of these important resources and guidelines, it remains an open question as to how much uniformity or consistency is evident in the design and reporting of AA studies of psychopathology. To address this, we review the reporting practices of published studies using AA in major psychopathology journals (Journal of Abnormal Psychology, Psychological Medicine, Clinical Psychological Science) over the last 7 years (2012-2018). Our review will highlight: (1) sample selection and size; (2) sampling design; (3) selection and reporting of measures; (4) devices used and software; (5) compliance; (6) participant training, monitoring and remuneration; and (7) data management and analysis. We conclude with recommendations for future AA studies in psychopathology.

Timothy Trull PhD, University of Missouri

Ulrich Ebner-Priemer PhD, KIT - Karlsruhe Institute of Technology

38. **Exploring experiential avoidance using an EMA paradigm**

Experiential avoidance (EA) refers to rigid attempts to alter the form, frequency, or intensity of unwanted internal experiences. EA has been linked cross-sectionally with negative psychological and behavioral outcomes and may prospectively predict worse mental health. However, few studies have explored within-person relationships between EA and negative outcomes or examined potential between-person moderators of these within-person relationships. We used EMA to examine within-person correlates, antecedents, and consequences of EA, and we tested the potential moderating role of depression and anxiety on these within-person relationships. Participants (n = 104) completed depression and anxiety measures and 28 momentary assessments of mood, thoughts, stress, and EA over a week. EA was positively associated with negative mood, negative thoughts, and stress, and negatively associated with positive mood and thoughts. The relationship between stress and EA was moderated by depression. Across the sample, negative mood, negative thoughts, and stress predicted later increases in EA. Positive mood and thoughts were not associated with later EA for the whole sample, but depression and anxiety both moderated the relationship between positive thinking and later EA. Across the sample, EA predicted later increases in negative mood, negative thinking, and stress, and decreases in positive thinking. EA was not associated with later positive mood. Anxiety moderated the relationship between EA and later negative thoughts. Our findings highlight links between momentary negative internal experiences and EA (which may be affected by depression or anxiety symptoms) and suggest that certain positive subjective experiences may buffer against EA.

Susan J Wenze PhD, Lafayette College

Trent L Gaugler PhD, Lafayette College

Erin S Sheets PhD, Colby College

Jennifer M DeCicco PhD, Holy Family University

39. **Understanding how mechanisms of motivational change contribute to the manifestation of dilatory behavior in students' daily lives**

Background: Dilatory behavior, the main criterion of procrastination, is characterized by the failure to implement an intended action in time (van Eerde, 2000). Although dilatory behavior is assumed to be determined by failures in self-regulation, investigations on these intra-individual mechanisms have been widely neglected. Therefore, an experience sampling study was conducted to investigate whether intra-individual variations in motivational appraisal processes contribute to the manifestation of dilatory behavior in real life. Aim: We aimed to examine whether the occurrence of dilatory behavior can be predicted by intra-individual changes in cognitive-affective appraisals of a given task over critical stages of goal-pursuit. Method: For eight days, 75 students used an e-diary to indicate study-related tasks they intended to work on the following day (intention-formation). At the time indicated for the implementation of an intention (intention-realization), participants stated whether they delayed or followed their intention. Task-specific appraisals (value, aversiveness, effort, expectancies) were measured within both units of assessment. Results: Results of logistic two level regression analyses confirm that intra-individual changes in the task-specific appraisals arising between intention-formation

and intention-realization predict the occurrence dilatory behavior. The relative risk for a delay increased with increasing task-aversiveness (OR = 2.12, p < .01), while the risk decreased when the subjective value of a task (OR = 0.39, p < .01) and expectations of success (OR = 0.36, p < .01) increased. These insights to intra-individual and task-specific antecedents of dilatory behavior may also help to develop effective strategies to prevent its dysfunctional effects.

Lena Wieland MSc, Karlsruhe Institute of Technology (KIT)

Ulrike E. Nett Jun.-Prof., Augsburg University

Ulrich W. Ebner-Priemer Prof., Karlsruhe Institute of Technology (KIT)

Posters (In order of program)

1. **A dynamic network approach to unravel micro-coded parent-child interaction**

Micro-level family interaction processes are considered to be the engines of child development as well as indicators of (mal) adaptation. Studying these interaction patterns in moment-to-moment exchanges between parents and their children, seems thus to be the next step in order to advance theory and, in the long run, diagnostic processes and interventions. To this end, videotaped parent-child interactions are coded in short time intervals (i.e., one or a few seconds) for the absence or presence of multiple target behaviors. In the current presentation we propose a data-analytic method based on corrected Jaccard similarity indices, which simultaneously captures the relative frequencies, the co-occurrences and sequential dependencies of the studied behaviors of the persons involved. To investigate whether the strength of the co-occurrences and sequential dependencies significantly exceed chance level, we developed a simulation based significance test that takes serial dependency into account. The method visualizes the significant sequences, co-occurrences and frequencies in a network picture, depicting the behaviors as nodes and the co-occurrences and sequential dependencies as links between them. Because of the gestalt perspective it offers, the network visualization helps to detect patterns that were previously unnoticed, allowing to interpret the complex dynamics of the interaction. By applying the framework to empirical data, we show that it can be used to compare the interaction patterns between/across different types of families, or to analyze the patterns of an individual family.

Nadja Bodner, Master, KU Leuven; Guy Bosmans PhD, KU Leuven; Francis Tuerlinckx PhD, KU Leuven; Eva Ceulemans PhD, KU Leuven

2. **Indivi: Personalizing Feedback for Study Participants at Scale**

Ambulatory assessment often includes a significant burden to the participant, particularly if it includes self-reports. One way of compensating this effort and allow the study participant to take part in the interpretational discourse, is to provide personalized feedback of own data. With increasingly large number of study participants, manually personalizing feedback becomes infeasible. In this poster, we present "Indivi", an open-source web application that aids researchers to personalize feedback at scale. Indivi is an interdisciplinary collaboration between experts in ambulatory assessment and Human−Computer Interaction. We started with Contextual Inquiry interviews with ambulatory assessment

experts, resulting in work models showing (1) an iterative process of analyzing and formulating personalized feedback, (2) a taxonomy of variables and the associated method to visualize and contextualize the feedback. Based on these findings, we iteratively designed and tested the Indivi tool . To use Indivi, the researchers import a comma-separated file of study data. Indivi supports data from many types of study designs, including longitudinal data and dyadic data, within- and between-subjects. Then, they specify sets of variables. For each of these sets, in the second step, Indivi automatically choose an appropriate chart type and classifies participants in three categories depending on their individual values. The researchers assign textual explanation individually for the high, medium, and low values. These are used to personalize the feedback.

We believe that Indivi will provide researchers within an ambulatory assessment framework a scalable way to use personalized feedback to foster the participatory moment in their studies and motivate study participants.

Florian Fischer MA, University of Zurich; Chat Wacharamanotham PhD, University of Zurich; Andrea B. Horn PhD, University of Zurich

3. **Optimizing remote study recruitment and compliance using videos for an online daily diary study of sexual minority women: An experimental design**

Ecological momentary assessment (EMA) methods can be used to remotely assess physical and mental health in daily life for hard-to-reach populations, such as sexual minority women (e.g., lesbian, bisexual), who, in the U.S., are marginalized and geographically dispersed. However, EMA studies are often complex and engaging participants from afar can be a challenge. This study experimentally examined whether adding videos to written recruitment materials would improve consent, compliance, and attrition for an online daily diary study. As part of a 2-week study of same-sex female couples' health, 378 women ages 18-35 were recruited from across the U.S. using a market research firm. Couples were randomized to an introductory information condition (videos+written materials or written materials only) prior to informed consent. Overall, 97.1% of eligible women reviewed introductory materials and of these 96.7% consented; consent rates did not differ by condition (p=.98). Compliance with daily diaries was high (84%) and attrition was low (7%); neither differed by video condition (ps>.56). Data from women randomized to receive videos indicated most (>69%) did not review all videos, but those who spent more time watching videos were more compliant with the daily protocol (p<.001). In sum, we had high consent and compliance and low attrition, regardless of video instructions. Although sexual minority women can be hard to reach, our potential participants appeared highly motivated to take part in research, and thus video recruitment materials were not necessary to improve participation. Future experimental research to maximize EMA study design and implementation could be important for populations less inclined to participate in EMA studies, or who are less familiar with research.

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Abby L Braitman PhD, Old Dominion University and Virginia Consortium Program in Clinical Psychology
Robin J Lewis PhD, Old Dominion University and Virginia Consortium Program in Clinical Psychology
Charlotte A Dawson BA, Virginia Consortium Program in Clinical Psychology
Lindsay M Howard MS, Virginia Consortium Program in Clinical Psychology
Rachel I. MacIntyre MS, Virginia Consortium Program in Clinical Psychology

4. **A Comparison of Signal- and Event-Contingent Ambulatory Assessment of Interpersonal Behavior and Affect in Social Situations**

Ambulatory assessment (e.g., ecological momentary assessment) is now widely used in psychological research, yet key design decisions remain largely informed by methodological lore as opposed to systematic inquiry. The present study experimentally tested whether signal- (e.g., random prompt) and event-contingent (e.g., complete a survey every time a target event occurs) recording procedures of interpersonal behavior and affect in social situations yield equivalent quality and quantity of data. Participants (N = 286) completed baseline questionnaires, underwent cluster randomization to either a signal- or event-contingent condition, then completed one week of ambulatory assessment during which participants answered questions about their social behavior and affect tied to their social interactions. Conditions were compared on response frequency, means and variances of interpersonal behavior and affect, correlations between interpersonal behavior and affect within-person, and associations between momentary behavior and affect and baseline variables (e.g., big-five traits). Results indicated that signal- and event-contingent recording techniques provided equivalent data quality, suggesting that researchers can use the two methodologies interchangeably to draw conclusions about means, variances, and associations when examining social interactions. However, results also showed that event-contingent recording returned, on average, a higher number of reported social interactions per individual and this was true for most time-periods of the day. Thus, event- contingent recording may hold advantages for studying frequency and timing of social interactions.

Philip Himmelstein BPhil, University of Pittsburgh
William C Woods, Masters of Psychology, University of Pittsburgh
Aidan G.C. Wright, Doctor of Philosophy, University of Pittsburgh

5. **Having purpose during recovery: Are daily fluctuations in affect and social experiences associated with eudaimonic wellbeing during opioid treatment?**

Eudaimonic wellbeing, which refers to a sense of meaning and purpose, is important in the context of addiction recovery as it may help to motivate behavior change or serve as a coping resource. This ecological momentary assessment (EMA) study predicts variation in end of day eudaimonic wellbeing from daily levels of positive and negative affect (PA and NA) and positive and negative social experiences (PSE and NSE).
Participants (n=73, 77% Male) were patients at a residential drug and alcohol treatment facility. They were administered smartphone-based surveys for 12 consecutive days, with affect measured 4 times per day, social experiences 3 times per day, and eudaimonic wellbeing once at the end of the day. We used multilevel modeling (MLM) to address three research questions: 1) To what extent does eudaimonic wellbeing vary within person across time? 2) Do daily fluctuations in affect and social experiences predict eudaimonic wellbeing? 3) Do a person's overall levels of affect or social experience alter the effects of those daily experiences?
ICCs revealed that 54% of the variance in eudaimonic wellbeing was explained by within-person variation over time. Significant main effects at the within-person level for both PA and PSE indicated that eudaimonic wellbeing was higher on days when PA and PSE were higher than average. Finally, an interaction between person-level and within-person PA showed that lower-than-average PA days were more strongly associated with greater decreases in eudaimonic wellbeing among people with lower average PA. While assessment and intervention within the field of drug treatment is commonly focused on negative states, these results suggest that promoting positive states and social experiences may be important for impacting eudaimonic wellbeing

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H. H. Cleveland PhD, The Pennsylvania State University

Timothy R. Brick PhD, The Pennsylvania State University
Scott C. Bunce PhD, The Pennsylvania State University

6. **Within-Subject Dynamics of Affect in Adolescents Daily Life's: Factor Structure and Psychometric Properties**

Even though affect is one of the most often used constructs in e-diary research, information on the dynamics of the within subject factor structure and on psychometric properties are sparse. Whereas, a few studies exist in adults (Wilhelm & Schoebi, 2007) and in children (Leonhardt et al., 2015), studies reporting psychometric properties in adolescents are, to our knowledge, missing completely. The aims of our study are: a) to report basic characteristics of affect in adolescents (mean, squared successive difference (SSD), intraclass correlation coefficients (ICC)); b) to examine the within-subject factor structure of affect, investigating whether a 3-dimensional model of affect is superior in adolescence to a 2-factor model of positive and negative affect and the pleasure-arousal model; c) to report reliability indices for momentary affect as well as for affective dynamics (SSD). To do this, we examined a sample of 200 adolescents (age 12-17 years). All participants had to answer 20 affect items up to 8 times on weekdays and up to 12 times a day on weekends on seven consecutive days. For data analyses, we used multilevel confirmatory factor analyses. Preliminary findings confirm assumptions on best model fit for the three-dimensional affect model in comparison to two-dimensional affect models. Detailed analyses on single affect items revealed specific patterns for SDs, intraindividual SDs and ICC. Recommendations for future studies assessing affective constructs will be provided.

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7. **Can patterns of daily life experience and behaviour prospectively predict depression in adolescence and young adulthood? Results of the BeMIND study**

Background. Mild to severe depressive disorders are among the most common mental illnesses in adolescents and represent an enormous personal, social and societal burden. Depression can affect every area of life, including health, sleep, and social relationships. For early detection, prevention and treatment of depression it is important to identify and understand the underlying risk factors. Aim of this contribution is to examine how different pattern of daily life experience and behavior can predict future depression. Methods. Analyses are based on data from the Ecological Momentary Assessment (EMA) sub-study of the BeMIND research project, a prospective longitudinal study of a community sample of adolescents and young adults aged 14-21 in Dresden, Germany. Among other assessments, participants completed a clinical diagnostic interview and took part in a four day EMA study including

measures of current affective states, mood, cognition, social interactions, and sleeping behavior. One year follow-up data on psychopathology is available from approximately 800 participants. Results. Regression analysis, adjusted for baseline depression, showed e.g. that EMA ratings of increased stress (OR 1.45), less optimism (OR 0.8), more pessimism (OR 1.53), more thoughts about negative things (OR 1.73), less positive mood (OR 0.65), decreased sleep quality (OR 0.85) and a less amount of pleasant social interactions (0.7) were associated with depression at 12 month follow-up. Conclusion. First results from the BeMIND study indicate, that EMA ratings of experience and behavior in daily life can predict the development of future depression. This research can help to examine the development and course of depression during adolescence and provide information relevant to early intervention.

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8. **Constructing a reward-related Quality of Life function in daily life -a proof of concept study-**

Aim: Mental healthcare needs person-tailored interventions. Experience Sampling Method (ESM) can provide daily life monitoring of personal experiences. Intuitively, quality of life improves by spending most time on rewarding experiences. ESM treatment interventions can use this information to coach individuals into finding a realistic and optimal balance of daily life reward. This study aims to operationalize a measure of momentary reward-related Quality of Life (rQoL) and tests its feasibility. Method: rQoL combines the frequency of engaging in a 'behavior setting' (i.e. meaningful context) with a momentary mental state (i.e. positive affect). High rQoL occurs when frequent situations are combined with high positive affect or rare situations co-occur with low positive affect. Resampling procedures were applied to assess the reliability of rQoL using various behavior setting definitions and several sample sizes for subjects (real or virtual) with low-, average- and high variability in behavior setting. Finally, resampling was used to assess whether rQoL is distinct from positive affect. Results: Resampling from an aggregated sample of 1058 valid ESM observations (virtual subjects) demonstrated behavior settings defined by 'Who-What' contextual information as most informative. At least 100 ESM observations are needed for reliable assessment when using virtual subjects. In real subjects, behavior setting defined by 'Who-What-Where' combinations is probably best. Small sample sizes are only feasible for subjects with a low variability in behavior setting. Last, rQoL is distinct from positive affect. Conclusion: rQoL is feasible. Future research should explore other options in defining rQoL and pilot its applicability as treatment intervention.

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9. **Ecological Momentary Assessment of Social Experiences: Patient Feedback on Social Constructs and Item Clarity**

Global self-reports of social experiences show associations with health outcomes in those at risk for cardiovascular disease. A critical next step is to differentiate between- from within-person effects of these experiences, in order to address their potential negative effects at the appropriate level of intervention. Women experience elevated cardiovascular risk during midlife (age 40-60) due to aging, menopause, and weight gain, as well as by social barriers to cardioprotective behavior (e.g., lack of encouragement or role models for physical activity). In preparation for an ecological momentary assessment (EMA) study among midlife women, the goal of this study was to collect women's feedback on the clarity and wording of EMA self-report items. Midlife women with one or more cardiovascular risk markers (e.g., hypertension; n=10, MAge=52, MBMI=29.8 kg/m2) were recruited from primary care. Patients were asked to read a set of EMA items and to describe their interpretation of each, including examples of events in social categories. Thematic integration of patient feedback revealed changes that could improve item clarity and ease of response. For example, 7/10 patients noted reluctance to report the occurrence of "negative social interactions," as these might reflect negatively on their social skills; rewording to "unpleasant social experiences" reduced reluctance and appeared to capture the same information. Similarly, 5/10 patients failed to recognize many cognitions or events as social comparisons and denied interest in comparisons, despite identifying with specific examples provided to them. Findings will inform modifications to an existing EMA protocol, and may be useful for increasing the clarity of EMA self-report items and informing just-in-time interventions.

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Adarsh K Gupta D.O., Rowan School of Osteopathic Medicine

10. **Self-esteem fluctuations in daily life: The roles of daily hassles, mental health and selected personality traits**

Theory: Stressors play an important role for self-esteem and predict intraindividual self-esteem fluctuations. While this has been shown for stressful life events in a small number of longitudinal studies, little is known about the impact of daily hassles on self-esteem fluctuations throughout the day. Impaired mental health is frequently associated with self-esteem fluctuations and may exacerbate effects of daily hassles on self-esteem fluctuations. An individual's personality (Big five, optimism, emotion regulation capacities, etc.) may be an additional moderator.
Objective: To examine whether daily hassles predict self-esteem fluctuations in daily life and whether mental health status and selected personality traits moderate this association.
Methods (Study in Progress): Participants (currently: N = 27, aim by May 2019: N = 50) complete a 1-

week smartphone-based Ecological Momentary Assessment study with 6 random signals per day reporting their current level of self-esteem, occurrence and severity of daily hassles. Mental health and personality traits are assessed at baseline.

Results: We expect a positive association between cumulative daily hassle severity ratings at a certain measurement point t and self-esteem fluctuations at t compared to the previous measurement point t-1. Furthermore, we hypothesize that impaired mental health and an individual's personality may exacerbate effects of daily hassle severity on self-esteem fluctuations. Final results will be presented at the conference.

Discussion: This study will offer novel insights into concomitants of self-esteem fluctuations in daily life.

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11. Ecological Momentary Assessment of Premenstrual Symptoms

Most women of reproductive age report at least mild premenstrual symptoms. Premenstrual Syndrome (PMS), characterized by physical discomfort and dysphoria in the late luteal phase, may affect as many as one in four premenopausal women. In this preliminary examination of Ecological Momentary Assessment (EMA) of premenstrual symptoms, we explored young adult women's reports of symptoms such as pain, anxiety and depressed mood during different phases of the menstrual cycle. Participants were recruited as part of a larger longitudinal study on recreational cannabis use. The Menstrual Cycle Questionnaire was used to determine menstrual cycle phase at the time of the of EMA assessment. Mean scores for premenstrual symptoms were calculated from EMA surveys that were administered at 6 points throughout the day. While the results did not reach statistical significance, higher means were found in the late luteal phase compared to all other phases for the following symptoms: pain, impatience, restlessness, anxiety, and depression. Lower ratings of overall physical health and self-esteem were also reported in the late luteal phase compared to the other phases of the menstrual cyde. It is possible that results did not reach significance due to being underpowered for the effect, with only 17 participants in the late luteal phase at the time of the assessment ($N_{menstrual}$ = 17, $N_{follicular}$ = 27, N_{luteal} = 22, $N_{late-luteal}$ = 17). Given that most women experience at least some premenstrual symptoms in the week before menstruation, once should consider menstrual cycle phase during intensive repeated measurements of mood. This also provides preliminary evidence for the usefulness of EMA in the diagnosis of Premenstrual Dysphoric Disorder. Past research on this disorder has shown that many women have clinically significant symptoms of PMS or PMDD but do not meet the current diagnostic criteria. Studies on the prevalence of premenstrual symptoms often rely on retrospective reports that are subject to recall bias. Momentary assessment of these symptoms may be the most accurate way of assessing the severity and prevalence of premenstrual symptoms.

Emma N. Cleary BA, Syracuse University
Philip S. Santangelo PhD, Syracuse University
Emily B. Ansell PhD, Syracuse University

12. **Ecological Momentary Assessment of PTSD Symptoms and Smoking in Combat Veterans with Risky Drinking**

Cigarette smoking is a leading cause of death in the United States and it is highly prevalent among individuals with posttraumatic stress disorder (PTSD). This comorbidity has received increased attention in recent years, but gaps in knowledge regarding the exact nature of the relationship between PTSD and smoking remain. This study models the daily course of PTSD symptoms and cigarette smoking in combat veterans with risky drinking to test the self-medication theory. Recent combat veterans with PTSD symptoms and risky drinking (N=143) completed brief assessments of PTSD symptoms, cigarette smoking, and drinking four times daily for 28 days. Earlier analyses in this sample found that increases in PTSD are associated with more drinking within the same time block, but not more drinking in the following time block (Possemato et al., 2015). The current study investigates if PTSD symptoms are also related to changes in smoking patterns. More than half of our sample were current smokers (57%, n=81), reporting an average of 15 cigarettes smoked per day. Initial results support a relationship between smoking and PTSD. Specifically, PTSD severity is associated with nicotine dependence severity as measured by the Faegerstrom (p= .022). Also, veterans who experienced combat trauma prior to onset of nicotine dependence smoked significantly more cigarettes than veterans who had nicotine dependence before experiencing combat trauma (p= .042). Analyses are now underway investigating the moment to moment relationships between PTSD severity and smoking. Full results will be presented in the poster. Results are intended to elucidate the association with PTSD and smoking and enable refinement of smoking cessation interventions for individuals with PTSD and hazardous alcohol use.

Kimberly Barrie MPH, MSW, VA Center for Integrated Healthcare
Kyle Possemato Ph.D., VA Center for Integrated Healthcare
Michael Wade M.S., VA Center for Integrated Healthcare

13. **Data-Driven AA protocols: Closing the automation loop between data collection and protocol (re)configuration in a AA software system**

General-purpose software systems for Ambulatory Assessment (AA) methods, allow researchers to easily construct the materials to perform data collection with, and the manner in which they are executed on the hardware that participants use. In a common signal-contingent scenario, the researcher composes questionnaires, prescribes times to alert respondents to fill them in, and determines the participant population that should have access to the configuration. Protocol creation, distribution, and data collection tends to be a fixed, linear process that results in a dataset meant to be analyzed at a later stage after the data collection has been completed. The process to a large extent resembles more manual processes of the past, with e.g., pen and paper or PDAs, with extra automation between steps, and miss out on creating more flexible, data-triggered protocols. In this work we discuss an AA software system that allows researchers to establish an automation loop between the collection of data and the configuration/execution of the protocol in real time. The setup lets researchers execute their own custom code in the Python programming language, outside of the AA system itself, and implement their own logic, in line with modern data-science approaches. It allows the Python program to listen for events such as incoming data, and issue commands that determine how the execution of the study should progress. As an example, incoming data from participant T could trigger the sampling of participant P, based on the former's response, where T and P have a Teenager-Parent relationship. The poster shall discuss operation and example protocols. The extra capabilities could allow researchers to invent creative protocol configurations for novel future studies.

Nikolaos Batalas PDeng, Eindhoven University of Technology

Bas Willemse
Vassilis J Khan
Panos Markopoulos
Maurits Kaptein

14. Experience Sampling with Ambulatory Physiological Monitoring Reveals the Scale of Variation in Affective Experience

Growing evidence indicates there is immense heterogeneity in affective experiences. Even experiences identified by a single emotion term (e.g., 'anger') vary dramatically across individuals, as well as within individuals across different contexts. When angry, a person might yell, cry, or even smile; similarly, heart rate or blood pressure may rise, fall, or stay the same. To date, scientists have largely ignored this variability, searching instead for consistency and specificity across all instances of a given emotion category and across all participants in a given sample. In the present study, we used context-aware experience sampling and ambulatory physiological monitoring to specifically assess variation in affective experience. For 14 days, participants wore devices that recorded their bodily activity (e.g., heart rate, respiration, skin conductance) in their daily lives. On the occurrence of a change in heart rate (not due to movement), participants were prompted to describe their current emotion and affective experience, including degree of pleasantness and activation. Change scores for physiological measures (e.g., interbeat interval) were derived for each event, and these features were submitted to idiographic machine learning algorithms. Unsupervised clustering analyses revealed a variable number of disparately sized clusters per participant. Each cluster of physiological features corresponded with a wide range of self-reported emotions, pleasantness, and activation, such that affective experiences are associated with heterogeneous patterns of bodily activity. These findings extend prior work on the variability of affective experience and associated physiological responses, and showcase a potent method for investigating individual differences in everyday life.

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Catie Nielson, Northeastern University
Madeleine Devlin, Northeastern University
Mallory Feldman, Northeastern University;
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Jolie B. Wormwood Ph.D., University of New Hampshire
Lisa Feldman Barrett Ph.D., Northeastern University
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15. Daily stress predicts level of fatigue among breast cancer survivors independent of cancer-related distress

Many breast cancer survivors report feeling fatigued in the months following treatment for their cancer (Schmidt et al., 2011). We used ecological momentary assessment (EMA) to test within and between-person predictors of momentary fatigue. Female breast cancer survivors (N=47, mean age=52.87, 6-36 months post-treatment) completed 14-days of EMA. Each survivor also rated cancer-related distress on a modified version of the Impacts of Events Scale (Weiss, 2007). Participants completed up to 5 EMA each day, reporting current level of fatigue and whether a stressor had occurred. Multi-level models tested the relationship between the occurrence of a stressor and level of fatigue. We tested whether

survivors reported more fatigue at moments when experiencing a stressor and whether those higher in cancer-related distress reported greater fatigue at moments when reporting a stressor compared to moments when not reporting a stressor. Participants reported, on average, a stressor on 17.73% of the momentary assessments (range=0%-51.52%). On moments when a survivor reported experiencing a stressor, her fatigue was about 4 units higher than at moments when she did not report experiencing a stressor (p<.05). Individual differences in cancer-related distress did not moderate the relationship between experiencing a stressor and fatigue (p=.50). Results suggest that survivors' day-to-day stressors predict momentary fatigue, but individual differences in cancer-related distress do not appear to exacerbate risk.

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16. Healthy or still anxious? How adolescents with remitted anxiety disorders experience everyday life.

Background. Anxiety disorders are the most common mental disorders in children and adolescents (12-month prevalence ~7%). The course of AD is often "waxing and waning", remaining symptomatology may increase the risk for relapse. Little is known, however, about how people with (remitted) AD experience everyday life. This study uses Ecological Momentary Assessment (EMA) to examine whether adolescents with remitted AD (REM), current AD (AD) and healthy (healthy) subjects differ on symptom and psychological measures in everyday life. Methods. Data of 665 participants (REM=86, AD=64, healthy=515) from BeMIND, a cross-sectional epidemiological study in a random sample aged 14-21 from Dresden, Germany, were used. ADs and other mental disorders were assessed using a standardized clinical interview (DIA-X/CIDI). Items of the Patient-Reported Outcomes Measurement Information System (PROMIS; depression, anxiety), the Multidimensional mental-state questionnaire (MDBF) and experiential avoidance were assessed in smartphone-based EMA on a scale of 0-100. Results. Linear regressions revealed significantly worse scores of REM on all MDBF-scales and experiential avoidance compared to healthy (mood: b=7.48, CI [4.40,10.57]; wake: b=5.97 CI [3.00,8.94]; calm: b=8.72 CI [5.58,11.85]; EA: b=-4.78, CI [-6.75, -2.82]), but they did not significantly differ from AD (mood: b=-1.53 CI [-6.48, 3.43]; wake: b=-0.29 CI [-4.64, 4.05]; calm: b=0.47 CI [-4.53, 5.48]; EA: b=3.99 CI [.40, 8.37]). Significant differences in PROMIS scales for anxiety and depression occurred for both REM vs. healthy subjects and REM vs. AD. Conclusion. Results suggest improvement of people with remitted AD on clinical variables, but not on other aspects of everyday life, possibly increasing their risk for relapse.

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17. Heart and mind: How the heart rate is connected to psychological states in daily life

Background: Heart rate variability (HRV) indicates general flexibility and capacity of the Autonomic nervous system (ANS) to respond adaptively to altering environmental conditions. Past research points

towards alterations in HRV among individuals with mental disorders. We aim to explore temporal associations between psychological symptoms and HRV indices in daily life in subjects currently diagnosed with depressive disorder. Methods: Data of 183 subjects from an epidemiological community-based sample of adolescents and young adults (14-21y) from Dresden, Germany, were used. Using smartphone-based Ecologic Momentary Assessment (EMA), optimism, pessimism, mood and craving (rated from 0-100) 8 times a day across 4 days were assessed. HRV was collected continuously over 4 days with local HRV sensors whereat time-domain measures were calculated. The square root of the mean squared differences of successive NN intervals (RMSSD) estimates parasympathetic influence on heart rate. Results: Multilevel modeling revealed that HRV-RMSSD (ms) was significantly negative associated with preceding EMA ratings of craving for nicotine (b=-0.049 CI[-0.086;-0.011]) or alcohol (b=-0.049 CI[-0.099;-0.000]) and subjective ratings of mood (b=-0.032 CI[-0.062;-0.003]), optimism (b=-0.048 CI[-0.077;-0.019]) and significantly positive associated with pessimism (D: b=0.034 CI[0.005;0.064]). Similar results were found for a second group of healthy subjects with no 12-month mental disorder. Conclusion: Daily life alterations in mood or craving seem to be associated with subsequent alterations in HRV as compensatory mechanism of responding to situational personal distress in both groups.

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18. **Investigating the interrelationships of sleep, emotion, and the HPA axis using mobile technologies in a community-based sample**

Prior studies have examined the association between cortisol, a stress hormone and the end hormone of the hypothalamic-pituitary-adrenal (HPA) axis, with various health outcomes ranging from mental health disorders to physical health disorders to emotional and physical states such as mood, stress, and sleep. Cortisol is secreted in a diurnal pattern with flattening of the diurnal cortisol slope (DCS) typically associated with worse health outcomes and a steeper DCS indicative of healthier states. However, there is a paucity of research examining the dynamic relationships between DCS, sleep, and emotional states, especially over prolonged time periods in a naturalistic setting. This study investigates the diurnal relationships between the HPA axis, sleep, and emotional states in a community-based setting. The sample includes 156 participants between the ages of 11 and 84 (mean age 37.4, 60% female) who were evaluated at the NIH Clinical Center and completed 2 weeks of ecological momentary assessments (EMA), actigraphy, and salivary cortisol sampling. We further examine whether these relationships differ among persons with history of mood or anxiety disorders as compared to controls and whether these relationships differ by sex and age groups . By incorporating mobile technologies (electronic diaries and actigraphy) with biologic markers (cortisol) within a community-based family study of health and behavior, we provide a unique opportunity to examine the interrelationships between multiple homeostatic regulatory networks in real time in an ambulatory setting.

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19. Using a Novel Ambulatory Paradigm to Investigate Perseverance in Problem Solving

Previous studies on problem solving show that perseverance is a critical determinant of performance. However, these studies often examine perseverance in the lab rather than in real-world settings. Here, we utilized a novel context-aware experience-sampling paradigm to investigate psychophysiological concomitants of perseverance during problem solving in daily life. Across a 14-day period, subjects wore a mobile monitoring device to record physiology and movement, including continuous electrocardiography. When the device detected a significant increase or decrease in heart rate (without movement), participants were prompted to self-report information about their current experience, including their felt affect (i.e., pleasantness and arousal). For half of these prompts, participants were also presented with a 5-7 letter anagram and given 30 seconds to attempt to rearrange the letters to form a real word. Participants had the option of 'skipping' these items by pressing a button to end the timer early. We operationalized "perseverance" as times when the participant worked on the anagram until they solved it or until the timer ran out, and "lack of perseverance" when the item was skipped. We found that participants were more likely to skip problems on prompts triggered by a heart rate increase (17.50%) than on those triggered by a heart rate decrease (14.09%; $X2=13.33$, $p<.001$). Additionally, we found an interaction between pleasantness and arousal ratings, such that higher felt arousal was associated with greater perseverance during unpleasant experiences, but less perseverance during pleasant ones. These findings suggest the need to consider current physiological state and felt affect in future studies exploring perseverance during daily life.

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20. Real Time Mobile Monitoring of Emotional Reactivity and Stability in Adults with Social Anxiety Disorder

People with social anxiety disorder (SAD) have been shown to have greater reactivity to contextual influences and daily life events than those with other subtypes of anxiety disorders, but there is limited prospective real time data on people with this condition. This study employs ecological momentary assessment (EMA) to study patterns of emotional and behavioral reactivity with actigraphy to examine daily motor activity and sleep patterns in a community based sample of people with a lifetime history of SAD. We utilized a mobile device that prompted participants 4x a day for a 2-week period combined with actigraphy monitors that collected minute-to-minute counts of physical activity. The aims are to investigate: (1) the average, variability and stability of daily patterns of mood and anxiety; (2) reactivity and stability of emotional states; and (3) the impact of contextual factors including social context, life events, and physical activity levels on emotional patterns among people with SAD compared to people

with other anxiety and mood disorders and controls without mood or anxiety disorders. We also assess the influence of how these questions differ by gender, age, and other potential correlates of SAD and emotional states. We also illustrate the use fragmentation analysis as a novel statistical approach to investigate stability of particular states. The findings reveal that people with a history of SAD have significantly greater levels of mood variability and greater reactivity to negative life events than both controls and other anxiety disorders. The application of these methods for the development of individualized interventions for anxiety disorders will be discussed.

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21. Cognition in daily life – how to unravel momentary variation?

Background: Cognition is often assessed as a trait in specific settings, such as the clinician's office. This yields valuable information on the individual's potential. However, information on how cognition fluctuates and is influenced by mood or daily situations is lacking. To study this, a task that objectively assesses cognition in daily life and allows a fine-grained map of fluctuations of cognition in relation to mood and context, is necessary. Method: We developed and pilot-tested a cognitive task implemented within the Experience Sampling Method (ESM) on a mobile application (PysMate™). The momentary Digit Symbol Substitution task (mDSST) is a modified digital version of the original WAIS task. It was added with a duration of 30 seconds at the end of the ESM questionnaire. Feasibility and initial reliability and validity was assessed in the general population (N = 40). The ESM protocol had eight semi-random assessments by day, for six consecutive days. Analyses use descriptive statistics and multilevel regression analyses to assess the relation between cognitive performance and other daily life domains. Results: Overall, participants reported that the app was user-friendly and obvious to use with a low to moderate burden. The mDSST subtask was reported as easy and reasonably pleasant. On average, participants completed 11 trials within the 30-second window; 97% correct. Higher positive affect is associated with more trials and a higher percentage correct, whereas high negative affect is associated with a lower percentage correct. No relationship was found with fatigue. Conclusion: Implementing a cognitive task within ESM is promising, but fine-tuning the task is needed.

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22. **The effects of music listening on somatic symptoms and stress: a comparative ambulatory assessment study with two patient samples**

Background: Somatic complaints are core symptoms of somatic symptom disorder (SSD). Moreover, they frequently occur in depressive disorders (DEPR). Music listening is an easily accessible means suggested to be effective in alleviating somatic complaints and reducing stress. We hypothesize that psychoneuroendocrine changes in stress regulatory systems (SRS) mediate the beneficial effects of music listening. We aim at testing if music listening in daily life is helpful in decreasing somatic symptoms and stress in patients with SSD and DEPR, respectively, and whether the SRS is a mediating agent within this relationship. Method: 29 women with SSD and 29 women with DEPR reported intensity of and impairment by momentary somatic symptoms using programmed iPods on five fixed time points per day for 14 consecutive days. They also indicated momentary stress and their music listening behavior since the previous data entry, and provided saliva samples for the analysis of biological stress markers (cortisol, alpha-amylase). Results: Music listening was reported in 15% of all possible occasions. Separate hierarchical linear models revealed that music listening had a stress reducing effect in SSD (p=.034), but not in DEPR (p=.055). However, subjects in the DEPR group felt less impaired by somatic symptoms after having listened to music high in valence (p=.029). Further analyses including stress biomarkers and mediation analyses will be presented at the conference.
Implications: This study helps to inform the development of ambulatory music interventions by increasing our understanding of the effects of everyday music listening on somatic symptoms and underlying biopsychological mechanisms for different patient samples.

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23. **Sociomarkers of anhedonia in MDD**

Background: Central to understanding the mechanisms that give rise to depression are the daily life factors that drive its core symptoms. Anhedonia is one of the two core symptoms of depression. We aimed to describe momentary anhedonia in the daily lives of patients diagnosed with Major Depressive Disorder (MDD), and investigated its link to social stress. We hypthesized that 1) In company of significant others, levels of anhedonia are lower; 2) Higher levels of subjective social stress are concurrently associated with higher levels of anhedonia; and that 3) Higher levels of subjective social stress are associated with higher levels of anhedonia thereafter, and not the other way around. Methods: We repeatedly sampled social context, fear of abandonment, and perceived relationship quality, and momentary anhedonia (i.e., 'To what degree do you find it difficult to experience pleasure in activities at the moment?') on 10 semi-random time points a day, for seven days in the daily lives of 43 MDD patients. Results: Using cross-lagged multilevel models in R, showed that levels of anhedonia were indeed generally lower when patients were in company of significant others versus alone, but not lower compared to the company of non-significant others. In line with our second hypothesis, higher levels of subjective social stress were concurrently associated with higher levels of anhedonia. The third hypothesis was partially supported, as we found a bidirectional effect between anhedonia and social stress. Conclusions: Being in company of others seems to buffer anhedonia, both concurrently and

prospectively, suggesting that social stress or low quality relationships might be considered equally harmful as the more established risk factors for depression, such as lack of exercise.

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24. Self-efficacy coaching based on ambulatory monitoring for adolescent occupational rehabilitants: First results

The aim of this study was to develop and evaluate a self-efficacy coaching tool combined with Ambulatory Monitoring for adolescent occupational rehabilitants suffering from mental, cognitive and/or physical disabilities. Self-efficacy (Bandura, 1982) is a relevant resource given the variety of demands in occupational qualification measures. 70 adolescent occupational rehabilitants of a German rehabilitative boarding school participated in this study. They were assigned either to experimental group 1 (Ambulatory Monitoring plus self-efficacy coaching), experimental group 2 (Ambulatory Monitoring only) or a passive control group. Each participant completed a paper-pencil-questionnaire (pre, post, and follow-up) on performance-related and social self-efficacy, desire for control and well-being (arousal, valence and calmness). Ambulatory Monitoring on situational experience was conducted via three smartphone-questionnaires a day for four weeks. The self-efficacy coaching was held face-to-face once a week and based on the monitoring data. First results were obtained by running one multivariate analysis of variance per group. As expected, social self-efficacy, arousal and valance increased over time in experimental group 1. Against expectations, for experimental group 1 no significant change over time was found. In the control group, as desired, the collected variables did not change significantly over time. These first results are indicative for the effectiveness of Ambulatory Monitoring as an intervention tool. It is perhaps more effective alone than in combination with coaching because of its self-determined character. However, the data has to be further analyzed. In sum, this study demonstrates an innovative tool combining the observation of behavior with intervention.

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25. Correlates of Mindfulness in Daily Life: An Ambulatory Assessment Study on Intervention Effects

Mindfulness-Based Stress Reduction (MBSR) interventions are known to enhance well-being and to facilitate the successful coping with stress. However, research concerning psychological and physiological correlates of mindfulness meditation in daily life is rare. The aim of the present study was to explore intervention effects using a nonclinical sample of adults participating in a MBSR program. Before and after the program, 37 individuals completed an ambulatory assessment study consisting of trait, state, and physiological measures. Specifically, the participants filled in a paper-pencil trait questionnaire, wore an electrocardiogram device throughout 24 hours and responded to an ambulatory state questionnaire twelve times throughout 48 hours. The trait measures included mindfulness, self-efficacy, and perceived stress. The state questionnaire assessed momentary demands, resources, mindfulness, and well-being. Heart rate variability (HRV) was analyzed as physiological correlate of cardiovascular health. Apart from trait characteristics, all pre- and post-measurements were conducted in real-time and real-life stress settings. The multilevel data were analyzed with regard to pre- and post-differences in mindfulness, health and well-being as well as in the management of daily stress and resources. In sum, this study incorporates inter- and intraindividual key dimensions relevant to a mindful

dealing with stress and reveals psychological and physiological changes following a mindfulness intervention.

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