

Society for Ambulatory Assessment Conference 2021

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Conference Agenda

Session Overview

Date: Wednesday, 30/June/2021

3:45pm - 4:45pm	K1: Keynote 1 Chair: Ulrich W. Ebner-Priemer , Karlsruhe Institute of Technology, Germany	
4:45pm - 5:00pm	B1: Break 1	
5:00pm - 6:15pm	P1-D1: Paper Session 1 - Day 1 (Methods 1)	P2-D1: Paper Session 2 - Day 1 (Adjustment Processes in Mental Health)
	S1-D1: Symposium Session 1 - Day 1	
6:15pm - 6:30pm	B2: Break 2	
6:30pm - 7:45pm	P3-D1: Paper Session 3 - Day 1 (Assessment Methods)	P4-D1: Paper Session 4 - Day 1 (Various 1: Network Approaches to Mental Health / Interpersonal Processes)
	S2-D1: Symposium Session 2 - Day 1	
7:45pm - 8:00pm	B3: Break 3	
8:00pm - 9:00pm	P1: Poster Session 1	

Date: Thursday, 01/July/2021

3:30pm - 4:30pm	P2: Poster Session 2	
4:30pm - 4:45pm	B4: Break 4	
4:45pm - 6:00pm	P1-D2: Paper Session 1 - Day 2 (Depression)	P2-D2: Paper Session 2 - Day 2 (Health Behavior Change)
	S1-D2: Symposium Session 1 - Day 2	
6:00pm - 6:15pm	B5: Break 5	
6:15pm - 7:15pm	K2: Keynote 2 Chair: Candice Odgers , University of California, Irvine, United States of America	
7:15pm - 7:30pm	B6: Break 6	
7:30pm - 8:45pm	P3-D2: Paper Session 3 - Day 2 (Affect Dynamics)	P4-D2: Paper Session 4 - Day 2 (Various 2: Application of ESM in Research and Practice)
	S2-D2: Symposium Session 2 - Day 2	

Date: Friday, 02/July/2021

3:30pm - 4:30pm	K3: Keynote 3 Chair: Michaela Riediger , Friedrich Schiller University Jena, Germany	
4:30pm - 4:45pm	B7: Break 7	
4:45pm - 6:00pm	P1-D3: Paper Session 1 - Day 3 (Disordered Eating)	P2-D3: Paper Session 2 - Day 3 (Methods 2)
	S1-D3: Symposium Session 1 - Day 3	
6:00pm - 6:15pm	B8: Break 8	
6:15pm - 7:30pm	P3-D3: Paper Session 3 - Day 3 (Affect & Mood)	S2-D3: Symposium Session 2 - Day 3
7:30pm - 7:45pm	B9: Break 9	
7:45pm - 8:30pm	F1: Flash Talks 1	F2: Flash Talks 2

K1: Keynote 1Time: **Wednesday, 30/June/2021: 3:45pm - 4:45pm**Session Chair: **Ulrich W. Ebner-Priemer**, Karlsruhe Institute of Technology, Germany**Session Abstract**

Real-Time Analyses, Digital Phenotyping and Real-Time Interventions – Which Innovative Strategies Does the Ambulatory Assessment Toolbox Provide?

The Ambulatory Assessment toolbox expanded significantly during the last decade. Meanwhile, location tracking and sensing smartphone parameters (digital phenotypes) complement the more classical parameters such as e-diaries and physiological assessments. Real-time onboard analyses, in addition, enable all kind of triggered diaries, real-time predictions and just-in-time interventions. They all support our ambition to understand, predict, and change human behaviour and experience in daily life.

In my talk, I will focus on two strategic questions: Do we have specific sampling strategies which ensure sufficient within-subject variance in daily life? What kind of ground truth do we need to interpret digital phenotypes. To discuss these questions: a) I will present, among other time-based designs, the concept of maximizing within-subject variance by the use of *-triggered e-diaries (activity-triggered, GPS- triggered, and sedentariness-triggered e-diaries); b) Using a study on urban green space exposure, I will illustrate how context (urban green space) influences affective states, and that this mechanism is heterogeneous and can be mapped on a neurobiological level; c) Using a data set on patients with bipolar disorders, I will discuss what time-based designs and integrative statistical models we might use to explore the potential of digital phenotyping fully.

P1-D1: Paper Session 1 - Day 1 (Methods 1)Time: **Wednesday, 30/June/2021: 5:00pm - 6:15pm****Presentations****ManyMoments – Using Multi-Lab Collaboration to Improve Replicability of Intensive Longitudinal Studies**

Julia Moeller¹, Christina Bergmann², Annette Brose³, Julia Dietrich⁴, Jana Kühnel⁵, Peter Kuppens⁶, Kristina Loderer⁷, Lars-Erik Malmberg⁸, Tim Mainhard⁹, Ulrike Nett⁷, Andreas B. Neubauer¹⁰, Reinhard Pekrun¹¹, Michaela Riediger⁴, Florian Schmiedek¹⁰ ¹University of Leipzig, Germany; ²Max Planck Institute for Psycholinguistics, The Netherlands; ³Humboldt-Universität zu Berlin, Germany; ⁴Friedrich-Schiller-Universität Jena, Germany; ⁵University of Vienna, Austria; ⁶KU Leuven, Belgium; ⁷University of Augsburg, Germany; ⁸University of Oxford, UK; ⁹Utrecht University, The Netherlands; ¹⁰DIPF | Leibniz Institute for Research and Information in Education, Germany; ¹¹University of Essex, UK

Rapid technological and methodological advancements as well as contemporary theoretical debates have led to increased reliance on ambulatory assessment and other intensive longitudinal sampling procedures. This increase in studies and novel approaches to data collection and analysis have unveiled both opportunities, but also challenges for the replicability and generalizability of findings. Cumulative knowledge gain may be thwarted, for example, by unrepresentative samples that may be limited to a specific context (such as one school district, or one specific clinical setting), and/or a small number of individuals. Such sample limitations leave it open to question whether the findings are generalizable to the larger target population.

In this paper, we first summarize the challenges that are specific to intensive longitudinal data and endanger replicability and generalizability in ESM studies. We then give an overview of currently existing solutions and discuss new ones that help solving these challenges to increase replicability. In particular, we introduce plans for a collaboration among multiple research groups, dubbed the ManyMoments initiative, following examples of other multi-lab collaborations, such as ManyLabs (Moshontz et al., 2018; Klein et al., 2018), ManyBabies (Frank et al., 2017; ManyBabies Consortium, 2020), and ManyPrimates (Altschul et al., 2019). We hope to start a debate about needs and solutions for replicable ESM research and get colleagues interested in joining collaborative ESM studies.

Uncovering When Dynamic Variables Optimally Predict One Another in Intensive Longitudinal Data using Novel Personalized Modeling Strategies**Nicholas C Jacobson, Lili Liu**

Geisel School of Medicine, Dartmouth College, United States of America

Researchers in the behavioral sciences rarely know the exact time period in which the dynamic relationships occur between these variables. The most common practice is to utilize data from the prior occasion to predict the next measurement occasion. However, this decision is often done without much thought and disregards all the other potential timescales in which these dynamic relationships might occur. Thus, the field has mostly only been fixated on answering if constructs predict one another but disregarded when constructs predict one another. A new method, entitled the Differential Time-Varying Effect Model (DTVEM), has been created to model when dynamic processes optimally predict one another, at either the individual level (i.e., person-specific) or the cohort level (i.e., group-based). DTVEM is a hybrid exploratory–confirmatory tool that features a convenient user- accessible function to identify optimal time lags and estimate these lags within a state-space framework (Jacobson, Chow, & Newman, 2019). However, the initial implementation of DTVEM does not allow one to model both personalized and group-based dynamic relationships between variables simultaneously. This paper will develop a novel personalized modeling strategy extending DTVEM to discover homogeneous clusters of when processes optimally predict one another. We will illustrate this novel method using both simulation studies demonstrating its validity and an empirical example examining anxiety and depression to demonstrate its clinical utility.

Interplay Between “Fast” and “Slow” Behavioral Processes in Children’s Physical Activity: Illustration Using Ecological Momentary Assessment Bursts Nested within a Longitudinal Study**Genevieve Dunton¹, Wei-Lin Wang¹, Stephen Intille², Eldin Dzubur¹, Aditya Ponnada², Donald Hedeker³**¹University of Southern California, United States of America; ²Northeastern University, United States of America; ³University of Chicago, United States of America

Background: Health behavior theories and interventions have been criticized for their failure to integrate both “fast” and “slow” behavioral processes at multiple timescales. Research demonstrated a novel modeling strategy to examine whether “fast” processes (e.g., hourly emotional variability) change over “slow” timescales (e.g., across three years), and whether “fast” processes (e.g., hourly emotional variability) are associated with changes in health behaviors such as physical activity over “slow” timescales (e.g., across three years). **Methods:** A multi-measurement burst ecological momentary assessment (EMA) design (six bursts lasting seven days each) was nested within a 3-year longitudinal study in children (8-12 years at baseline). Positive affect was reported through random EMA prompts (up to seven times per day). Day-level moderate-to-vigorous physical activity (MVPA) was assessed through a waist-worn accelerometer. A two-stage modeling approach estimated random effects (i.e., subject-level means, variances, slopes) for positive affect through a mixed-effects multiple location-scale model at the first stage, and then entered these random effect estimates as predictors in a second-stage multilevel linear model of day-level MVPA. **Results:** Subject-level mean and variance for positive affect decreased longitudinally as children got older. Longitudinal declines in daily MVPA were greater for children who had higher subject-level variance in positive affect. **Conclusion:** Emotional instability in children may be a risk factor for declining levels of physical activity across late childhood and early adolescence. Study designs and modeling strategies to capture the interplay between “fast” “slow” behavioral are needed to fully understand the effects of intensively time-varying variables in psychology and health.

Understanding the temporal dynamics of intervention processes: Mediation analysis using intensive-longitudinal data**Corina Berli¹, Jennifer Inauen², Gertraud Stadler³, Urte Scholz¹, Patrick E. Shrout⁴**¹Universität Zürich, Switzerland; ²University of Bern, Switzerland; ³Charité Universitätsmedizin Berlin; ⁴New York University

Understanding the mechanisms through which interventions affect outcomes over time is key to advancing psychological science. With intensive-longitudinal outcome data being increasingly collected during randomized controlled trials, there is the potential to better understand the temporal dynamics of intervention processes. However, researchers have not been given a framework for assessing which temporal assumptions are appropriate. In the present research, we aim to present a conceptual framework for systematically exploring the temporal dynamics in mediating processes, and selecting an appropriate analytic model based on these observations. Two empirical examples of between-person health behavior change interventions will be presented, using intensive-longitudinal outcome data. Study 1

(N = 203) is a randomized trial of a support group intervention to promote daily healthy eating. Study 2 (N = 119) is a randomized trial of a text message intervention to promote daily adherence to physical activity recommendations. We demonstrate how five conceptual analytic steps can be applied to these two empirical examples. We show that the patterns of longitudinal mediation can be fit with versions of longitudinal multilevel structural equation models that represent how the magnitude of direct and indirect effects vary over time. In conclusion, this research shows that exploring mediation in an (intensive) longitudinal context allows to address time appropriately in mediation analysis and contributes to a better conceptual understanding of mechanisms of change over time.

Best practices for Electronically Activated Recorder (EAR) research: A practical primer on coding and processing EAR data

Deanna Kaplan¹, Colin Tidwell², Nicole Nugent¹, Matthias Mehl²

¹Brown University, United States of America; ²University of Arizona, United States of America

The Electronically Activated Recorder (EAR) is an ecological assessment tool for the naturalistic observation of everyday behaviors and social interactions (Kaplan et al., 2020; Mehl et al., 2017). The EAR is a digital audio recorder, available as an app for Android, that is downloaded onto participants' smartphone devices and worn as they go about their typical daily lives. The app passively and intermittently samples ambient sounds from the wearer's environment, capturing an "audio diary" of daily life.

One of the most critical parts of EAR research is the coding and transcription process that converts raw audio data into quantitative data for statistical analysis. The evolved procedures for doing so have, hitherto, largely been informally communicated between EAR researchers. This presentation is based upon a recent publication (Kaplan et al., 2020) by the submitting author which formally documents current "best practices" for processing EAR data. Our presentation will provide practical information on the development of a coding system, the training and supervision of EAR coders, troubleshooting common coding challenges, and considerations specific to diverse populations. We discuss scenarios in which researchers may wish to build upon or deviate from these suggested "best practices", as well as forthcoming advances (e.g., audio signal processing) that may soon alter the practices presented here. Our aim is to provide attendees with a brief primer on how to code and process EAR data, making this labor-intensive method more accessible, and laying the foundation for the collective continued development of this and other ecological behavioral observation methods.

Conference Agenda

Session

P2-D1: Paper Session 2 - Day 1 (Adjustment Processes in Mental Health)

Time: **Wednesday, 30/June/2021: 5:00pm - 6:15pm**

Presentations

Stress Reduction in Everyday Life: Feasibility and Pilot Results of an Ecological Momentary Music Intervention (EMMI)

Anja Christine Feneberg, Urs Markus Nater

Department of Clinical and Health Psychology, University of Vienna, Austria

Background: Despite the growing potentials of mobile-based technologies, innovative interventions targeting the reduction of acute stress in daily life remain under-researched. Music listening is an easy-to-administer activity that is associated with lower levels of biological and self-reported stress according to recent ecological momentary assessment (EMA) studies. Building upon these previous findings, we developed an ecological momentary music intervention (EMMI) aiming at alleviating stress in everyday life.

Methods: The EMMI provides the opportunity to listen to self-selected relaxing music when feeling stressed, combining event-based and semi-random assessments over 18 consecutive days. Within a feasibility study, ten chronically stressed women will test the mobile-based EMMI (implemented via the app movisensXS). Besides subjective stress, saliva samples will be used to measure effects on biological stress indicators (cortisol, alpha-amylase).

Results: Preliminary descriptive analyses (N = 5, 25 ± 3 years of age) revealed that 36 events of acute stress were reported. Participants listened to music an average of 16±13 minutes following these stress events. Overall stress levels were 28% reduced from before to after music listening. Complete results of the feasibility study with respect to acceptability and effectiveness of the EMMI and the protocol of the subsequent large-scale main trial will be ready for presentation at the conference.

Conclusions: Since the repeated experience of stress can pose a threat to physical and mental integrity, interventions that are easily applicable in everyday life are necessary. The present study aims at developing and evaluating such an intervention using music delivered just-in-time, i.e. when needed most.

Ambulatory assessment of stress- and resilience-related mechanisms in everyday life of caregivers and people with dementia (EMA-DEM): a study protocol

Svenja Christina Palm¹, Katharina Geschke^{1,2}, Kristina Endres², Andreas Fellgiebel^{1,2}, Alexandra Wuttke-Linnemann^{1,2} ¹Center for Mental Health in

Old Age, Landeskrankenhaus (AöR), Mainz; ²Department of Psychiatry and Psychotherapy, University Medical Center, Mainz, Germany

Objectives: Caregivers of people with dementia (PwD) are particularly vulnerable to chronic stress-related physical and mental illness. In this subpopulation, stress and resilience factors were mainly investigated using retrospective self-reports so far. The aim of our descriptive study is to explore the mechanisms underlying stress and resilience by measuring biopsychological reactivity directly in daily life. Factors associated with the caregiver, the respective PwD and their dyadic interplay will be considered.

Methods: By means of an ambulatory assessment approach, a total of 70 caregivers of PwD will be examined on 14 consecutive days. Each day, the caregiver will be asked for self-reports on stress, resilience and respective coping strategies as well as behavioural symptoms of the PwD. In addition, saliva samples for the analysis of the stress-markers cortisol and alpha-amylase will be collected six times per day. Furthermore, electrocardiography will be continuously recorded to determine heart rate variability, measures of physical activity and sleep behaviour. At the beginning and end of the assessment period, the caregivers and PwD will be additionally examined by a comprehensive psychometric test battery, hair cortisol and saliva microbiome will be determined. The data will be analysed using hierarchical linear modelling appropriate for dyadic data analyses.

Discussion: This study will provide more insights on predictors of stress and resilience depending on situational characteristics of caregivers and PwD in their daily life. This knowledge will help to adjust individualized interventions in the context of ecological momentary intervention studies.

Exploring the daily postpartum experiences of mothers of multiples using an EMA paradigm

Susan J Wenzel¹, Danielle M Kats¹, Cynthia L Battle²

¹Lafayette College, United States of America; ²Warren Alpert Medical School of Brown University, United States of America

Mothers of multiples (MoMs; twins, triplets+) experience unique postpartum stressors, but studies testing differences in trait-level depression, anxiety, and related outcomes between MoMs and mothers of singletons (MoSs) have yielded mixed results. An EMA paradigm would allow a finer-grained examination of the daily experiences of MoMs and perhaps shed light on these inconsistencies, but no such studies have been published. We used EMA (28 assessments over 7 days) to examine mood, stress, and sleep in a sample of 130 women (n = 65 MoMs, n = 65 MoSs), 6-24 weeks postpartum, recruited from postpartum support websites. Baseline parenting stress was marginally higher in MoMs (M = 42.34, SD = 9.38) versus MoSs (M = 39.04, SD = 10.53), t(125) = -1.87, p = .06, but depression, anxiety, sleep quality, relationship satisfaction, and postnatal bonding did not differ between these groups (all p > .10). On a momentary basis, however, MoMs reported significantly more stress (b00 = 2.02, b01 = 0.30, p = .01) and overwhelm (b00 = 1.81, b01 = 0.35, p = .003); marginally more fatigue (b00 = 2.66, b01 = 0.23, p = .06); and significantly worse sleep outcomes (e.g., more nighttime awakenings, b00 = 2.55, b01 = 0.57, p = .02). Momentary stress, overwhelm, and fatigue were negatively associated with positive mood and feelings of connection with one's baby/babies, and positively associated with negative mood (all p's < .001). Findings highlight different postpartum experiences for MoMs versus MoSs and underscore the need for extra support for MoMs.

Mental health, risk and protective factors at micro- and macro-levels across early at-risk stages for psychosis: the Mirorr study

Johanna T.W. Wigman¹, Sara van der Tuin¹, Marijke Muller¹, Sanne H. Booij^{1,2}

¹University of Groningen, University Medical Center Groningen, Dept of Psychiatry, Interdisciplinary Center Psychopathology and Emotion regulation, Groningen, the Netherlands; ²Center for Integrative Psychiatry, Lentis, Groningen, the Netherlands

The clinical staging model states that psychosis develops gradually through subsequent stages of illness severity. However, questions remain regarding what drives progression to more severe stages. The current paper aimed to characterize individuals in different clinical stages in terms of psychopathology and risk factors, but also in terms of well-being, functioning and protective factors, using a multimethod approach (cross-sectional assessments and daily diary reports).

Participants (n=96, age 18-35) were divided across four subgroups that represent increasing levels of risk for psychosis, ranging from

general population (stage 0; subgroup 1) to help seeking individuals at Ultra High Risk (UHR) for psychosis (stage 1b; subgroup 4). Cross-sectional and 90-day daily diary data on psychopathology, well-being, psychosocial functioning, risk and protective factors were statistically compared across subgroups and descriptively compared across domains and assessment methods.

Psychopathology seemed to increase across subgroups, but not always linearly and nuanced differences were seen between assessment methods. Wellbeing and functioning differed mostly between subgroup 1 and the other subgroups (suggesting differences between non-clinical and clinical populations). Risk and protective factors, when differing, mostly did so between the two highest and lowest subgroups, especially in the experienced need (but not reported amount) of social support and coping.

Characterization of clinical stages in terms of psychopathology, well-being, risk and protective factors and patterns of daily experiences is an important next step to understand the development of mental health problems in young people. This can improve our identification of those at highest risk for developing (more severe) mental health problems.

State anxiety and heart rate variability in everyday police training: An ambulatory assessment study on the stress- buffering potential of momentary self-efficacy

Regina Franziska Schmid, Joachim Thomas

Catholic University of Eichstätt-Ingolstadt, Germany

Police training involves critical and potentially dangerous units that require high concentration, functionality, and resilience in still unfamiliar situations. New recruits are therefore confronted with a very demanding and pressurizing setting in order to be adequately prepared for their future officer duties. Based on the job demands-resources framework, the present ambulatory assessment study investigated measures of state anxiety and heart rate variability (HRV) among 31 police trainees in association with their current training demands and momentary self-efficacy. During two training days, the police cadets wore a continuously recording electrocardiogram device and answered recurring smartphone questionnaires in which situational performance pressure and emotional demands, as well as self-efficacy and anxiety were rated five times a day. Multilevel models were calculated for a total of 297 training units to predict state anxiety and short-term HRV. High performance pressure was associated with temporarily increased anxiety and decreased HRV, while emotional demands were not. Furthermore, momentary self-efficacy significantly buffered the effects of performance pressure and emotional demands on anxiety and the effect of performance pressure on HRV. Contributing to psychophysiological ambulatory research in occupational health psychology, the present study provides insights into the detrimental concomitants of high-pressure situations in police training, while emphasizing the importance of increasing self-efficacy as protective and stress-buffering resource.

Conference Agenda

Session

S1-D1: Symposium Session 1 - Day 1

Time: **Wednesday, 30/June/2021: 5:00pm - 6:15pm**

Presentations

Investigating and Intervening Intra- and Interpersonal Regulation of daily affective experiences

Chair(s): **Andrea B. Horn** (University of Zurich, Switzerland)

Discussant(s): **Matthias R. Mehl** (University of Arizona)

Ambulatory assessment offers new ways of investigating the unfolding and regulation of emotional experiences in daily life. This allows not only new insights in relevant contextual factors of the regulation of daily emotions but also opens up opportunities for intervening these processes with ecological momentary interventions. In this symposium innovative contributions investigating intra- and interpersonal regulation of daily emotions will be presented and discussed.

The first study by Salo and colleagues will present experience sampling data investigating spill-over of subjective stress experiences on intimacy in the romantic relationship during the COVID-pandemic and the moderating role of dyadic coping. Huber et al. will then introduce analyses of dyadic ambulatory assessment data on younger and older couples with a focus on emotional co-regulation, followed by another study of the same project in which Meier et al. investigate the role of daily disclosure for well-being as reflected in language markers of daily couple conversations. The series of talks will be completed by Marciniak and colleagues' mHealth Ecological Momentary Intervention study "ReApp" which is aimed at training reappraisal skills to increase resilience. After these contributions, Matthias R. Mehl will discuss the presented studies and provide his reflections on the results and their implications.

Presentations of the Symposium

Spillover of subjective stress experiences in Intimate Relationships: The Importance of Common Dyadic Coping in Times of the COVID-19 Pandemic

Katharina Salo, David Koch, Lisanne Pauw, Gerald Echterhoff, Anne Milek

University of Münster

The increase in daily stress associated with the COVID-19 pandemic might challenge romantic relationships, since stress can negatively impact relationship functioning. In this study, we investigated whether couples with high common dyadic coping skills might be at a lower risk for the negative spillover effect of daily stress on intimacy in times of the COVID-19 pandemic.

We conducted a two-wave experience sampling study for seven days at the beginning of the lockdown (April, wave 1) and for seven days three weeks later (May, wave 2). Common dyadic coping was assessed once at the beginning of the study. Stress, personal partner contact, and intimacy was assessed three times a day (N of participants = 272, N of observations = 6377).

Our results from multilevel modeling confirmed the spillover effect of daily stress to intimacy. In addition, we found a significant three-way interaction effect: When participants had spent time with the partner, stress spillover was buffered to some extent for participants who reported high (as compared to low) dyadic coping. Further, seeing the partner (as compared to not having had face-to-face contact) aggravated stress spillover for those reporting low dyadic coping.

The present study replicated the spillover effect of stress on intimacy in times of the COVID-19 pandemic and shows that couples with low common dyadic coping skills might be at a higher risk for negative relationship outcomes. Thus, to prevent detrimental consequences of the current pandemic and lockdown periods, couples should be trained in common dyadic coping strategies.

Daily interpersonal regulation of affective experiences in younger and older couples: a dyadic ambulatory assessment study

Zilla M. Huber, Tabea Meier, Olenka Dworakowski, Mike Martin, Andrea B. Horn

University of Zurich

Background: Daily emotion regulation is more interpersonal than it was long thought of with social proximity playing an important role for daily affective appraisal

and emotion regulation. Especially in a romantic partnership, this proximity poses an important resource for this so called co-regulation. The aim of the study was to more closely investigate different aspects of interpersonal emotion regulation in younger and older couples and how it is affected by age and situational factors such as stressful or uplifting events and time spent together with the partner.

Methods: The study consisted of N = 116 couples with 62 younger (between 18 and 30 years) and 54 older couples (60 years and older). Each participant received a smartphone and received 3 daily prompts over the span of 21 days in which they were asked to report their momentary affect (valence/energetic arousal), and daily situational factors (stressors, uplifting events, time spent together) additionally time spent together was measured objectively through beacon based mobile sensing.

Results: Multilevel double intercept models show a synchronization of the romantic partners' daily affect, with lower synchronization in older couples's valence. On days with stress, older couples reported lower energetic arousal, which was then less synchronized with their counterpart's arousal in female partners.

Discussion: These results open doors for further research regarding micro- and macro-contextual factors and resources of emotion regulation over the life-span and how these resources can be supported.

We-ness in young and older couples' daily conversations: the role of daily emotional disclosure **Tabea Meier¹, Zilla M. Huber¹, Olenka**

Dworakowski¹, Claudia M. Haase², Mike Martin¹, Andrea B. Horn¹ ¹University of Zurich, ²Northwestern University

Emotional disclosure in close relationships is fundamental for processes leading to relationship quality. Especially the disclosure of positive emotional experiences is thought to be uniquely rewarding; it may capitalize positive experiences and foster social positivity resonance. This allows expansion of one's own resources by sharing a sense of "we-ness" in the couple. Socioemotional theories on lifespan development suggest that older individuals increasingly focus on these kinds of positive resources. This study aims at investigating whether dyadic language indicators of daily we-ness are associated with emotional disclosure in young and older couples' daily life.

In an dyadic ambulatory assessment study, N = 117 couples (N=64: 18-30 years, N=53: 60+ years) reported their emotional experiences and disclosure three times a day over 21 days. They were moreover instructed to trigger audio-sensing of four daily conversations. We-ness was assessed as the rate of we-pronouns in couples' daily conversations.

Modified dyadic score models revealed that older couples showed a higher manifestation of mean we-ness in their daily conversations compared to younger couples. These age differences were partially explained by higher levels of positive emotional disclosure: Older

couples shared more positive and fewer negative emotional experiences than younger couples. Moreover, daily negative disclosure was associated with more we-ness as well.

Our results expand earlier findings of more we-ness and positivity in older couples by showing these effects with real-life indicators. They furthermore underline the importance of daily disclosure for these outcomes and encourage further research on the distinct roles of emotional valence in disclosure.

ReApp – an mHealth Ecological Momentary Intervention to improve reappraisal skills: a feasibility study.

Marta A. Marciniak¹, Lilly Shanahan², Ilya M. Veer³, Jens Timmer⁴, Erno Hermans⁵, Kalisch Raffael⁶, Kleim Birgit¹

¹University of Zurich/Psychiatric University Hospital, ²University of Zurich, ³Charité – Universitätsmedizin Berlin, ⁴Albert-Ludwigs- Universität Freiburg,

⁵Radboud University Medical Center/ Donders Institute for Brain, ⁶Johannes Gutenberg University Mainz/ Leibniz Institute for Resilience Research (LIRR)

Background: Stress-related disorders are highly prevalent and an economic burden on society. Approaches to increase stress resilience, particularly in vulnerable populations, are thus much-needed. Based on theoretical and empirical findings, reappraisal is a key target for such approaches. Through reappraisal, individuals learn to focus on positive aspects and potential benefits arising from situations that are initially perceived as stressful. Here we build on advances in ecological momentary assessment (EMA) and ecological momentary intervention (EMI) techniques to investigate the feasibility of ReApp, a mobile health (mHealth) app, to foster resilience via reappraisal training.

Methods: The study was a two-arm randomized controlled trial with 40 healthy participants (students aged 18–29 years), running over one week. After screening their current reappraisal skills, participants were randomly assigned to either an intervention (IG) or control group (CG). Both groups received 10 prompts per day - IG receiving EMI and EMA modules, while CG received EMA modules only.

Results: Compliance rate with high, 93.6%. Participants completed 66 out of 70 planned EMA/EMI surveys on average. App functionality, as well as the quality of information received positive ratings by participants - 86% and 79% (on a scale from 0 to 100). While there were no group differences in reappraisal skills in the overall sample, ReApp was more efficacious in increasing reappraisal skills in participants with lower reappraisal scores at baseline.

Discussion: ReApp has been proved to be feasible and efficacious in increasing reappraisal skills in participants with initially low reappraisal skills.

Capturing and analyzing physical behavior in daily life: examples and implications for personalized interventions.

Chair(s): Marco Giurgiu (mental mHealth Lab, Department of Sports and Sports Science, Karlsruhe Institute of Technology (KIT), Baden- Wuerttemberg, Germany)

Discussant(s): Yue Liao (Department of Kinesiology, University of Texas at Arlington, Arlington, Texas, USA)

Physical behavior (physical activity, sedentary behavior, and sleep) is a crucial lifestyle factor for preventing and managing diseases across the lifespan. Therefore understanding physical behavior as well as its antecedents and consequences within a 24h cycle is critically important. However, given the methodological complexity of these behaviors, there is a gap between technical feasibility and adequate assessment in daily life. Hence, this symposia aims to examine real-life associations between physical behavior and psychological constructs among healthy participants and patients, and present novel technical possibilities to capture physical behavior in daily life. In particular, the first presentation will show findings demonstrating that physical activity positively influences both positive and negative affect in patients with ADHD and healthy individuals. The second presentation will examine associations between a novel, smartphone-based implicit attitude assessment and subsequent accelerometer-derived physical activity. The third presentation will introduce sedentary triggered e-diaries as a novel and valid methodological approach to capture social and environmental context information during bouts of sedentary behavior. The fourth presentation will show analyses on daily associations between exercise duration, moderating aspects (i.e., timing, intensity, type) and subsequent night sleep parameters. In the interactive scientific exchange, we will discuss and develop ideas on how researchers can simultaneously assess physical behavior and behavioral antecedents and consequences in different samples and how researchers can use data from ambulatory assessment to inform the development of personalized, adaptive, and timely behavioral interventions.

Presentations of the Symposium

Effects of physical activity on affect in the everyday life of patients with ADHD – A mobile health approach

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Physical activity is beneficial for both physical and mental health. Investigating healthy individuals mainly, Ambulatory Assessment studies showed physical activity to be positively associated with affect. However, the investigation of this association in the everyday life of a diagnosed adolescent and adult ADHD sample has not been a major issue in research. Patients with ADHD and healthy individuals, aged 14-44 years, reported on positive and negative affect repeatedly (i.e., up to twelve times a day) via Smartphone-App and wore accelerometers across four days in their daily life. For analysis, we used multilevel-models to identify the within-subject-effects of physical activity on positive and negative affect. Preliminary findings showed physical activity to increase positive affect in both patients with ADHD and healthy individuals. However, patients with ADHD showed a steeper slope regarding the effect of physical activity on positive affect. Additionally, physical activity decreased negative affect significantly in the patient group but not in the healthy control group. Also, the cross-level interaction effect on negative affect remains not significant. Physical activity positively influences both, positive and negative affect in patients with ADHD and

healthy individuals. The effect of physical activity on positive affect remains larger for patients with ADHD than for healthy individuals. Our findings show patients with ADHD to benefit from physical activity in improving negative affect, which may serve as a helpful basis to set up interventions for improving mood in patients with ADHD.

Implicit Attitudes and Physical Activity in Daily Life

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Non-conscious processes operating beyond our intent may play a central role in regulating our behavior. One such non-conscious process is implicit attitudes, automatic positive or negative evaluations of a target activity or object. The work investigating the role of implicit attitudes in regulating physical activity has focused on how between-person differences in implicit attitudes predict physical activity.

However, there is evidence to suggest that implicit attitudes may change within people based on recent experiences over short timescales (e.g., days, weeks). The purpose of this study was to determine associations between daily implicit attitudes and subsequent physical activity. University students (N=94) completed a novel, brief smartphone-based physical activity vs sedentary behavior implicit attitude test, assessment of their instrumental and affective attitudes towards physical activity each morning, and wore an accelerometer to measure their moderate- to vigorous-intensity physical activity (MVPA) for 4 days. Linear multilevel regression models controlling for instrumental and affective attitudes, age, and body mass index revealed that individuals who, on average, had more positive implicit attitudes towards physical activity tended to engage in more minutes of MVPA overall ($B=72.17$, $p<0.01$); however, implicit attitudes on a given day were not associated with minutes of MVPA that day ($B=17.87$, $p<0.19$). Our findings support previous work that between-person differences in implicit attitudes are related to physical activity; however, despite day-to-day variability in implicit attitudes and physical activity, these two constructs did not appear to covary within people. Physical activity promotion efforts should integrate strategies to manipulate implicit attitudes towards physical activity.

Accuracy of sedentary triggered e-diaries.

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Sedentary behavior is negatively associated with physical and mental health. However, information such as sedentary behavior occurs throughout the day, where, when, and with whom it takes place, and what people are doing has been less examined. To gather information about social and environmental context while being sedentary is useful to inform interventions to reduce sedentary time. Sedentary triggered electronic diaries comprise continuous assessment of sedentary behavior via accelerometers and repeated contextual assessments via e-diaries. In real-time, the accelerometer analyzes and transfers data regarding body position to a smartphone and triggers after a specified time (e.g., 30 min) in a sedentary position, contextual assessments. To test the accuracy, we calculated a percentage score for all triggered prompts in relation to the total number of bouts that could trigger a prompt in three independent studies. 29.3% of all sedentary bouts were classified as moderate-to-long (20-40 min) and long bouts (≥ 40 min). On average, the accuracy by participant was 82.77% (SD: $\pm 21.01\%$), ranging from 71 to 88.22% on the study level. Compared to simulations of random prompts (every 120 min), the number of triggered prompts was up to 47.9% higher through the sedentary triggered e-diary approach. Sedentary triggered e-diary is an accurate method for collecting contextual information on sedentary behavior in daily life. Given the growing interest in sedentary behavior, this approach offers the opportunity to collect contextual information or unravel dynamic associations. Moreover, it can be modified to develop sedentary triggered mHealth interventions.

Daily Associations Between Exercise and Subsequent Sleep: An Examination of Moderators and Mediators.

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Research has demonstrated daily associations between sleep and physical activity and/or exercise, but findings regarding the impact of physical activity and/or exercise on sleep is mixed. Understanding of these daily associations would be enhanced by greater consideration of moderating and mediating factors. The current study tested whether the daily association between exercise duration and subsequent night sleep duration, awakenings, wake after sleep onset, and sleep efficiency would be moderated by timing of last exercise, exercise intensity (moderate-to-heavy vs. light), and exercise type (aerobic vs. anaerobic). Moreover, it was tested whether positive affect, negative affect, and fatigue mediated associations between exercise and sleep. Hypotheses and analytic decisions were pre-registered (<https://osf.io/vx5pe>). Participants (N=78) were healthy college students who completed 7 consecutive days and nights of an ecological momentary assessment protocol. Exercise was self-reported each night before bed, and sleep was assessed via actigraphy. Affect and fatigue were assessed 4 times per day (wake time, afternoon, evening, bedtime). As expected, exercise duration was not associated with subsequent sleep outcomes. Exercise intensity moderated the association with sleep duration and exercise duration, such that sleep duration was lowest following days with longer than usual exercise of high intensity. Wake after sleep onset was longest following days of longer than usual, anaerobic exercise. Affect and fatigue were not mediators of any association. Current analyses suggest that daily associations between exercise and sleep may be moderated by aspects of exercise, which has implications for sleep health promotion efforts targeting exercise and physical activity.

Ambulatory assessment in academic contexts: Variability in students' self-regulation and responses to interventions

Chair(s): Friederike Blume (DIPF | Leibniz Institute for Research and Information in Education, Germany)

Discussant(s): Kou Murayama (University of Tübingen)

Self-regulation denotes an individual's capacity to positively adjust cognitions, emotions, and behaviour to support the pursuit of individual objectives. Its relevance for academic goal achievement has consistently been demonstrated, with higher self-regulation always predicting more favourable outcomes such as higher grades and degrees. With the help of interventions, attempts were therefore made to increase self-regulation and thus improve academic performance. Until now, most existing research in this field relied on self-regulation data collected through one-off assessments using questionnaires and laboratory tasks (e.g., marshmallow task). Thus, self-regulation was usually considered a relatively stable disposition. These approaches, however, largely ignored the dynamic nature of self-regulation varying over time. Additionally, as self-regulation data were usually collected independent from academic contexts (e.g. in the lab), the generalisability of results to real-life academic contexts should be limited. Since a few years, however, studies measuring self-regulation in academic contexts using ambulatory assessment techniques emerged, thereby compensating for these drawbacks. Four of these studies will be presented in this symposium.

The first talk will address the role of students' trait self-regulation and attributes of academic tasks students worked on during the homeschooling period due to the SARS-CoV-2 pandemic for their daily self-regulation (Blume). The second talk will present work examining the within-person structure of students' motivational engagement involved in self-regulation (Tamura). The third and the fourth talk will present results of studies investigating the effectiveness of self-regulation interventions implemented as part of the ambulatory assessment in schoolchildren (Schwarz) and medical students (Breitwieser).

Presentations of the Symposium

The role of students' trait self-regulation and task attributes of daily academic tasks for students' daily self-regulation during homeschooling

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Between mid-March and end of April 2020, all schools throughout Germany were closed as a means to counter the SARS-CoV-2 pandemic. Teachers provided students with learning tasks to work on at home. Students' trait self-regulation and characteristics of the learning tasks should have played important roles when adjusting to this novel schooling situation. They may be expected to have

influenced students' daily self-regulation and hence the independence with which they worked on learning tasks. The present study therefore examined the role of

students' trait self-regulation as well as task difficulty and task enjoyment for students' daily independence from their parents with which they worked on the learning tasks. Data on students' trait self-regulation were obtained through a baseline questionnaire filled in by the parents of 535 students (Mage = 9.69, SDage = 2.80). The parents additionally reported about the difficulty and enjoyment of the daily learning tasks and students' learning independence through 21 consecutive online questionnaires. Results showed that students' with higher trait self-regulation worked more independently on the daily learning tasks. Additionally, students learned more independently on days when tasks were found to be easier and more enjoyable. As students' daily learning independence should be positively associated with their daily self-regulation, and higher self-regulation should in turn result in better learning outcomes, teachers should aim to design tasks that foster the independence with which students work on them. Our findings suggest that this might be achieved through tasks that are not too difficult and at the same time enjoyable.

Exploring the within-person contemporaneous network of motivational engagement

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Existing theoretical frameworks on motivation have identified a number of critical components in our motivational engagement process in learning. However, little empirical research has examined how these different components interact with each other to support our motivational engagement as a whole. In this symposium, I would like to introduce our study that explored such dynamics by examining within-person contemporaneous network structure of key components in motivational engagement process (i.e. reasons/values, expectancy belief, goals, social relations, affective experiences, and perceived autonomy). The unique method of this study was to collect the data with an intensive longitudinal design and perform network analysis. We tracked four participants working on psychological research projects over a year on a daily basis, and found that their motivational engagement mainly consisted of a large network of nodes that support autonomous forms of self-regulation. Scrutiny of the network also suggests the critical roles of curiosity and intrinsic reason in bridging affective and core motivational aspects of engagement. The results suggest the utility of psychological network approach in understanding people's motivational engagement process.

The measurement of self-regulatory abilities of 11-year-olds by ambulatory assessment and the monitoring of self-regulation training using smartphones

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Children's trait self-regulation was consistently demonstrated to be relevant for a variety of academic outcomes. As such, higher trait self-regulation was shown to be associated with less careless mistakes, higher school attendance and participation in class, and overall higher grades. However, in addition to this trait, children's self-regulation must be assumed to fluctuate over time (i.e. state self-regulation). The research question being at the core of this presentation is whether fluctuations in children's self-regulation can be measured in daily environments and modified through a self-regulation training (i.e., Mental Contrasting with Implementation Intentions [MCII]; Oettingen, 2004). To this end, using ambulatory assessment, 49 schoolchildren (Mage = 11.2) informed about their self-regulation three times per day (in the morning before school, after school, and in the evening) over 18 consecutive days. Children participated in one session of either a self-regulation (MCII) or a positive thinking training prior the daily assessment phase. The results demonstrated that children's self-regulation fluctuated from day to day. No differences in daily variations of self-regulation were observed between children in the MCII as compared to the positive thinking condition; both conditions reported a better self-regulation at the end of the survey period. Awareness of the fluctuations in self-regulation among schoolchildren and the associated difficulties should be raised. In addition, self-regulatory interventions should be developed and implemented in a more differentiated manner on a day-to-day basis. In this context future possibilities of measuring self-regulation, e.g. for consulting services, as well as possibilities of intervention by means of portable devices are imaginable.

Using Ambulatory Assessments to Gauge the Temporal Dynamics of Self-Regulation Interventions

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Self-regulated learning (SRL) processes fluctuate within students over relatively short periods of time (e.g., Liborius et al., 2019; Schmitz & Wiese, 2006). This high volatility raises the question of how stable the effects of interventions targeting SRL processes are and, consequently, how frequently intervention prompts might need to be repeated to produce reliable change. To better understand the temporal trajectory of intervention effects, we used an intra-individual approach that coupled self-regulation prompts with ambulatory assessment data. Over 40 days, 339 medical students preparing for a high-stakes exam on a digital learning platform reported on various components of their SRL by answering online questionnaires before and after learning. Additionally, students in the experimental group (N = 223) received self-regulation prompts on half of the days, alternating between 2-3 days of consecutive prompting and no-prompting. Our results confirmed that students' perceived control processes during learning were coupled with their learning success, which was measured objectively via log-files. The intra-individual intervention design further revealed that the beneficial effect of prompting built up over consecutive days of prompting and faded out when prompting was discontinued. The effects of self-regulation prompts on academic outcomes may, thus, wax and wane more quickly than previously assumed. In conclusion, our study highlights the importance of leveraging intra-individual data to uncover the temporal dynamics in the effects of SRL interventions.

Mobile technology, multilevel modelling, network analysis, and theory-based predictions: recent advances in improving our understanding of suicidal ideation

Chair(s): Heide Glaesmer (University of Leipzig, Germany), **Dajana Rath** (University Duisburg-Essen, Germany)

Discussant(s): Heide Glaesmer (University of Leipzig, Germany)

Since suicidal ideation is one of the major predictors for the development of suicidal behavior, it is important to consolidate our understanding of how suicidal ideation develops and which factors predict its course to improve treatment of both suicidal ideation and behavior. For that reason, research should focus on assumptions of current theoretical models on the development of suicidal ideation, e.g. the Interpersonal Theory of Suicidal Behavior (ITSV) and the Integrated Motivational-Volitional Model of Suicidal Behavior (IMV). Moreover, researchers should take advantage of modern methodological approaches for collecting and analyzing of longitudinal data, such as ecological momentary assessments (EMA), multilevel modelling, and network analysis of EMA data.

The results presented in this symposium come from two different EMA studies. The first EMA study examined a sample of 74 inpatients with a depressive disorder and recent/lifetime suicidal. This study focused on fluctuations and the predictive power of thwarted belongingness and perceived burdensomeness (talk 1, 2, 3) as proximal risk factors of suicidal ideation (IPTS). The second EMA study examined a sample of 61 healthy participants and focused on defeat and entrapment of the IMV model as well as interoceptive abilities

(talk 4). All presenters used multilevel modelling (talk 1, 3, 4) or network analysis (talk 2) for examining cross-sectional (within EMA assessments) and prospective associations (from assessment to assessment) with suicidal ideation.

All results will be discussed in the light of the IPTS and IMV model. Practical conclusions for therapy will be drawn.

Presentations of the Symposium

Predicting the occurrence of suicidal ideation by momentary ratings of burdensomeness and belongingness: An experience sampling study in psychiatric inpatients with unipolar depression

Thomas Forkmann

University of Duisburg-Essen

Purpose: Empirical evidence on proximal factors predicting suicidality is scarce. One theory shedding light on this issue is the Interpersonal Theory of Suicide (IPTs, Joiner, 2005). The IPTs hypothesizes two dynamic, cognitive-affective states: perceived burdensomeness (PB) and thwarted belongingness (TB). The simultaneous presence of these constructs is assumed to cause active suicidal desire. This experience sampling study investigated whether PB and TB are positively associated with suicidal ideation (SI) cross-sectionally and whether PB and TB are able to predict the occurrence of SI prospectively (controlling for well-known risk factors for SI as depression and hopelessness).

Methods: 74 inpatients with unipolar depression reported on their momentary PB, TB, depressiveness, hopelessness, and SI ten times per day for six days via experience sampling method. Hierarchical linear modelling (HLM) was used to analyze associations between suicidal ideation and PB, TB, depressiveness, and hopelessness cross-sectionally and prospectively.

Results: Multilevel analyses revealed that PB and TB are significantly and positively associated with SI cross-sectionally. In prospective analyses, only PB at t-1 turned out to be a significant predictor for suicidal ideation at t (even when controlling for suicidal ideation at t-1, depression, hopelessness at t).

Discussion: According to the assumption of the IPTs, SI is associated with PB and TB cross-sectionally. In contrast, only PB is a significant predictor for SI in the longitudinal analysis. The findings are in line with a recent comprehensive review of Ma et al. (2016) indicating mixed evidence for TB in cross-sectional studies, but contributing evidence from a longitudinal study.

Predicting suicidal ideation from beep to beep: Application of network analysis to ecological momentary assessment data

Dajana Rath

University of Duisburg-Essen, Germany

Background: Ecological momentary assessment (EMA) within the field of suicide prevention can help better understand the real-time fluctuations for suicidal ideation. Using network analysis for EMA data provides the opportunity to understand which variables predict suicidal ideation from beep to beep and to interpret complex interactions of symptoms.

Methods: Seventy-four depressed inpatients from a German psychiatry answered 10 assessments a day for a period of 6 days. They rated their momentary suicidal ideation (SI), perceived burdensomeness (PB), thwarted belongingness (TB), hopelessness (H), depression (D), anxiety (A), and positive affect (PA). A temporal network and centrality parameters were estimated via multi-level vector autoregression modelling.

Results: The temporal network revealed that SI was only predicted by itself and PB from assessment to assessment. Rather than being influenced by the variables in the network, SI had an impact on all other variables. Moreover, SI, D, and H were the most central variables.

Conclusion: SI over time is only predicted by previous SI and PB, but not by any of the other well-known risk factors such as hopelessness and depression. The network analysis results were comparable with the multilevel regression analysis and should not only be considered as a visual presentation of standard analyses but also as a more complex analysis, which might be useful to discuss more complex relations between symptoms.

How is the presence of company related to thwarted belongingness in real time? Taking a closer look at the conceptualization of the construct of the Interpersonal Theory of Suicide

Heide Glaesmer, Nina Hallensleben

University of Leipzig, Germany

Background: The role of Thwarted Belongingness (TB) in predicting suicidal ideation, as originally assumed by the Interpersonal Theory of Suicide, is repeatedly challenged by empirical findings. This could be due to an inadequate conceptualization of the construct TB that is assumed to be influenced by intrapersonal and interpersonal factors.

Method: We examined the associations of TB with intrapersonal variables related to depression, and of interpersonal variables related to an individual's actual social environment analyzing data from an ecological momentary assessment study in psychiatric inpatients with depressive disorders. N = 73 participants rated momentary TB, depressive affect and status of company up to 10 times per day over a period of six days on smartphones.

Results: TB was lower when assessed while participants were in company compared to when they were alone and the more desired the company was, the less TB was experienced. Individuals who had a partnership experienced less momentary TB. Furthermore, higher levels of momentary depressive affect as well as more stable level of depression were related to higher levels of TB and the relation between presence of company and TB was weaker for more depressed persons.

Conclusions: Our findings can be seen as evidence that both intrapersonal and interpersonal factors relate to TB and thus support the conceptualization of TB as proposed by the Interpersonal Theory of Suicide.

Defeat, entrapment, and interoception: time courses and associations with suicidal ideation

Inken Höller

University of Duisburg-Essen, Germany

Background: Defeat, entrapment, and interoceptive sensibility, awareness, and accuracy have been highlighted to be associated with suicidal ideation and behavior. However, little is known about their short-term variability and their longitudinal associations with suicidal ideation. The aim of this study was to investigate possible fluctuations of these constructs, the association of the interoceptive facets with suicidal ideation, and the association of defeat and entrapment with each other.

Method: Sixty-one participants (age: M = 24.1, SD = 7.00, n = 54 female [88.5%]) took part in a seven-day smartphone-based ecological momentary assessment (EMA). To control for potential training effects of repeated interoceptive assessments during the EMA period, participants were randomly assigned to a control (n = 30) and an interoception (n = 31) group, which was additionally assessed for facets of interoception. A baseline and post assessment was included.

Results: Multilevel analyses revealed significant fluctuations for all three interoceptive facets as well as for defeat and entrapment. Defeat was associated with entrapment and only attention regulation as part of interoceptive sensibility was associated with suicidal ideation cross-sectionally. Prospectively, defeat could not predict entrapment and again only attention regulation could predict suicidal ideation. There were no training effects for interoception.

Conclusion: Evidence on the short-term variability of defeat, entrapment, and interoception could be provided highlighting the necessity of repeated measurement of these constructs in clinical practice. Further research – within a clinical sample – seems warranted.

Replicating SIGMA across three countries to study the development of adolescent psychopathology in everyday life

Chair(s): Olivia J. Kirtley (Center for Contextual Psychiatry, KU Leuven)

Discussant(s): Inez Myin-Germeys (Center for Contextual Psychiatry, KU Leuven)

SIGMA is a large-scale, accelerated longitudinal study of social and environmental risk and protective factors in adolescent mental health, which uses the Experience Sampling Method (ESM) to zoom in on dynamic and contextually-based processes. The original SIGMA study began in Flanders (Northern Belgium) in 2018 and Wave I included 1913 adolescents, aged 12 – 16 years old at study enrolment. Since then, SIGMA has inspired similar studies in Scotland and in Hong Kong. This symposium brings together findings from all three of these studies to highlight the value – and challenges – of using ESM to investigate adolescent psychopathology. First, Robin Achterhof presents data from SIGMA (Flanders), showing that face-to-face social interactions have unique affective benefits, but that online social interactions may yield benefits for those already "rich" in social resources. Next, Eva Bamps' uses SIGMA (Flanders) data to shed light on another topical issue in adolescent mental health: social withdrawal. Her work uses latent profile analysis of ESM data to tease apart when being alone is benign and when it is deleterious. Next, Dorothy Chan presents initial results from the HK-YES study (Hong Kong), demonstrating that higher negative and lower positive affect correlate with PHQ-9, but not GAD-7, scores among adolescents. Finally, Matthias Schwannauer presents preliminary data from "SIGMA Scotland", investigating the relationship between momentary affect, peer attachment, and contextual risk factors for psychopathology in adolescents. Leading ESM and youth mental health expert, Inez Myin-Germeys will be the discussant and SIGMA (Flanders) project lead, Olivia Kirtley will chair the session.

Presentations of the Symposium

Online Interaction: Who Is It Good For? Affective Profiles of Momentary Online and Face-to-Face Interactions

Robin Achterhof¹, Olivia J. Kirtley¹, Maude Schneider², Ginette Lafit¹, Noemi Hagemann¹, Karlijn S. F. M. Hermans¹, Anu P. Hiekkaranta¹, Aleksandra Lecei³, Inez Myin-Germeys¹

¹Center for Contextual Psychiatry, KU Leuven, ²University of Geneva, Switzerland, ³Center for Clinical Psychiatry, KU Leuven

In the modern day and age, youth are constantly connected to each other through digital means. Little is known, however, about the in-the-moment differential experience of online versus face-to-face social interactions, and whether adolescents with more social resources experience different affective benefits from online social interactions than others. In this study, we explored the different affect levels of $n=1705$ Flemish adolescents (mean age=13.7) as they engaged in online social interactions in the moment that they occurred, as opposed to being alone and engaging in face-to-face interactions. We also explored whether different indicators of social resources moderated these relationships. Results of a set of multilevel linear regression models indicated significantly higher levels of PA (B 95%CI= [.05; .20], $p=.001$), lower levels of NA (95%CI= [-.18; -.06], $p=.001$), and lower levels of loneliness (B 95%CI= [-.75; -.55], $p=.001$) when participants interacted face-to-face vs. online; and significantly lower levels of PA (B 95%CI= [-.23; -.06], $p=.001$) when participants were alone vs. interacting online. Exploratory moderator analyses revealed potential support for the 'rich-get-richer' hypothesis, where those with more social resources benefit most from engaging in an online social interaction. In sum, this study demonstrates the potential of measuring the experience of online interactions in the moment, while also highlighting the affective benefits of face-to-face social interactions for adolescents. Online social interactions may be considered valuable yet limited substitutes of real-life social interactions.

Disentangling benign and malignant social withdrawal in adolescents' daily lives

Eva Bamps¹, Ana Teixeira¹, Ginette Lafit¹, Olivia Kirtley¹, Noemi Hagemann¹, Karlijn S. F. M. Hermans¹, Anu P. Hiekkaranta¹, Aleksandra Lecei², Inez Myin-Germeys¹

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Social withdrawal is a risk factor for mental health problems like depression, anxiety and psychosis. This link is established in children and adults, but little is known about social withdrawal in adolescence. Adolescence is a crucial period in which time spent alone increases and mental health problems can develop. Still, adolescents need time alone to gain independence and form their identities. Therefore, social withdrawal seems to be both malignant and benign. It remains unclear, however, under which circumstances adolescents experience either form of social withdrawal.

In this study, we investigated if benign and malignant social withdrawal experiences can be distinguished in adolescents' daily lives and if momentary and person-level factors influenced these experiences. This study used ESM data from the SIGMA project. 1913 participants completed a six-day period of ESM with ten beeps per day. We used Latent Profile Analysis to classify social withdrawal experiences based on momentary affect, loneliness, desire to be alone, feelings of exclusion and of pleasantness when alone. Further, we conducted a Latent Class Regression to investigate if momentary activity, general preference to be alone and total amount of time spent alone influenced the social withdrawal experiences. We hypothesized that a two-class model would fit the data best. We also expected that more time spent alone and a higher preference to be alone would increase the experience of malignant social withdrawal. This study provides insight into different social withdrawal experiences in adolescents' daily lives and can help tailor interventions to when adolescents most need them.

Measuring momentary affects of young adults in Hong Kong using experience sampling method: Preliminary findings from the Hong Kong Youth Epidemiological Study (HKYES)

Dorothy Chan, Corine Wong, Charlton Cheung, Stephanie Wong, Eric Y.H. Chen

Department of Psychiatry, University of Hong Kong

Experience sampling method (ESM) using mobile devices has allowed researchers to capture moments of day-to-day life without altering their circumstances. The current study examines the momentary positive affect (PA) and negative affect (NA) of young people aged 15-24 in Hong Kong and their associations with depressive and anxiety symptoms. Participants were recruited from an ongoing epidemiological study with sub-study using ESM. Socio-demographic and psychosocial characteristics were assessed in the baseline interview. The Patient Health Questionnaire (PHQ-9) and General Anxiety Disorder-7 (GAD-7) were used to measure depression and anxiety symptoms respectively. Participants were given a smartphone pre-installed with "mobileQ" and answered questionnaires relating to their affects and social and physical contexts 10 times per day for 6 consecutive days. The sample consisted of 105 young adults (35.2% males and 64.8% females), their mean age was 19.97 (SE=2.70). Among all, 22 individuals (21.0%) scored moderate-to-severe in depressive symptoms, and 9 individuals (8.6%) reported having moderate-to-severe anxiety symptoms. After adjusting for age and gender, high PHQ-9 score predicted higher momentary NA ($B=0.599$, $p=0.039$) and lower PA ($B=-0.787$, $p=0.006$), while no effect was found for GAD-7 score. Significant higher event-related stress was also found in the high PHQ-9 group ($p<0.001$) and high GAD-7 group ($p=0.008$). Our results provide a preliminary view on Hong Kong youths' momentary experiences and their associations with common mood symptoms. Further investigation is needed to offer valuable contextual insights into psychopathology.

Sigma Scotland

Matthias Schwannauer, Simona Simona di Folco, Helen Sharpe, Ingrid Obsuth, Fiona Duffy, Gillian Barclay

University of Edinburgh

The Sigma UK Research Project investigates mental health and wellbeing of a cohort of young people aged between 12 and 16 and underpinning factors leading to resilience, as a way to bounce back from adversity, following them up every two years until they step into

adulthood. This study allows a cross-cultural comparison of young people's mental health and wellbeing with their European peers in SIGMA (Flanders). We assessed health and well-being as part of a standard psychometric battery and ecological momentary assessments collecting data from adolescents in their everyday lives. Preliminary results about the gender differences found in our study suggested that regarding emotional and psychological wellbeing boys scored higher than girls ($F(2, 250) = 7.023$, $p = 0.001$). Relationships with peers were valued as a source of attachment by young people involved in this study and regarding Adverse Childhood Experiences (ACEs) girls scored significantly higher than boys ($F(2, 227) = 5.213$, $p = .006$). Overall, in our sample, significant positive relationships were found between perceived socioemotional wellbeing and social support ($r = .48$) security of attachment ($r = .41$) and identity development ($r = .29$) as well as anxiety ($r = -.54$), and depression ($r = -.63$). Having experienced ACEs significantly and positively correlated with anxiety ($r = .48$), depression ($r = .50$) and security of attachment ($r = -.38$). Both peer attachment and contextual risks had a significant impact on responses to daily stressors and variation of mood and well being reflected in the momentary assessments.

Researcher degrees of freedom in ESM studies

Chair(s): **Eva Ceulemans** (KU Leuven, Belgium)

The design and analysis of ESM studies involve a multitude of methodological and analytical choices. Some of them are arbitrary or based on common practices. Others are inherently related to the complexity that characterized ESM data. However, one important question remains unanswered: how researcher degrees of freedom affect the reproducibility, replicability, and generalizability of empirical findings? The goal of this symposium is to address this question by presenting four projects that draw attention to the challenges related to the design and analysis of ESM studies. Gudrun Eisele examines the effects of sampling frequency and questionnaire length on burden, compliance, and careless responding, and discusses how researchers can make informed decisions about the design of their ESM study. Ginette Lafit introduces a Shiny app to select the number of participants in intensive longitudinal designs and highlights current challenges related to sample size planning for ESM studies. Jeroen Weermeijer applies multiverse analysis to investigate how preprocessing choices in ESM affect the robustness of statistical conclusions. Evelien Schat discusses how ESM design choices influence the performance of statistical control processes in detecting mean shifts of affect across time. Finally, Laura Bringmann addresses challenges related to the analysis of dynamic psychological processes using person-specific networks and highlights issues related to the implementation of these models when ESM is used in clinical practice. Eva Ceulemans, a leading figure in the development of quantitative methods applied to intensive longitudinal research, will chair the session.

Presentations of the Symposium

The Effects of Sampling Frequency and Questionnaire Length on Perceived Burden, Compliance, and Careless Responding in Experience Sampling Data in a Student Population

Gudrun Eisele¹, Hugo Vachon², Peter Kuppens³, Marlies Houben³, Inez Myin-Germeys³, Wolfgang Viechtbauer⁴

¹KU Leuven, Belgium, ²EORTC, Belgium, ³KU Leuven, ⁴Maastricht University, Maastricht, the Netherlands

Currently, little is known about the association between assessment intensity, burden, data quantity, and data quality in Experience Sampling Method (ESM) studies. Researchers, therefore, have insufficient information to make informed decisions about the design of their ESM study. Our aim was to investigate the effects of different sampling frequencies and questionnaire lengths on burden, compliance, and careless responding.

Students ($n = 163$) received either a 30- or 60-item questionnaire three, six, or nine times per day for 14 days. Preregistered multilevel regression analyses and

ANOVAs were used to analyze the effect of design condition on momentary outcomes, changes in those outcomes over time, and retrospective outcomes. Our findings offer support for increased burden and compromised data quantity and quality with longer questionnaires, but not with increased sampling frequency. We, therefore, advise against the use of long ESM questionnaires, while high sampling frequencies do not seem to be associated with negative consequences.

Selection of the Number of Participants in Intensive Longitudinal Studies: A User-friendly Shiny App and Tutorial to Perform Power Analysis in Multilevel Regression Models that Account for Temporal Dependencies

Ginette Lafit¹, Janne K. Adolf¹, Egon Dejonckheere¹, Inez Myin-Germeys¹, Wolfgang Viechtbauer², Eva Ceulemans¹

¹KU Leuven, Belgium, ²Maastricht University, The Netherlands

In recent years the popularity of procedures to collect intensive longitudinal data, such as the Experience Sampling Method, has immensely increased. The data collected using such designs allow researchers to study the dynamics of psychological functioning, and how these dynamics differ across individuals. To this end, the data are often modeled with multilevel regression models. An important question that arises when designing intensive longitudinal studies is how to determine the number of participants needed to test specific hypotheses regarding the parameters of these models with sufficient power. Power calculations for intensive longitudinal studies are challenging, because of the hierarchical data structure in which repeated observations are nested within the individuals and because of the serial dependence that is typically present in this data. We, therefore, present a user-friendly application and step-by-step tutorial to perform simulation-based power analyses for a set of models that are popular in intensive longitudinal research. Since many studies use the same sampling protocol (i.e., a fixed number of at least approximately equidistant observations) within individuals, we assume this protocol fixed and focus on the number of participants. All included models explicitly account for the temporal dependencies in the data by assuming serially correlated errors or including autoregressive effects.

Coming to terms with preprocessing choices in experience sampling studies: An investigation of the robustness of statistical results using multiverse analysis

Jeroen Weermeijer, Ginette Lafit, Glenn Kiekens, Martien Wampers, Peter Kuppens, Inez Myin-Germeys

KU Leuven, Belgium

Researcher degrees of freedom allow for heterogeneity in choices related to data preprocessing. This may impede scientific progress when different, but perceived as equally reasonable, choices lead to substantially different statistical results. In this study we, using experience sampling data, investigated how different preprocessing choices affect statistical results on group differences between individuals with psychosis and healthy controls in negative affect, stress-sensitivity, and emotional inertia.

Data came from five ESM studies and included 233 individuals with psychosis and 223 healthy individuals (26,892 longitudinal assessments). Using multiverse analysis, we evaluated the robustness of statistical results when applying different preprocessing choices related to data exclusion (i.e., based on various levels of compliance and exclusion of the first assessment day) and calculation of the different constructs (i.e., composite scores calculated as either the mean, median, or mode of construct items).

Preprocessing choices related to data exclusion did not affect the results. For both stress sensitivity and emotional inertia of negative affect, group differences were affected depending on how negative affect was calculated. Post-hoc analyses revealed this may be explained by differences in the within- and between-factor factor structure of negative affect. Additional analyses reveal that excluding a single negative affect item can considerably affect previous results.

Our findings suggest that factor structure of ESM constructs may be substantially different at the within- versus between-person level. We recommend future research to (1) study structural validity of ESM constructs, and (2) implement multiverse analyses when preprocessing choices are subject to researcher degrees of freedom.

The Influence of Experience Sampling Data Characteristics on the Detection of Mean Shifts Across Time Through Statistical Process Control

Evelien Schat, Francis Tuerlinckx, Bart de Ketelaere, Eva Ceulemans

KU Leuven, Belgium

Mood disorders, including depression, are highly prevalent and come with a large cost for individuals, their social environment and society in general. Early detection of developing mood disorders is of great importance, as this would allow to intervene and to prevent an episode from occurring or to mitigate its severity. Retrospective analyses of experience sampling (ESM) data suggest that online monitoring of how self-reported affect fluctuates in daily life may be a promising avenue for future research. These analyses revealed that the patterns of these fluctuations seem to change multiple days before the start of a depressive episode. Therefore, these changes may be potential early warning signals of an imminent depression. Statistical process control (SPC) procedures are promising online methods for scanning continuously harvested ESM data for the presence of such early warning signals of depression. These procedures capture the variation present in a set of in-control data. Afterwards, incoming data are compared to the in-control distribution, to detect and test whether and when the incoming data go out of control. This study seeks to investigate how well SPC handles the specific characteristics of ESM reported affect and how design choices influence the performance of these procedures. The results of simulation studies showed that design choices indeed influence the performance of three standard SPC procedures. Specifically, the number of beeps per day (i.e., sampling frequency), the in-control distribution of the monitored affect items and the number of in-control beeps influence the performance of SPC procedures in detecting mean shifts across time.

Person specific networks: From theory to clinical practice

Laura Bringmann

University of Groningen, the Netherlands

In the psychological network approach, mental disorders such as depression are conceptualized as networks. The network approach thereby focuses on the symptom structure or the connections between symptoms. By focusing on individual networks, the network approach promises to bring psychological research closer to personalized medicine. However, there is a translational problem from the network theory to actual network models in clinical practice. In theory, the network approach sounds promising, but in practice, the networks used are vector autoregressive models that are now visualized as networks. In this talk, I will discuss the reliability and validity of these person-specific networks. I will show that network theory assumes a causal structure of the network, but that the vector autoregressive model does not represent causal interactions. Furthermore, the standard network model does not allow change over time, whereas psychiatry aims to elicit change from an unhealthy to a healthy state. Moreover, the reliability of these network models is often low. Thus, although the VAR model helps to bring psychological network theory closer to clinical practice, several discrepancies arise when we map the psychological network theory onto the VAR-based network models.

Zooming in: A momentary perspective on psychopathological processes

Chair(s): Johanna Hepp (Central Institute of Mental Health Mannheim), **Philip S. Santangelo** (Karlsruhe Institute of Technology)

Studies in this symposium present a diverse mix of Ambulatory Assessment (AA) psychopathology research, spanning different disorders (e.g., borderline personality disorder, anxiety disorders) and symptoms (e.g., non-suicidal self-injury, drinking). All studies also speak to unique design aspects in AA psychopathology research and present innovative solutions for tracking the ebb and flow of momentary symptoms. Examples include innovative designs that integrate experimental paradigms and mathematical solutions for modelling distinct initiation and continuation phases of symptoms. The first two talks in the symposium present data from participants with BPD. First, Kockler et al. present data on the specificity of affective instability and self-esteem instability in participants with acute and remitted BPD as well as clinical controls using three established instability indices. Santangelo et al. then link momentary self-esteem and affect in BPD to dysfunctional behavior, using dynamic structural equation modeling. Following this, Wycoff et al. and Hepp et al. present data on two specific problem behaviors that can occur in the course of BPD but also in many other disorders. Wycoff et al. present data on continued drinking and provide solutions for modeling different phases of drinking. Next, Hepp et al. present an investigation of pain dynamics during non-suicidal self-injury, using an assessment burst design with chains of symptom and control prompts. Finally, Schmitz et al., present a study in which they combined behavioral tasks on emotion processing and distrust with an assessment of momentary affect. Taken together, studies in this symposium impressively illustrate the potential of AA for advancing psychopathology research.

Presentations of the Symposium

Examining affective instability and self-esteem instability in borderline personality disorder using ambulatory assessment: A

comparison of acute and remitted patients with borderline personality disorder as well as clinical and healthy controls

Tobias D. Kockler¹, Philip S. Santangelo¹, Michael Eid², Christine Kuehner³, Martin Bohus³, Ulrich W. Ebner-Priemer¹

¹Karlsruhe Institute of Technology, ²Free University of Berlin, ³Central Institute of Mental Health Mannheim

Borderline personality disorder (BPD) is commonly characterized by pervasive instability. The investigation of dynamic processes has proved challenging in the past due to the incapacity of single assessments to capture symptom dynamics. Offering the possibility of repeated assessments, ambulatory assessment methodology is suited to investigate unstable symptoms in the most relevant context, patients' everyday lives. Even though BPD is the only disorder for which affective instability is a diagnostic criterion, recent studies revealed heightened instability in other disorders. Thus, the specificity of affective instability for BPD has to be called into question. We examined affective instability as well as the neglected criterion of self-esteem instability and repeatedly assessed momentary affective state and current self-esteem 12 times daily for four consecutive days in a population comprising 131 acute and 35 remitted BPD patients, 134 healthy controls (HCs), and 121 patients with anxiety disorders (ADs). We used multilevel models to determine group differences regarding three established instability indices, i.e., squared successive difference (SSD), probability of acute change (PAC), and aggregated point-by-point change (APPC). Compared to HCs, affective instability was elevated in acute and remitted BPD patients and those with ADs. However, patients with acute BPD showed heightened self-esteem instability compared to both remitted BPD patients and HCs. Self-esteem instability in the acute BPD sample was also heightened compared to patients with ADs. These findings provide the first evidence that heightened self-esteem instability is particularly prominent in acute stages of BPD, underscoring the importance of self-esteem for the understanding of dysregulation in BPD.

The within- and between-person effects of self-esteem and affective state surrounding dysfunctional behavior in the everyday lives of patients with borderline personality disorder

Philip S. Santangelo¹, Jana Holtman², Tobias D. Kockler¹, Michael Eid², Martin Bohus³, Ulrich W. Ebner-Priemer¹

¹Karlsruhe Institute of Technology, ²Free University of Berlin, ³Central Institute of Mental Health Mannheim

Dysfunctional behavior (DB) is prevalent among patients with borderline personality disorder (BPD) and is conceptualized as maladaptive affective coping attempts. Studies modeling the proposed affective dynamics surrounding DB revealed mixed findings. The recent benefits-and-barriers model extended the affective function of DB by adding self-esteem as a protective between-person factor, claiming that a positive view of the self constitutes a general barrier to engaging in DB. To investigate the effects of affect and self-esteem as they relate to DB, we had 119 patients with BPD complete e-diaries for four consecutive days during their everyday lives. The participants reported 12 times a day in approximately hourly intervals regarding their current self-esteem (SE), emotional valence (VA), and tense

arousal (TA) and whether they had recently engaged in DB. We used dynamic structural equation modeling (SEM) to examine the within- and between-person processes preceding and following DB in patients with BPD. On the within-person level, high momentary negative affect predicted dysfunctional behaviors, and on the between-person level, low trait self-esteem predicted dysfunctional behaviors. We also found an association between engaging in dysfunctional behaviors and momentary self-esteem and trait levels of valence and tense arousal. Moreover, our results indicate a deterioration of, rather than relief from, negative affective state after dysfunctional behaviors. These findings highlight the importance of emotion-regulation skills and reestablishing a positive self-view as important treatment targets to reduce dysfunctional behaviors in BPD.

Momentary predictors of daily-life drinking continuation

Andrea M. Wycoff, Sarah A. Griffin, Timothy J. Trull

University of Missouri, Columbia MO

Subjective stimulation and alcohol craving predict subsequent self-administration of alcohol in the laboratory, suggesting that stimulation and craving during drinking episodes predict continuing to drink. We used ecological momentary assessment to examine predictors of continued drinking in individuals' daily lives, providing increased ecological validity to complement existing laboratory findings. We hypothesized that higher craving, being around other people who are drinking, higher subjective stimulation, and lower subjective sedation would predict continued drinking. Participants included 111 individuals who endorsed regular drinking (52 with borderline personality disorder and 59 community individuals). Participants reported 6+ times per day for 21 days on alcohol craving, social context, subjective stimulation and sedation, and alcohol use, with follow-up reports after any reported alcohol use to more densely sample drinking episodes. For the present study, we retained only observations that followed participants' reports of their first drink on drinking days. We used logistic regression with generalized estimating equations in SAS PROC GENMOD to examine predictors of continuing to drink (yes/no) once already in a drinking episode. Consistent with hypotheses, higher craving, being with people who are drinking, and lower subjective sedation predicted continuing to drink. However, contrary to hypotheses and existing laboratory findings, lower subjective stimulation was associated with continued drinking, possibly highlighting a momentary effect of level of response to alcohol. By identifying the momentary predictors of continuing to drink once an individual has already started, we may be able to target specific proximal factors in prevention and intervention efforts aimed at reducing or moderating drinking.

The experience of pain during and in the minutes following real-life non-suicidal self-injury

Johanna Hepp¹, Lisa M. Störkel¹, Ryan W. Carpenter², Inga Niedtfeld¹

¹Central Institute of Mental Health Mannheim, ²University of Missouri, St. Louis MO

The experience of pain during non-suicidal self-injury (NSSI) has sparked a range of hypotheses but remains somewhat enigmatic. Some argue that individuals experience no pain during NSSI (analgesia model), whereas others suggest pain is a necessary component that distracts from emotionally painful experiences (pain-onset model) or that individuals seek the relief that follows cessation of the pain (pain- offset model). However, pain during NSSI has mostly been studied using laboratory proxies and rarely in real-life. We investigated NSSI- associated pain in 51 women for two weeks, with five semi-randomized daily assessments. Additionally, participants self-initiated reports whenever they self-harmed and received three follow-up prompts in 10-minute intervals. We assessed several potential moderators of the pain experience. On average, participants reported mild levels of pain during NSSI, with complete analgesia in 26.5% of events. Thus, there was no evidence for a general analgesia effect, and pain experience varied from event to event. Both the intensity and unpleasantness of pain increased in the 30 minutes following NSSI, and more so for more severe NSSI events. Testing the pain-offset model, we assessed whether pain during NSSI predicted the decrease in negative affect and tension in the minutes following NSSI. We observed a significant linear trend, such that greater pain intensity during NSSI predicted a steeper decline in negative affect and tension following NSSI. We discuss how AA research may inform theory and treatment of NSSI by considering pain processes within person and further researching contextual factors that modulate this experience.

Effects of childhood maltreatment on momentary distrust and emotion processing, moderated by momentary negative affect

Inga Niedtfeld, Sara E. Schmitz, Johanna Hepp

Central Institute of Mental Health Mannheim

Previous evidence suggests that childhood maltreatment (CM) is associated with interpersonal distrust and with deficits in emotion processing. However, the connection between aversive emotional states, heightened distrust and biased emotion processing remains unexplored in the daily life of those affected. The purpose of the present study was to explore these associations in individuals with varying levels of CM. We used Ambulatory Assessment (AA) to test whether CM is related to (I) distrust and (II) a negatively biased evaluation of emotional faces. Further, we investigated whether CM moderate the association (III) between negative affect and distrust, and (IV) between negative affect and a negatively biased evaluation of emotional faces. Within the AA design, we combined self-reports with behavioral tasks on emotion processing and distrust. We recruited 60 individuals with varying levels of CM, answering six prompts per day for seven days. Using multivariate multilevel modeling, we found that CM were associated with distrust and a negatively biased evaluation of emotional faces. Furthermore, CM were a significant moderator of the associations between negative affect and distrust, and between negative affect and a negatively biased evaluation of emotional faces. In exploratory analyses, we found that those reporting more CM experienced intrusions more often, while dissociative symptoms were associated with CM and momentary negative affect. We discuss our results, especially regarding the newly implemented behavioral tasks.

Conference Agenda

Session

P3-D1: Paper Session 3 - Day 1 (Assessment Methods)

Time: **Wednesday, 30/June/2021: 6:30pm - 7:45pm**

Presentations

Validity of electrodermal activity-based measures of sympathetic nervous system activity from a wrist-worn device

Denise Johanna van der Mee¹, Martin J. Gevonden¹, Joyce .H.D.M. Westerink², Eco J.C. de Geus¹

¹Vrije Universiteit Amsterdam; ²Eindhoven University of Technology

Measuring electrodermal activity (EDA) on the wrist with the use of dry electrodes is a promising method to help identify person-specific stressors during prolonged recordings in daily life. While the feasibility of this method has been demonstrated, detailed testing of reliability and validity of such ambulatory EDA is scarce. In a controlled laboratory study we compare EDA derived from wrist based dry electrodes (Philips DTI) to palm based wet electrodes (VU-AMS) across a variety of mental stressors and physical activities in 121 healthy adults (56% females, mean age = 22.3, SD = 3.3). Overall, we find that data quality of the wrist-worn EDA recording was as good as that of palm-based EDA recording, with 89% of the recorded data being artefact free. Absolute SCL and ns.SCR frequency were lower at the wrist compared to the palm but both signals show significant correlation across experimental conditions. The wrist based EDA measures responded directionally consistent with our experimental manipulation of sympathetic nervous system (SNS) activity. The ns.SCR frequency showed the highest correspondence with its palm based parallel and it's cardiac SNS counterpart the pre-ejection period. Our data suggest that wrist-based ns.SCR frequency is a useful addition to the psychophysiology toolkit that could be easily applied in epidemiology-sized ambulatory studies of stress in daily life.

Developing an interactive ambulatory psychophysiological assessment approach for detecting additional HRV decreases/increases: A multilevel hyperplane simulation study

Andreas R. Schwerdtfeger, Bernhard Weber, Christian Rominger

University of Graz, Austria

Heart rate variability (HRV) has been associated with diverse psychosocial concepts, like stress, anxiety, depression, rumination, social support, positive affect, and self-worth, among others. Although recent research devoted the analysis of cardiac-psychosocial interactions in daily life using ecological momentary assessment, traditional time sampling designs are compromised by more or less random pairing of cardiac and psychosocial variables across several time points. Grounding on the concept of additional heart rate (Mrytek & Brügger, 1996) and additional heart rate variability (Brown et al., 2016), which aims to control for metabolic-related changes in cardiac activity, we aim to develop and validate an algorithm for automated triggering of psychosocial states by online-analysis of transient HRV changes. As a first step, we used an already published data set (Schwerdtfeger, Rominger, & Obser, 2019) in order to identify potential triggers offline indexing meaningful HRV decrements as related to lower levels of perceived social support. Diverse patterns of non-metabolic HRV decreases (e.g., magnitude of the decreases, frequency and duration of decreases) were manipulated and quantified by binary triggers (salient HRV decrease detected vs. not). Triggers were subjected to multilevel models predicting (lower levels of) social support. Effect estimates and significance levels of the associations were then visualized on a hyperplane to inform about the most suitable trigger settings. Further development and validation studies are currently undertaken and will be presented.

Comparing wearable device performance and usability in a 24-hour ambulatory physiological monitoring study

Martin Gevonden, Denise van der Mee, Cor Stoof, Eco de Geus

Vrije Universiteit, Netherlands, The

A growing number of portable solutions are available to measure physiological signals influenced by activity of the autonomic nervous system. This provides new opportunities for ambulatory assessment but also poses the challenge of selecting the right tool for the problem at hand.

This ongoing study aims to facilitate research design decisions by comparing popular devices on the dimensions of reliability, validity, ease of implementation and user acceptance. We collect 24-hour unstructured ambulatory registrations of physiology with multiple devices worn simultaneously, supplemented with ecological momentary assessment (MovisensXS) and a user acceptability questionnaire.

Preliminary analyses were conducted on 5 participants with synchronized signals (2x electrocardiogram, 2x pulse plethysmography, 3x electrodermal activity, 1x impedance cardiography, 5x accelerometry) from 5 devices (VU-AMS, Movisens EDAmove, Movisens ECGmove, Empatica E4 and Fitbit Sense).

The main result of the preliminary analyses is a sharp negative correlation between device reliability/validity and user acceptance, for both electrodermal and cardiac signals. Research-oriented devices generally fare best when it comes to validity. While the design choices for consumer-oriented devices which can be easily self-applied, worn for a longer time and are available for relatively low cost will appeal to many researchers, the current generation of consumer devices is mostly interesting for studies with very large sample sizes and/or long observation windows.

Feasibility and Acceptability of Experience Sampling Methods among LGBTQ+ Young People with Experiences of Self-Harm and Suicide

A. Jess Williams^{1,3}, Jon Arcelus², Ellen Townsend³, Maria Michail¹

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Young people who identify as LGBTQ+ have markedly higher rates of self-harm and suicide compared to cisgender, heterosexual peers. Experience sampling methods (ESM) have the potential to provide a unique, prospective view of how self-harm and suicide might vary within daily life and what environment, socio-cultural and mental health factors may influence these. This type of method has not previously been used LGBTQ+ young people with self-harm and suicide experiences. The aim of this study is to assess the feasibility and acceptability of using experience sampling through the mEMA app within LGBTQ+ young people with experiences of self-harm and suicide.

This mixed-method study is built of 3 stages; 1) pre-ESM baseline assessment; 2) 7-day ESM period; and 3) qualitative feedback interview. ESM variables are based on previous findings, which indicated minority stressors, social experiences and mental health are influential to engaging with self-harm and suicide. Across the 7-day period, participants will receive 6 random prompts a day. The final prompt of the day will consider their experiences of self-harm and suicide for the last 24 hours. Participants who are 16-25 years old, who have experiences of self-harm and suicide, and who identify as part of the LGBTQ+ umbrella will be recruited.

Descriptive statistics will be presented regarding recruitment and attrition rates. The experiences of taking part in the ESM study, including barriers and facilitators will be discussed. The findings from this study will inform how well ESM may be used with LGBTQ+ young people, and provide information for future studies.

The «kleineWeltentdeckerApp» – a smartphone-based application to study dynamic developmental processes in children from 0 to 6 years

Sabrina Beck^{2,3}, Lisa Wagner^{2,3}, Anja Gampe¹, Marco Bleiker^{2,3}, Moritz Matthäus Daum^{2,3}

¹Universität Duisburg-Essen, Deutschland; ²Universität Zürich, Schweiz; ³Jacobs Center for Productive Youth Development, Universität Zürich, Schweiz

Most knowledge on child development stems from cross-sectional studies testing children of different ages within a narrow time frame. However, measuring variability in children's development and uncovering individual developmental trajectories requires a high-density longitudinal approach. One approach to this aim is to outsource data collection to parents to measure contextualized everyday life behavior in a naturalistic setting. In this presentation, we introduce an easy-to-use smartphone-based developmental diary that integrates a population-based, prospective, and microgenetic approach with the Age-of-Attainment method: the kleineWeltentdecker App. This ambulatory assessment tool allows parents of children from birth to 6 years to track the ongoing development of their children's skills in different domains by answering questions that are matched to the children's age, thereby covering the entire period in which changes of particular skills are expected to occur. The kleineWeltentdeckerApp contains a database of around 2000 questions that focus on the four major domains of development in early childhood: cognitive, motor, language, and social-emotional skills. Questions were selected based on scientific relevance, can be answered based on parents' observations, and have been validated. Currently, the app is offered in German, French, Italian, and English, and more translations will be added. Thus, the tool can be used to assess children's development and its variability across different cultures and to extend developmental research beyond WEIRD countries. In this presentation, we will also present some preliminary results based on the data of the first > 3000 children whose development has been documented using the

Conference Agenda

Session

P4-D1: Paper Session 4 - Day 1 (Various 1: Network Approaches to Mental Health / Interpersonal Processes)

Time: Wednesday, 30/June/2021: 6:30pm - 7:45pm

Presentations

Similarities and differences in dynamic symptom networks in individuals at different levels of risk for psychosis

Sara van der Tuin¹, Robin N. Groen¹, Sebastian Castro-Alvarez², Albertine J. Oldehinkel¹, Sanne H. Booij^{1,3}, Johanna T.W. Wigman¹

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Introduction: Improving understanding of how symptoms interact with each other over time in early stages of psychosis may reveal important insights in its development. It is likely that these mechanisms are partly shared, and partly unique. The aim of this study is to assess (i) the extent to which dynamics between daily symptoms reflect universal, stage-specific or person-specific processes and (ii) whether a data-driven search based on similar symptom dynamics renders different results than theory-based subgroups of individuals at risk for psychosis.

Methods: Baseline data of the Mapping Individual Routes of Risk and Resilience (Mirorr) study were used (N = 96, age: 18-35 years). Mirorr combines a daily diary study with three long-term follow-up measurements on mental health and functioning in individuals at risk for psychosis. Mirorr consists of four subgroups (nsub1 = 25, nsub2 = 27, nsub3 = 24, nsub4 = 20) that represent different levels of risk for psychosis (different early stages). We estimated and compared two models: Confirmatory Subgrouping Group Iterative Multiple Model Estimation (CS-GIMME) in which subgroups are defined a priori based on level of risk for psychosis, and Subgrouping GIMME (S-GIMME) in which subgroups with similar symptom connections are identified by GIMME. We used MANOVA to investigate how the S-GIMME subgroups differed on gender, social functioning, well-being and general psychopathology.

Results: Preliminary results suggest that symptom dynamics are partly universal, partly stage-specific and partly individual-specific. Theory-driven and data-driven subgroup solutions differ.

ConNEcT: A novel network approach to investigate the co-occurrence of psychopathological symptoms over time

Nadja Bodner¹, Laura Bringmann², Francis Tuerlinckx¹, Peter de Jonge², Eva Ceulemans¹

¹KU Leuven, Belgium; ²Rijksuniversiteit Groningen, The Netherlands

Network analysis is an increasingly popular approach to study mental disorders in all their complexity. Often applied to cross-sectional data, it allows to obtain nomothetic insights in how symptoms relate to each other across individuals. As network structures have been found to vary hugely across persons, it is useful to complement cross-sectional analyses with person-specific networks based on time-series data. We therefore propose ConNEcT, a network approach for binary symptom data across time. ConNEcT allows to visualize and study the prevalence of different symptoms as well as their co-occurrence, measured by means of a contingency measure in one single network picture. ConNEcT can be complemented with a significance test that accounts for the serial dependence in the data. In this study, we use ConNEcT to re-analyze data from a study in which patients diagnosed with major depressive disorder weekly reported the absence or presence of eight depression symptoms. Extracting networks for each patient that provided data during at least 104 weeks reveals strong inter-individual differences in which symptom pairs co-occur significantly. To gain insight into these differences, we apply Hierarchical Classes Analysis on the co-occurrence patterns of all patients, showing that they can be grouped into meaningful clusters. Core depression symptoms (i.e., depressed mood and/or diminished interest), cognitive problems and loss of energy seem to co-occur universally, but preoccupation with death, psychomotor problems or eating problems only co-occur with other symptoms for specific patient subgroups.

Auditing the research practices and statistical analyses of the temporal network approach to psychological constructs: A systematic review

M. Annelise Blanchard¹, Alba Contreras², Alexandre Heeren¹

¹Université Catholique de Louvain, Belgium; ²Complutense University of Madrid, Spain

One burgeoning method to analyze the interactions between psychological variables from intensive longitudinal data is to visualize them as a temporal network, which illustrates how different psychological components influence one another from one timepoint to the next. However, there are no accepted best practices for the data collection, methodology, and analyses for temporal networks. We thus conducted a systematic review to audit the methodological practices and statistical analyses of this emerging field of research. We included studies that comprised intensive time-series data, investigated psychological variables with human subjects using temporal network analyses at a group level, and were published in peer-reviewed international journals. We identified 26 studies and extracted numerous variables relating to data collection, temporal network estimation and visualization, open science practices and research quality (for our preregistration, see <https://osf.io/9va82/>). During the presentation, we will discuss the most commonly used analytical approaches reported in these studies. Moreover, because most studies rely on reanalyzed data and do not include information about the development or validity of the ambulatory assessment items, we also formulated a set of guidelines to help the field to move forward.

Reactions to Others' Norm Violations in Everyday Life – Scrutinizing Reactivity to Intensive Assessments

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We investigated cognitive, emotional, and behavioral reactions to others' norm violations in everyday life, and scrutinized reactivity effects of intensive assessments. Across three weeks, N = 111 students reported all occasions in which they had observed that someone else had transgressed a social norm, provided open ended descriptions of the situation, rated their cognitive and emotional appraisals, and indicated whether they had intervened against the transgression. In order to examine reactivity to intensive assessments, we randomly assigned participants to one of two assessment schedules. In one group, participants started the assessment whenever they encountered another person's norm violation (event-contingent). In addition, every evening they had the opportunity to report any relevant situation that they forgot to report during the day. The other group only completed assessments every evening (daily evening assessments), and reported on situations that they had experienced during the day. We compared frequency and quality of reported events. To determine event quality, an independent sample (N = 122) rated the open-ended descriptions regarding severity and moral relevance of the reported

transgressions. We found that the group with event-contingent assessments reported more norm violations than the group with only evening assessments. However, the quality of reported violations did not differ. We concluded therefore, that event-contingent assessment served to obtain more complete reports of observed norm violations, without leading to reports of trivial cases. In both groups, subjective severity of the violation, sense of efficacy and anticipated antagonism predicted intra-individually whether participants intervened against a norm violation or not.

Characterizing daily-life social interactions in adolescents and young adults with neurodevelopmental disorders: a comparison between individuals with ASD and 22q11DS

Clémence Mathilde Feller¹, Laura Ilen¹, Maude Schneider^{1,2}

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Social functioning impairments, including social withdrawal, are common features of several neurodevelopmental conditions, including 22q11.2 deletion syndrome (22q11DS) and autism spectrum disorders (ASD). ESM will be used to characterize social functioning in adolescents and young adults with these two conditions. Our goal is to better distinguish the phenomenology of social interactions between the two conditions, often considered as presenting a similar profile of social impairments.

32 individuals with 22q11DS, 26 individuals with ASD and 44 healthy controls (HC) aged 12-30 have been recruited. All participants were assessed during 6 days 8 times a day using a mobile app. The items assessed positive (PA) and negative affects (NA), social context (alone versus in company) and the subjective experience of solitude and social interactions.

Participants with 22q11DS and ASD did not spend more time alone, but spent less time with familiar individuals such as friends, and more time with people they live with, compared to HC. However, distinct profiles emerged between the two conditions regarding the subjective experience of solitude, with more exclusion feeling for participants with ASD compared to both 22q11DS and HC. The subjective appreciation of interactions revealed that individuals with ASD felt more judged and more nervous than both 22q11DS and HC. Nevertheless, both conditions expressed higher desire to be alone when in company of other people than HC.

This study highlights distinct social functioning profiles in daily-life interactions in 22q11DS and ASD, giving new intel on the social phenotypes of these conditions, and pointing towards different therapeutic targets.

Conference Agenda

Session

S2-D1: Symposium Session 2 - Day 1

Time: **Wednesday, 30/June/2021: 6:30pm - 7:45pm**

Presentations

Personality, Self-Esteem and Emotions in Daily Life

Chair(s): Ketaki Diwan (Tilburg University, The Netherlands), **Anne Reitz** (Tilburg University, The Netherlands)

Discussant(s): Niall Bolger (Columbia University)

This symposium presents recent findings from four studies using an experience sampling methodology. The studies examine the link between daily life experiences such as emotions and individual characteristics such as personality, self-esteem, and narrative identity. The first two studies examine the longitudinal links between individual difference characteristics (self-esteem and identity) and daily experiences (emotions and well-being). The last two studies characterize daily emotional experiences in terms of personality and situations. First, Diwan et.al, examine whether daily affect and the self-conscious emotion pride predict individual differences in self-esteem change. Second, van Doeselaar & Reitz examine whether a more adaptive narrative identity (characterized by an agentic self and a redemptive ending) predicts greater variability in daily self-esteem and life satisfaction four months later. Third, Erbas & Houben examine Alexithymia, a trait that refers to difficulties in describing, processing, and distinguishing emotions, relates to emotional experiences in daily life in two experience-sampling studies. Fourth, Chung et.al. examine how experiences of discrete emotions relate to people's momentary views of themselves, perceptions of behavior and appraisals of situations in daily life. In sum, these studies provide novel insights about the links between self-esteem, identity, personality and emotions in daily life as it is lived. Bolger will discuss these findings.

Presentations of the Symposium

Emotions, pride and self-esteem development in daily life

Ketaki Diwan, Anne Reitz, Christina Meyers

Tilburg University, The Netherlands

Longitudinal studies have shown that self-esteem increases in young adulthood, but that individuals differ considerably in their self-esteem change. Normative life events, such as the transition to work, and individual differences in the experience of to these events, are considered a driver of these changes. In the present study, we examine whether daily emotional experiences contribute to individual differences in self-esteem change across the transition to work. We expect that 1. Daily experiences of positive (versus negative) affect will predict higher (versus lower) self-esteem and that 2. Daily experiences of the self-conscious emotion pride will predict self-esteem to a greater extent than the non-self-conscious emotion joy. We will explore whether these links differ for job beginners and those who do not yet have a job to examine whether the emotional experiences help explain individual differences in self-esteem change. We will examine the hypotheses using three waves of intensive longitudinal data with 4-month intervals. At Wave 1, 238 young adults who were in the last year of their master's program provided ESM data. We assessed emotions and self-esteem four times a day in 14 daily-diary assessments at each wave.

Do stories about past experiences predict young adults' daily self-esteem and life satisfaction?

Lotte van Doeselaar, Anne Reitz

Tilburg University, The Netherlands

Individuals construct stories about their past as part of the creation of an internalized life story, their narrative identity, which provides a feeling of continuity and purpose. One's narrative identity is not only a product of lived experience, but it is likely also predictive of new experiences. Previous findings indicate that especially during more stressful phases, the way individuals narrate about key moments is predictive of changes in well-being over time. We proposed that in order to understand how these changes over time arise, it is worthwhile to examine the link between narrative characteristics and daily experiences. We expected that the presence of characteristics that are known to be part of a more adaptive narrative (i.e., an agentic self, a redemptive ending) will make individuals' well-being less susceptible to their daily experiences, and thus more stable. In the present multi-method longitudinal study, part of project GradLife, we examined 238 young adults that were (close to) graduating from their master's programs during the corona pandemic. Young adults' narratives about a previously experienced turning point were coded for the presence of agency and redemption. Next, apart from examining whether these narrative characteristics relate to changes in self-esteem and life satisfaction 4 months later, we examined whether the narrative characteristics related to variability in daily experiences of self-esteem and life satisfaction across 14 days of experience sampling. In sum, this study will set a first step in linking narrative identity to daily experiences. Future steps and ways of studying these will be discussed.

Alexithymia and emotional experience in daily life

Yasemin Erbas, Marlies Houben

KU Leuven

People differ in how they experience, process and communicate their emotions. One important construct that captures such differences between people is alexithymia. Alexithymia is a multi-faceted trait variable that is measured with self-report questionnaires. It refers to difficulties in understanding, processing and describing emotions, distinguishing them from bodily arousal and focusing more on external events rather than inner experiences. Alexithymia is a well-studied construct with several implications for well-being, but interestingly, it is unclear how alexithymia relates to people's actual emotional experience in daily life. In this study, we aimed to fill this gap by assessing this relationship across two experience sampling studies (N=95 and N=202). More specifically, we examined how alexithymia (as measured with the TAS-20) relates to the experience of positive and negative emotions, to indicators of emotional complexity (i.e., emotion differentiation and emotional bipolarity), and to the dynamics of emotions (i.e., emotional variability and inertia). Results showed that individuals with elevated levels of alexithymia also experienced increased levels of negative emotions. All other relations were either not significant, or inconsistent across the datasets. These initial findings suggest that alexithymia, which is an indication of people's meta-knowledge about their emotional functioning, is related to higher levels of negative emotions, but not to the experience of positive emotions, emotional complexity, and emotion dynamics. Future research should further examine this relationship, and try to disentangle the pathways through which both alexithymia and emotional experience in daily life relate to well-being.

A Systematic Investigation of the Within-Person Structure and Correlates of People's Emotional Experiences in Everyday Life

Joanne M. Chung¹, Gabriella M. Harari², Jaap J.A. Denissen³

¹University of Toronto, Mississauga, ²Stanford University, ³Utrecht University

In the present study, we examined people's self-reported emotional experiences in everyday life using samples of Mechanical Turk workers in the United States (Ns = 55, 107, 224) over 3 short-term intensive longitudinal studies (Nobservations = 1,375; 7,176; 11,833).

Using a discrete emotions approach based on lexical studies of emotion (e.g., Shaver et al., 1987), we constructed the Distinct Affective States questionnaire using factor analyses on the within-person level, documenting preliminary evidence for the validity and reliability of participant responses. Participants reported experiencing a range of emotional experiences that were differentiated into reports of specific emotions (e.g., contentment), and affective clusters of related emotions (e.g., love, compassion, and adoration). Reports of distinct affective states related to joy and love showed the greatest number of correlations with participants' momentary views of themselves, perceptions of behavior, and appraisals of situations, supporting the idea that examining differentiated positive emotional experiences is important. People's patterns of distinct affective experiences differed from each other. Overall, although our findings are restricted to our sample and research is needed to examine their generalizability, our results suggest that future work in personality dynamics may benefit from incorporating a more expanded view of emotional experience in everyday life.

Objective Sleep Measures and Psychological Outcomes

Chair(s): **Alexander F. Danvers** (University of Arizona, United States of America), **Matthias R. Mehl** (University of Arizona, Psychology)

Modern wearables that objectively sense sleep (via actigraphy) allow for large-scale data collection and the measurement of sleep in naturalistic contexts. Four talks from researchers in a variety of career stages (graduate student, postdoc, assistant professor, full professor) explore how mobile sensing of sleep allows us to answer new questions about healthy psychological functioning.

Danvers and colleagues present a large-scale study of the association of minutes slept on next-day's positive and negative affect, finding evidence for an ideal level of sleep. Too many or too few minutes was associated with worse mood, but the ideal level differed among individuals.

Coppola and colleagues conducted a large, multi-wave study of sleep in individuals experiencing divorce or marital separation. They find that individuals in this population with more anxious attachment styles, who watch more television, and who spend more time with their ex- partner (measured objectively through the Electronically Activated Recorder, or EAR) all experienced worse sleep efficiency after separation.

Spangler and colleagues conducted a multi-modal study examining sleep fragmentation across seven days using an ankle sensor measuring overnight leg motions. Multivariate auto-regressive models were developed to estimate the associations of sleep with self- reported and objectively sensed indicators of stress.

Najafi and colleagues studied the role of office layout on sleep, finding that private offices were associated with poorer sleep, as compared to other office types like open-bench seating and cubicles. Further, open-bench workers who slept well reported significantly less stress during the workday, suggesting advantages for open office layouts in promoting healthy functioning.

Presentations of the Symposium

Objective Sleep and Daily Affect in High-Tech Office Workers: An Intensive Longitudinal Mobile Sensing Study

Alexander F. Danvers¹, **Michael A. Grandner**², **Evan C. Carter**³, **Erica Baranski**⁴, **Matthias R. Mehl**⁵, **Esther M. Sternberg**⁶ ¹University of Arizona, Psychology, ²University of Arizona, Department of Psychiatry, ³U.S. Army Research Labs, ⁴University of Houston, Psychology Department, ⁵University of Arizona, Psychology Department, ⁶University of Arizona, Medicine

How does sleep influence mood the next day? The association of sleep quantity on affect the next day was estimated in a mobile sensing study with 268 Silicon Valley office workers who were each monitored for 60 consecutive workdays. Sleep was measured objectively with the Actiwatch Spectrum Plus; affect was measured with daily (workplace) diaries using a 10-item version of the Positive and Negative Affect Schedule (PANAS). Multi-level models were constructed to estimate the separate within- and between-person effects of sleep on positive and negative affect, separately.

Results of model-building indicated that, after adjusting for previous day's affect, there was a quadratic effect of sleep duration on positive affect. People reported the most positive mood when they slept a typical amount (for them), and reported a worse mood as sleep duration was either shorter or longer than average. Self-reported negative affect was highly skewed, such that most days participants reported no negative affect, but on the days when negative affect was reported it varied substantially. Models accounting for this skew indicate that the tendency to experience any negative affect was higher if the individual had slept more the night before, but that the intensity of the negative affect, if there was any, was unrelated to sleep duration. Results suggest that longer sleep duration can adversely influence next- day mood, and that there is possibly an ideal sleep duration. However, this value differs across individuals, according to their own typical sleep patterns.

Sleep Efficiency and Objectively-Measured Daily Social Experiences Following Marital Separation: The Critical Role of Contact with an Ex-partner

Andrea M. Coppola¹, **Matthias R. Mehl**¹, **Allison M. Tackman**¹, **Spencer C. Dawson**², **Karey L. O'Hara**³, **David A. Sbarra**¹

¹University of Arizona, Psychology Department, ²Better Sleep Bloomington, ³Arizona State University, REACH Institute

Marital disruption in midlife is associated with increased risk for a range of poor health outcomes, including disturbed sleep. The current study examines the trajectory of objectively-measured sleep efficiency following marital separation as well as the daily social behaviors and subjective experiences that are associated with variability in sleep efficiency following marital separation. One hundred twenty-two recently separated adults were followed longitudinally for 3 measurement occasions over 5 months. To objectively measure daily social behaviors and sleep efficiency, participants wore the Electronically Activated Recorder (EAR) during the day (for 3 consecutive days per assessment period) and an Actiwatch at night (for seven consecutive days per assessment period). Greater time spent with an ex-partner, as assessed using the EAR, was associated with decreased sleep efficiency between subjects ($b = -.44.71$, $SE = 14.68$, $95\% CI = [-73.18$,

$-16.23]$, $p = .003$). Higher attachment anxiety also was associated with decreased sleep efficiency ($b = -.125$, $SE = 0.56$, $95\% CI = [-2.34$, $-0.16]$, $p = .03$), as was the observed measure of "television on," and this effect operated both between ($b = -.9.40$, $SE = 3.17$, $95\% CI = [-15.55$, $-3.25]$, $p = .004$) and within subjects ($b = -.7.02$, $SE = 2.45$, $95\% CI = [-11.74$, $-2.29]$, $p = .005$). Our findings link objectively- measured social behaviors following marital separation with actigraphy-assessed sleep efficiency. This work builds on prior research and contributes to our understanding of daily life following marital separation using multiple objective measures.

Diurnal stress as a multimodal predictor of leg movements during sleep

Nilanjan Banerjee¹, **David Chhan**², **Ryan Robucci**¹, **Derek Spangler**³

¹University of Maryland, Baltimore County, Computer Science and Electrical Engineering Department, ²U.S. Army Research Labs, ³U.S. Army Research Labs / Pennsylvania State University, Biobehavioral Health Department

Leg movements during sleep are an important marker of sleep fragmentation and quality, which may be exacerbated by psychological stress and its complex dynamics across timescales and contexts. Ambulatory psychophysiological measures may reveal these real-world stress dynamics and aid in the prediction of sleep fragmentation. To this end, the current talk describes a longitudinal study examining the extent to which dynamics in stress during the day (estimated with self-report, motor activity, and cardiovascular physiology) predict future sleep events, namely sleep fragmentation marked by leg movements. Participants (N=20) completed both in-lab and out-of-lab procedures across seven days. Outside of the lab, multimodal estimates of stress were estimated from wrist-worn (Empatica E4) pulse and movement time courses alongside self-reported indices of stress. Participants wore a RestEaze ankle device during sleep in order to estimate leg movements. In the lab, participants completed a naturalistic team task while cardiovascular and motor responses were collected with electrocardiography and wrist-worn sensors. Prospective relations among stress indicators and leg movement during sleep were modeled with a multivariate autoregressive approach, thus probing multiple timescales and contexts (e.g., lab vs. home) while addressing stress as

a multimodal construct. Results shed light on how multimodal stress during waking hours impacts motor activity during sleep. Results also highlight a neurovisceral architecture that integrates motoric, cognitive, and physiological responses in support of stress, energy expenditure, and sleep. Lastly, the implications of findings are discussed with respect to mobile health applications and the prediction of sleep quality.

The use of wearable to screen the impact of workstation design on sleep quality in office workers

Catherine Park¹, **Bijan Najafi**², **Brian Gilligan**³, **Matthias R. Mehl**⁴, **Kevin Kampschroer**³, **Esther M. Sternberg**⁵

¹Baylor College of Medicine, ²Baylor College of Medicine, Surgery Department, ³U.S. General Services Administration, ⁴University of Arizona, Psychology Department, ⁵University of Arizona, Medicine

Introduction: The scientific research on healthy offices is still limited. In particular, the impact of office interior office space on sleep quality, one of the key health metrics, is poorly understood. We proposed a sensor-based sleep quality index (SB-SQI) to untangled association between workstation and sleep quality.

Methods: We monitored 231 office-workers (mean age 43.4 years, 56% women) using a chest-worn sensor for 72 hours, yielding 11,736 hours of usable data. SB-SQI was based on a validated algorithm estimating sleep-onset latency, total sleep-time, and sleep-efficiency, but using the scoring method from the Pittsburgh Sleep Quality Index (PSQI). We examined the interaction of SB-SQI, office workstation type (open-bench seating, cubicle, and private office), work-hours stress (quantified by standard deviation of heart rate variability), and after- work physical activity (PA; quantified by duration of moderate-to-vigorous activity).

Results: The sensor-derived poor-sleep ratio of the private-office workers was higher than with other office types (81% vs. 66.1%, $p = 0.023$). PSQI provided a similar but insignificant trend with lower effect-size. Among good-sleepers, open-bench workers had 22% ($p = 0.018$) less stress during work-hours than others. A significant association between work-hours stress and after-work hours PA ($r = 0.331$, $p = 0.000$) was observed irrespective of office type, with the highest PA level observed for open-bench seating workers.

Conclusions: Office workstation type has a significant impact on work-hours stress, affecting PA after work hours, which influences sleep quality. SB-SQI could be more sensitive than PSQI in determining the impact of office types on sleep quality.

Geoinformatic methods and their application in ambulatory investigations of environmental influences on human behavior and mental health

Chair(s): **Markus Reichert** (mental mHealth Lab, Institute of Sports and Sports Science, Karlsruhe Institute of Technology, Germany; Department of Psychiatry and Psychotherapy, Central Institute of Mental Health, University of Heidelberg, Medical Faculty Mannheim, Germany)

Discussant(s): **Markus Reichert** (mental mHealth Lab, Institute of Sports and Sports Science, Karlsruhe Institute of Technology, Germany; Department of Psychiatry and Psychotherapy, Central Institute of Mental Health, University of Heidelberg, Medical Faculty Mannheim, Germany)

Digital progress enables to unobtrusively capture a considerable wealth of parameters in humans' everyday life, one of them being geolocation data. Since geolocation data provides incredible opportunities to operationalize contextual parameters that undoubtedly shape human behavior and health, we aim to shed light on this novel and promising field of ambulatory assessment research. First, Sarah Lohr and Sven Lautenbach (Germany) will focus on the geoinformatic methods applicable to quantify environmental exposures from geolocation data. In particular, they will show how different data sources, e.g., OpenStreetMap, administrative data, satellite imagery, or LIDAR data, can be used to derive contextual information. Hannah Roberts (Netherlands) will build upon this talk, presenting their study results from 393 participants researched regarding their real-life exposure to green space, noise, and air pollution and its effects on long-term depressive symptoms. Taking a more fine-grained perspective, Carina Nigg (Swiss Confederation) will continue by giving insights into the momentary dynamic interplay between environmental factors, physical activity, and mood. She will provide insights, which may shed light on the real-life processes underlying Hannah Roberts et al.'s findings. In the final talk, Anastasia Bendyk (Germany) will show preliminary data of how the dynamic interplay of human behavior and environmental factors is being impacted by the COVID-19 pandemic, complementing our symposium with research on one of the most pressing issues nowadays. At the end of the symposium, Markus Reichert (Germany) will sum up the presented results, provide us with lessons learned, and put the findings into a broader perspective.

Presentations of the Symposium

Assessing green spaces to untangle the effects of ecosystem services on human well-being and mental health

Sarah Lohr¹, Sven Lautenbach¹, Christina Ludwig², Markus Reichert³, Ulrich W. Ebner-Priemer³, Heike Tost⁴, Andreas Meyer-Lindenberg⁴, Alexander Zipf²

¹Institute of Geography, Department of GIScience, University of Heidelberg; Department of Psychiatry and Psychotherapy, Central Institute of Mental Health, University of Heidelberg, Medical Faculty Mannheim, Mannheim, Baden-Wuerttemberg, Germany, ²Institute of Geography, Department of GIScience, University of Heidelberg, Heidelberg, Baden-Wuerttemberg, Germany, ³mental mHealth Lab, Institute of Sports and Sports Science, Karlsruhe Institute of Technology, Germany; Department of Psychiatry and Psychotherapy, Central Institute of Mental Health, University of Heidelberg, Medical Faculty Mannheim, Germany, ⁴Department of Psychiatry and Psychotherapy, Central Institute of Mental Health, University of Heidelberg, Medical Faculty Mannheim, Mannheim, Baden-Wuerttemberg, Germany

Urban areas provide a heterogeneous environment for their inhabitants that potentially influences human behavior, mood, and mental health. Environmental ambulatory assessments linked to environmental conditions at the place of the assessment provide an excellent opportunity to untangle these effects. In the absence of real-time measurements by sensors, proxies on average conditions at the sites can be derived by geoprocessing tools. Strong effects by green spaces on mood and mental well-being have been untangled recently. The talk indicates how different data sources – such as OpenStreetMap, administrative data on green spaces, satellite imagery and LIDAR data – can be used to derive information on green space presence and quality and how these can be used together with environmental assessment data. Different indicators of green space quality are presented as well, which include size and form of green spaces as well as related infrastructure (e.g., benches) and public accessibility.

GPS-derived exposure to green space, blue space, noise and air pollution and depressive symptoms

Hannah Roberts, Marco Helbich

Department of Human Geography and Spatial Planning, Faculty of Geosciences, Utrecht University

Multiple environments are encountered in daily life, yet few studies consider exposure to environments beyond the home when examining environment-mental health associations. In this study we investigate the relationship between environmental exposures both in the residential environment and along the daily mobility path and depressive symptoms.

Depressive symptoms (PHQ-9) and individual characteristics were obtained via an online survey. Participants ($n=393$) were subsequently tracked using GPS via a smartphone app for up to 7 days. Exposure to green space, blue space, noise and air pollution within 50m and 100m was computed around residential location and along the daily mobility path. Separate multiple regression analyses were conducted using the residential- and mobility-based environmental exposures. Analyses adjusted for demographics, socioeconomic status, neighbourhood deprivation, social fragmentation and population density. Interactions between the environmental exposures and gender were also explored.

Results showed a significant negative relationship between green space and depressive symptoms in both exposure models when using the 50m buffer. The effect was slightly greater in the mobility-based model. Other exposures and associations using the 100m buffer were non-significant. When the fully adjusted models using the 50m buffer were stratified by gender, the green space-depressive symptoms relationship remained significant for men only.

Our results suggest that exposure to green space in the immediate environment, both at home and along the daily mobility path, is associated with a reduction in depression symptoms. The association may be stronger for men. The study provides new insights on the role of dynamic environmental exposures on mental health.

Combining Context and Behavior as Predictors of Adolescents' Mood Makes a Difference

Carina Nigg¹, Sven Lautenbach², Urs Braun³, Iris Reinhard⁴, Alexander Zipf², Ulrich W. Ebner-Priemer⁵, Heike Tost³, Andreas Meyer-Lindenberg³, Markus Reichert⁶

¹mental mHealth Lab, Institute of Sports and Sports Science, Karlsruhe Institute of Technology, Karlsruhe, Baden-Wuerttemberg, Germany; ²Institute of Sports Science, University of Bern, Bern, Switzerland, ³Institute of Geography, Department of GIScience, University of Heidelberg, Heidelberg, Baden-Wuerttemberg, Germany, ⁴Department of Psychiatry and Psychotherapy, Central Institute of Mental Health, University of Heidelberg, Medical Faculty Mannheim, Mannheim, Baden-Wuerttemberg, Germany, ⁵Department of Biostatistics, Central Institute of Mental Health, University of Heidelberg, Medical Faculty Mannheim, Mannheim, Baden-Wuerttemberg, Germany, ⁶mental mHealth Lab, Institute of Sports and Sports Science, Karlsruhe Institute of Technology, Karlsruhe, Baden-Wuerttemberg, Germany, ⁶mental mHealth Lab, Institute of Sports and Sports Science, Karlsruhe Institute of Technology, Germany; Department of Psychiatry

and Psychotherapy, Central Institute of Mental Health, University of Heidelberg, Medical Faculty Mannheim, Germany

Purpose: Contextual factors and human behavior are crucial for mood. The within-person relationship between physical activity (PA) as a behavior and mood has been investigated in some ambulatory assessment studies, but results are inconsistent. This might be due to a neglect of contextual factors. Thus, we tested if PA and green space (GS), a well-researched contextual factor, confound each other in predicting mood.

Methods: 134 healthy adolescents wore accelerometers for seven consecutive days and responded on average six times per day to mood-questionnaires on GPS-triggered smartphone-diaries during everyday life. We calculated the percentage of GS within 100m2 around the participants geolocation, parameterized GS, non-exercise PA (NPA), and exercise activity (EA) ten minutes prior to the e-diary prompts, and applied multilevel model analyses to test for within-subject effects on mood.

Results: If using separate models for NPA, EA, or GS predicting mood, all predictors were positively associated with affective valence and energetic arousal, but calmness was only negatively predicted by NPA and EA (all $p < .05$). However, when the three predictors were entered simultaneously into the models, valence and energetic arousal were only positively predicted by GS and EA.

Conclusion: Our results indicate that EA and GS have distinct effects on valence and energetic arousal, whereas NPA and GS are confounded. These findings may explain inconsistent findings from within-person studies, suggesting that future studies should assess both the behavior and the context. Moreover, those findings may guide interventions using PA and GS to regulate adolescents' mood.

INDICATE-N: IN Depth multimodal ChAracTERization of Negative symptoms

Anastasia Benedyk¹, Alexander Moldavski¹, Sarah Lohr², Markus Reichert³, Iris Reinhard⁴, Dusan Hirjak¹, Christoph von der Goltz⁵, Heike Tost¹, Andreas Meyer-Lindenberg¹

¹Department of Psychiatry and Psychotherapy, Central Institute of Mental Health, University of Heidelberg, Medical Faculty Mannheim, Mannheim, Baden-Wuerttemberg, Germany, ²Institute of Geography, Department of GIScience, University of Heidelberg; Department of Psychiatry and Psychotherapy, Central Institute of Mental Health, University of Heidelberg, Medical Faculty Mannheim, Mannheim, Baden-Wuerttemberg, Germany, ³mental mHealth Lab, Institute of Sports and Sports Science, Karlsruhe Institute of Technology, Germany; Department of Psychiatry and Psychotherapy, Central Institute of Mental Health, University of Heidelberg, Medical Faculty Mannheim, Germany, ⁴Department of Biostatistics, Central Institute of Mental Health, University of Heidelberg, Medical Faculty Mannheim, Mannheim, Baden-Wuerttemberg, Germany, ⁵Lundbeck GmbH

Schizophrenia (SZ) and major depressive disorder (MDD) are categorized as two separate psychiatric conditions, although the overlap in clinical symptoms is considerably high. Negative symptoms and cognitive impairments, including deficits in attention-directed activity, social and hedonic behaviors are present in both disorders and particularly difficult to treat.

To better investigate the underlying pathophysiological mechanisms of patients' symptomatology, we are currently conducting a 6-month prospective multimodal observational study of negative symptoms in 50 patients with SZ, 50 patients with MDD, and 50 healthy controls.

The aim of our study is to provide a novel framework for multimodal characterization of negative symptoms using smartphone- and sensor-based ambulatory assessments and geolocation tracking in patients' daily life, combined with standard clinical assessment, neuroimaging, and genetics.

Exposure to environmental factors such as green spaces, population density, or traffic noise may have an enormous influence on patients' well-being and current symptomatology. Our preliminary data analyses show that longitudinal ambulatory assessment is well suited to capture roaming behavior and mood fluctuations during stressor exposure and major life events, such as the COVID-19 pandemic, with high spatial and temporal resolution, respectively.

We aim to gain more insights into the role of physical movement, roaming, and environmental stimuli on symptoms in the daily life of patients with SZ and MDD. The results may help to inform future predictions of clinical outcome or treatment response.

Antecedents and consequences of perseverative cognitions in children and adults: Findings from recent ambulatory assessment studies

Chair(s): Andrea C. Kramer (DIPF | Leibniz Institute for Research and Information in Education, Frankfurt am Main, Germany; Center for Individual Development and Adaptive Education of Children at Risk (IDeA), Frankfurt am Main, Germany)

Discussant(s): Joshua M. Smyth (Biobehavioral Health, Pennsylvania State University)

Research has shown that perseverative cognitions (PC) can have adverse effects on physiological and psychological outcomes. This symposium targets antecedents and consequences of distinct types of PC in daily life in clinical as well as non-clinical populations. All contributions of this symposium use ambulatory assessment to examine the dynamics of PC in individuals' daily lives. In the first talk, Kramer et al. investigate the contemporaneous effects of worries on working memory as well as on positive and negative affect in a sample of elementary school children. In the second contribution, Blanke et al. investigate the temporal dynamics between rumination and negative affect in undergraduate students. In the third talk, Zhao et al. focus on pandemic related changes of PC in older adults as well as factors accounting for interindividual differences in these changes. In the last contribution, Schricker and Kuehner present results from a study examining prospective effects of rumination on positive and negative affect in patients with recurrent depressive episodes. Additionally, they compare the effects of rumination to those of mind-wandering. Together, these talks provide insights into the daily life dynamics of PC in different age groups and populations as well as in the course of major events such as the COVID-19 pandemic. Additionally, they emphasize the importance of PC for affective well-being, with potential reciprocal effects among these. Joshua Smyth will discuss the findings of these talks in a broader context and address their limitations and implications, as well as directions for future research.

Presentations of the Symposium

Worries in children's daily lives: Within-person associations with affective well-being and working memory performance

Andrea C. Kramer¹, Andreas B. Neubauer¹, Florian Schmiedek²

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Research focusing on children's worries has usually examined between-person differences. However, children's worries may not be stable over time but rather fluctuate on a momentary basis. Such meaningful within-person variability may be linked to changes in well-being or cognitive performance. The aim of the present study was to assess moment-to-moment variations in children's worry levels and investigate effects on concurrent affective well-being as well as working memory performance. We expected higher levels of worrying to be associated with higher levels of concurrent negative affect and lower levels of concurrent positive affect. In addition, we hypothesized that higher momentary worry is linked to lower concurrent working memory performance. Hypotheses and analyses were preregistered (<https://osf.io/v829s/>). School children (N = 84, age = 8-11 years) participated in a 21-day ambulatory assessment study conducted using smartphones. Children reported their momentary worries twice per day (in the afternoon and in the evening) and their affective well-being three times per day (in the morning, the afternoon and the evening). Working memory performance was assessed in the afternoon of each day using one numerical and one spatial updating task with eight trials each. Consistent with the hypotheses, children showed higher levels of negative affect and lower levels of positive affect when they reported higher momentary worry than usual. Further, children with higher levels of worries showed poorer working memory performance. Findings emphasize that worries fluctuate within children of 8-11 years and that these fluctuations are linked to other psychologically relevant outcomes.

A dynamic structural equation modeling approach to the reciprocal effects of rumination and negative affect

Elisabeth S. Blanke¹, Andreas B. Neubauer², Marlies Houben³, Yasemin Erbas³, Annette Brose⁴

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Rumination describes perseverative thoughts about feelings and problems. As a response to affective distress, it is often viewed as a maladaptive emotion regulation strategy. However, according to the response styles theory, rumination is not only a consequence, but also an antecedent of further negative affect (NA). To study such reciprocal effects at the within-person level, most previous studies related rumination to changes in NA, and NA to changes in rumination, in separate multilevel models. In the present study, we modeled the two interrelated within-person time series by using dynamic structural equation modeling

(DSEM). This parsimonious approach more closely matches theoretical assumptions as both effects (NA on subsequent rumination and rumination on subsequent NA) are modelled simultaneously while acknowledging the autoregressive nature of both states. We used two data sets including university students from Belgium (N = 200) and Germany (N = 70). Participants were paged on smartphones several times a day (Study 1: 10; Study 2: 6) for several days (Study 1: 7; Study 2: 9-12). We found evidence for reciprocal effects with NA predicting rumination and rumination predicting NA. The strengths of associations were similar indicating that rumination was both a consequence of and a trigger for NA. Both processes also showed autoregressive relations, and more persistence of rumination was associated with higher levels of rumination across studies. That is, more habitual rumination was related to prolonged rumination. Our findings strengthen the notion that interventions specifically targeting rumination may be needed to decrease its impact on NA.

Perseverative Cognitions Before and During a Pandemic

Giancarlo Pasquini¹, Ruixue Zhaoyang², Karra Harrington², H. Andrew Schwartz³, Stacey B. Scott¹

¹Psychology, Stony Brook University, ²Center for Healthy Aging, Pennsylvania State University, ³Computer Science, Stony Brook University

The novel coronavirus (COVID-19) poses a major threat to physical and mental health, particularly among older adults and those with pre-existing conditions. Changes in behaviors (i.e., social distancing, hygiene) are well-documented. Given the threat, it is likely that perseverative cognition (PC) would increase. As part of a longitudinal measurement burst study, older adults (mean age=77, range: 71-94) completed ecological momentary assessments (EMAs) of PC five times daily for 2 week bursts. The sample resided in Bronx County, NY, USA nearby an early COVID-19 hotspot. A natural experiment occurred such that n=78 individuals had both completed an EMA burst prior to (i.e., 12/15/2018-10/22/2019) and during the COVID-19 pandemic (i.e., 2/22/2020-6/15/2020). Multilevel models were used to test pandemic-related PC changes. We tested 2 questions: (1) within individuals, is there a pandemic-related increase in PC?, and (2) do individual differences in personality or cognitive status predict differential impacts? On average, neither thought unpleasantness nor worry intensity showed pandemic-related change ($p>0.25$). There was a trend suggesting increased uncontrollable thoughts during the pandemic ($p=0.063$). Individuals low in Extraversion ($p=0.041$) and high in Neuroticism ($p=0.049$) showed increases in thought unpleasantness in the pandemic. Cognitively unimpaired individuals showed a trend for increases in thought unpleasantness ($p=0.087$). The outcomes of this study highlight the impact of the pandemic on perseverative cognition, and suggest one mechanism through which mental health is impacted by major events.

Effects of mind wandering and rumination on affect during everyday life in patients with recurrent depression

Isabelle Schricker, Christine Kuehner

Research Group Longitudinal and Intervention Research, Department of Psychiatry and Psychotherapy, Central Institute of Mental Health, Medical Faculty Mannheim, Heidelberg University, Mannheim, Germany

Repetitive negative thoughts such as rumination have been shown to impair mood and to have adverse health outcomes in observational and experimental studies, while respective findings on mind wandering, defined as task-unrelated thoughts, are mixed. Possible effects of such momentary cognitions on affect during everyday life specifically in clinical populations are still underinvestigated. The present study aims to examine prospective effects of momentary mind wandering and rumination on subsequent positive and negative affect during daily life in individuals with recurrent depressive episodes (rMDD). A sample of n = 49 rMDD patients, aged 25-65 years, will be recruited. During five consecutive days of electronic AA, they will indicate their experience of momentary cognitions as well as the intensity of positive and negative affect during daily life ten times per day via smartphone. With this approach, we will investigate the following research hypotheses: (1) We expect patients acutely suffering from a depressive episode as well as (2) patients with a higher number of lifetime depressive episodes to demonstrate higher levels of momentary mind wandering and rumination. (3) We expect that rumination will generally lead to subsequent affect deterioration whereas (4) the effect of mind wandering on subsequent affect will depend on intentionality and content of thoughts. (5) Finally, we will investigate possible moderating effects of trait rumination on respective associations between cognitions and mood. Lagged effects of mind wandering and rumination will be analysed using multilevel models. Results of this ongoing study will be presented and discussed at the conference.

Latest scientific developments in the implementation of personalized monitoring in psychiatric care

Chair(s): **Harriette Riese** (Interdisciplinary Center Psychopathology and Emotion regulation (ICPE), Department of Psychiatry, University

Medical Center Groningen, the Netherlands), **Fionneke Marijke Bos** (Interdisciplinary Center Psychopathology and Emotion regulation (ICPE), Department of Psychiatry, University Medical Center Groningen, the Netherlands)

Discussant(s): **Bennard Doornbos** (Department of Specialized Training, Psychiatric Hospital Mental Health Services Drenthe, Outpatient Clinics, Assen, The Netherlands)

The experience sampling methodology (ESM) has been used now for several decades to monitor mood, symptoms, and contextual experiences in an ecologically valid way. Increasingly, it is being recognized that such electronic monitoring has great potential for psychiatric care. Possible applications span across different psychopathologies, treatment modalities, and treatment phases.

However, research indicates that in order to become an effective and acceptable clinical tool, ESM needs to be well integrated in clinical practice. While this is technically possible nowadays, the challenge will be to develop intuitive and time-efficient tools that have clinical relevance and scientific validity. In this symposium, we will update you on recent innovative implementation efforts, and critically reflect on if, when, and how ESM could be useful for clinical care.

Lino von Klipstein will kick-off this symposium by presenting the Therap-i randomized controlled trial, which studies the efficacy of ESM in the treatment of depression. Next, Merlijn Mestdagh will present m-path, a freely available tool that therapists can use to initiate ESM with their patients. Then, Naomi Daniels will demonstrate how ESM might be used to support detailed functional analyses in family medicine, and discuss potential barriers to implementation. Finally, Fionneke Bos will present the PETRA tool, which helps clinicians and patients to construct a personalized ESM diary together, and attractively visualizes the feedback.

Presentations of the Symposium

Personalized ESM monitoring and feedback to support psychological treatment for depression: A case study

Lino von Klipstein, Michelle Servaas, Robert Schoevers, Date van der Veen, Harriette Riese

Interdisciplinary Center Psychopathology and Emotion regulation (ICPE), Department of Psychiatry, University Medical Center Groningen, the Netherlands

With this case study we want to introduce the Therap-i module. The module is an ESM-based tool that is integrated into outpatient psychotherapy for depression and developed to support the process of case conceptualization. Case conceptualization is the collaborative process by which patients and therapists develop a working theory of the patient's psychopathology in order to make treatment decisions in the face of complexity. In the module, patient, clinician, and researcher collaborate to create a personalized ESM questionnaire based on their ideas and hypotheses about the patient's case concept. Patients then monitor themselves by filling out the ESM questionnaire 5 times a day during 8 weeks. During this period, patients receive feedback on their collected data three times, which is discussed between the abovementioned three parties. The Therap-i module is currently being tested in a pragmatic two-armed randomized controlled trial (n=100), where Therap-i supported treatment as usual (TAU) is compared to TAU. We hypothesize that the Therap-i module will make TAU more efficient, decreasing depressive symptoms and improving general functioning, therapeutic working alliance, illness perception, and self-management.

We are presenting a case study from one of the first participants of our study. We show the collaborative processes of making a personalized ESM questionnaire and interpreting feedback in a session. With this case we provide an example of what can be learned from personalized ESM and how this may impact the course of psychotherapy.

Creating a user-friendly and statistically sound ESM tool for blended care

Merlijn Mestdagh, Stijn Verdonck

KU Leuven

Although yet to be clinically established, it is widely expected that the experience sampling method (ESM) holds an enormous potential for clinical practice. To further explore this, we started developing m-Path (www.m-Path.io), a framework for practitioners and researchers alike, where ESM concepts for therapy can be developed, tested, shared, and used in practice.

While developing m-Path, we try to address the generic barriers that are preventing the adoption of ESM blended care in clinical settings. Two such barriers, identified by focus groups, will be discussed in this talk. First and foremost, a good tool should lead to evidence-based conclusions for individual clients. ESM by itself has been extensively validated as a research method for gathering information about experiences and their context. However, in a research environment, researchers have ample knowledge of the planning of ESM studies and the statistical analysis of the collected data. This is not the case for clinical practitioners who are confronted with unique single case scenario's, and lack the time and/or methodological expertise (experimental design, rigorous statistical analysis) to

properly plan and analyse such an assessment. Therefore, m-Path should optimally support the practitioner in both setting up useful protocols as well as arriving at statistically sound conclusions from the gathered data. Second, the tool should be extremely user-friendly. Already overburdened practitioners should not have to deal with the long and taxing learning curve of a complicated and unintuitive tool. In this presentation we will discuss how we are addressing both barriers on the m-Path platform.

Patients' and mental healthcare professionals' experiences with the use of experience-sampling technology in family medicine – An action research design

Naomi Daniels¹, Anna Beurskens², Catherine van Zelst¹, Philippe Delespaul¹, Marloes van Bokhoven²

¹School for Mental Health and Neuroscience (MHeNs), Department of Psychiatry and Neuropsychology, Faculty of Health, Medicine and Life Sciences, Maastricht University, Maastricht, The Netherlands, ²Care and Public Health Research Institute (CAPHRI), Department of Family Medicine, Faculty of Health, Medicine and Life Sciences, Maastricht University, Maastricht, The Netherlands

Background: Clinicians use paper diaries to get insight into the patient's feelings, thoughts and behaviors in-between sessions. Adequate reports on contextual variation are lacking and patients often complete diaries last minute. mHealth tools using Experience Sampling Method (ESM) can eliminate these drawbacks. ESM is extensively researched, but, its place within clinical processes not yet clear.

Objective: To discover how ESM can support detailed functional analyses for patients with anxiety and/or sleeping problems who are referred to a psychological assistant to the general practitioner (PAGP) in family medicine, and to learn about patients' and PAGPs' experiences.

Methods: An action research design was used. A draft program was developed based on a needs assessment, followed by iterative testing and evaluation by six PAGPs. Data were collected by observations, interviews, dossier, and logbook of telephone and WhatsApp contacts. The whole process was analyzed using directed content analysis.

Results: Two PAGPs could not integrate ESM within their work processes due to production-target. Essential elements for success are explaining the goal of the platform, demonstrating it, tailoring the ESM results discussion to the patient's needs, interpreting results together and connecting them to personal goals. Added value was demonstrated; increasing awareness, providing starting points for treatment. However, continuous support is needed and the tool needs further fine-tuning.

Conclusion: Using ESM to support detailed functional analyses in family medicine seems promising, but remains challenging. Becoming acquainted with innovative tools can be considered a growth process, in which PAGPs have to explore usefulness within their work processes.

Personalized Treatment Real-time Assessment (PETRA): bringing personalized diaries to psychiatric care **Fionneke Marijke Bos¹, Lino von Klipstein¹, Ando Emerencia², Erwin Veermans¹, Judith Rosmalen¹, Marieke Wichers¹, Harriette Riese¹**

¹Interdisciplinary Center Psychopathology and Emotion regulation (ICPE), Department of Psychiatry, University Medical Center Groningen, the Netherlands,

²University of Groningen, Department of Developmental Psychology, The Netherlands

Background:

Research shows that frequent recording of mood and experiences throughout the day via the experience sampling method, ESM can be highly relevant for psychiatric care. Although clinicians and patients are eager to use ESM in clinical practice, until now no user-friendly personalized ESM tool was available. Therefore, the present project developed a flexible interface called PETRA, to enable use of personalized and scientifically valid EMA diaries in clinical practice.

Methods:

PETRA is developed using the roadmap of the Center for E-health Research (CeHRes). In the first phase, interviews and focus groups (patients=42, clinicians=34) were held to identify needs and requirements for PETRA. In the second phase, PETRA prototypes were developed and adapted based on 15 usability sessions, in which clinicians and patients walked through prototypes together.

Findings:

Based on the results of phase 1 and 2, the PETRA tool was built to consist of a decision aid as well as a feedbackmodule. The decision aid helps patients and clinicians to construct a personalized and scientifically valid ESM diary in a user-friendly way during a regular consult. The feedbackmodule presents the gathered ESM data in a clinically relevant format, and can be tweaked according to personal preference and treatment goals. In the usability sessions, patients and clinicians indicated high usability and clinical relevance of PETRA.

Discussion:

Preliminary findings suggest PETRA facilitates the use of personalized ESM in psychiatric practice. Critical reflections on the clinical utility of personalized ESM will be discussed.

Stress reactivity, self-esteem and self-compassion as putative momentary mechanisms in psychosis and mental health

Chair(s): Thomas Vaessen (Center for Contextual Psychiatry, Department of Neurosciences, KU Leuven, Belgium), **Ulrich Reininghaus**

(Department of Public Mental Health, Central Institute of Mental Health, Germany)

Discussant(s): Inez Myin-Germeys (Center for Contextual Psychiatry, Department of Neurosciences, KU Leuven, Belgium)

Several putative psychological mechanisms have been proposed to contribute to the development and maintenance of mental ill-health. The Experience Sampling Method (ESM) enables us to examine these mechanisms, such as stress reactivity, self-esteem and self-compassion and their relation to momentary symptoms of mental disorder, in daily life. In this symposium, we will present a series of translational experience sampling studies that connect momentary measures to brain activity and discuss the relevance of genetic liability in stress reactivity and (fluctuations in) self-esteem as putative mechanisms in pathways to psychosis. Further, findings from an experience sampling study on momentary self-compassion as a putative protective mechanism will be presented and its association with emotion regulation and well-being will be discussed. Dr. Thomas Vaessen will present results of an ESM study in which he investigated whether stress-related activity in limbic and frontal areas of the brain is associated with affective and psychotic reactivity to daily life stressors in early states of psychosis. Subsequently, Dr. Anita Schick will discuss the role of Polygenic Risk Scores for schizophrenia (PRS) in stress reactivity in patients with enduring non-affective psychotic disorder, their first-degree relatives and healthy controls. Maud Daemen will elaborate on momentary self-esteem and fluctuations in self-esteem (i.e., variability and instability) as putative mechanisms in pathways to psychosis in three groups with different levels of (familial) liability to psychotic disorder. Finally, Lara Mey will present findings on the role of self-compassion as a putative protective mechanism for well-being with regard to emotion regulation strategies.

Presentations of the Symposium

The association between the neural response to psychosocial stress and affective reactivity to real-life stressors in early stages of psychosis

Thomas Vaessen¹, Ulrich Reininghaus², Evelyn van Aubele¹, Inez Myin-Germeys¹, James Waltz³

¹Center for Contextual Psychiatry, Department of Neurosciences, KU Leuven, Belgium, ²Department of Public Mental Health, Central Institute of Mental Health,

³Maryland Psychiatric Research Center, University of Maryland

Everyday stressful situations elicit affective and psychotic responses in individuals at early stages of psychosis (EP). On the neuronal level, both patients with schizophrenia and individuals at increased risk show aberrations in stress-reactivity in limbic and frontal areas when compared to healthy controls. No study to date has investigated whether stress-related activity in these areas is associated with affective and psychotic reactivity to daily-life stressors in early stages of psychosis. 28 EP individuals were administered a stress task in conjunction with functional magnetic resonance imaging. All participants also provided diary data on momentary mood, symptoms, and stressful activities in their everyday environment. Multilevel models were used to estimate if the affective response to daily stressors was moderated by activity in limbic and frontal brain areas. A higher task-related increase in reported stress levels was significantly associated with a larger momentary increase in negative affect in response to stressful activities in daily life. Changes in the vmPFC, vACC, and AI were associated with measures of affective and psychotic stress reactivity, whereas changes in the HC and amygdala were associated with overall stress levels. Results suggested that a relative neural non-responsiveness to the stress task was indicative of higher levels of PLE and NA and blunted stress reactivity, possibly revealing traces of a neural affective pathway to psychosis.

Stress reactivity, polygenic risk and familial liability in psychosis

Anita Schick¹, Ruud van Winkel², Bochao Danae Lin³, Jurjen Luykx³, Inez Myin-Germeys⁴, Ulrich Reininghaus¹

¹Department of Public Mental Health, Central Institute of Mental Health, ²KU Leuven, Department of Neuroscience, Research Group Psychiatry, Center for Clinical Psychiatry, Leuven, Belgium, ³Department of Translational Neuroscience, Brain Center Rudolf Magnus, University Medical Center Utrecht, Utrecht University, Utrecht, the Netherlands, ⁴Center for Contextual Psychiatry, Department of Neurosciences, KU Leuven, Belgium

There is evidence on a polygenic contribution to psychosis. One targetable mechanism through which polygenic variation may impact on individuals and interact with the social environment is stress sensitization, characterized by elevated reactivity to minor stressors in daily life. The current study aimed to investigate whether stress reactivity is modified by Polygenic Risk Score for schizophrenia (PRS) in cases with enduring non-affective psychotic disorder, first-degree relatives of cases, and healthy controls. We used the Experience Sampling Method to assess minor stressors, negative affect, positive affect and psychotic experiences in 96 cases, 79 first-degree relatives, and 73 healthy controls at wave 3 of the Dutch Genetic Risk and Outcome of Psychoses (GROUP) study. Genome-wide data were collected at baseline to calculate PRS. We found that associations of momentary stress with psychotic experiences, but not with negative and positive affect, were modified by PRS and group (all $p_{fwe} < 0.001$). In contrast to our hypotheses, relatives with high PRS reported less intense psychotic experiences in response to momentary stress compared to relatives with low PRS. No differences in magnitude of these associations were observed in cases with high vs. low level of PRS. By contrast, controls with high PRS showed more intense psychotic experiences in response to stress compared to those with low PRS. This tentatively suggests that polygenic risk may operate in different ways than previously assumed and amplify reactivity to stress in unaffected individuals but operate as a resilience factor in relatives by attenuating their stress reactivity.

Self-esteem and its fluctuations as underlying mechanisms in psychosis in daily life

Maud Daemen¹, Therese van Amelsvoort¹, Ulrich Reininghaus²

¹Department of Psychiatry and Neuropsychology, School for Mental Health and Neuroscience, Maastricht University, Maastricht, The Netherlands, ²Department of Public Mental Health, Central Institute of Mental Health

Evidence suggests that self-esteem might be an important mechanism in the pathway to psychosis. However, it remains unclear whether low or high self-esteem is associated with psychotic experiences. Furthermore, only a small amount of studies has examined fluctuations in state self-esteem in patients with psychotic disorder. We aimed to examine the associations of momentary self-esteem and fluctuations in self-esteem with psychotic and paranoid experiences in three groups with different levels of (familial) liability to psychotic disorder. The Experience Sampling Method (ESM) was used to assess momentary self-esteem, fluctuations in self-esteem (variability and instability), and psychotic and paranoid experiences in 147 patients with psychotic disorder, 131 of their first-degree relatives and 113 healthy controls. Both lower levels of momentary self-esteem and greater variability in self-esteem were associated with increased intensities of psychotic and paranoid experiences. The magnitude of the associations for momentary self-esteem were greatest in patients, followed by relatives. Interestingly, for variability the magnitudes were greatest in relatives. Instability in self-esteem was associated with psychotic experiences in all three groups, and with paranoid experiences only in relatives. These findings demonstrate that there is evidence for familial liability in (fluctuations in) self-esteem as putative mechanisms in the pathway to psychosis. Targeting momentary self-esteem as well as variability and instability in self-esteem in patients with psychotic disorder and in their first-degree relatives may be beneficial in decreasing the intensity of psychotic and paranoid experiences in daily life in patients and their first-degree relatives.

Be kind to yourself: Implications of momentary self-compassion for emotion regulation and well-being in daily life

Lara Mey¹, Mario Wenzel², Zarah Rowland², Karolina Kurth¹, Thomas Kubiak², Oliver Tüscher¹

¹Leibniz Institute for Resilience Research, Mainz, Germany, ²Health Psychology, Institute for Psychology, Johannes Gutenberg University, Mainz, Germany

Self-compassion is a well-established and strong predictor for mental health and well-being. One possible mechanism may be that self-compassion promotes more adaptive emotion regulation strategies, as suggested by past research. So far, self-compassion has only been assessed as a baseline characteristic and little is known about how it unfolds and covariates with emotion regulation in daily life. The ongoing study consists of up to four seven-day smartphone based ecological momentary assessment waves every 6 months. During each wave, participants (currently $N = 110$) receive 6 semi-random signals per day reporting experienced daily hassles, emotion regulation strategies (reappraisal, acceptance, rumination, distraction, expressive suppression and social sharing) as well as momentary self-compassion and affect. Preliminary results show positive associations between momentary self-compassion and the emotion regulation strategies reappraisal and acceptance and negative associations with rumination and distraction. We found momentary self-compassion to be unrelated to social sharing and expressive suppression. Furthermore, momentary self-compassion seems to explain variance in positive and negative affect beyond emotion regulation strategies, providing evidence for its benefits for well-being in addition to these emotion regulation strategies. This study will shed new light on the associations between self-compassion, emotion regulation and well-being by examining its implications in daily life.

Psychological Measurement in Experience Sampling Methods.

Chair(s): Laura F. Bringmann (University of Groningen), **Sebastian Castro-Alvarez** (University of Groningen, Netherlands, The)

Measurement in psychology has never been an easy task. Now, when it is combined with intensive longitudinal data, it becomes even more challenging. In this symposium, we tackle some of the many challenges that are associated to psychological measurement in experience sampling methods. Firstly, Noemi Schuurman will discuss why researchers should care about measurement in intensive longitudinal studies and why developing measurement theory is a top priority for the field. Secondly, Anja Ernst will present a multilevel mixture model, which allows for classifying individuals with similar dynamic processes. Thirdly, Sebastian Castro will introduce dynamic item response theory models to analyze individual time series. Fourthly, Timothy Bricks will address the question about when and how often persons should be measured, for which he proposes an adaptive assessment. Finally, IJsbrand Leertouwer will discuss assumptions in the procedure of providing personalized feedback based on experience sampling or ecological momentary assessment data, many of which have to do with perceptions on measurement.

Presentations of the Symposium

Intensive Longitudinal Data (ILD) Measurement Manifesto

Noëmi K. Schuurman
Utrecht University

Measurement in the context of social sciences is hard. To evaluate and ensure a good quality of measurements, the psychology field has developed a consistent measurement tradition, with standard tools like factor modeling and measures like Cronbach's alpha.

However, what works for research on inter-individual differences, does not necessarily generalize to intra-individual differences. This also applies to measurement. Hence, many popular statistical tools for measurement were not directly applicable to ILD, although recently more statistical tools and measures have been developed for this purpose. In practice, much of ILD research has had to work with face validity, qualitative evaluations of validity, and trial and error to evaluate measurements.

This is not always the preferred approach of reviewers. However, in this talk, we will argue it is also a strength of current ILD research - where evaluating measurements has become a focus area of a study, rather than revolving around ticking statistical boxes. ILD research does need to move beyond face validity to progress, such that we can establish a high (intra-individual) validity of our measurements. We will argue that to attain this we first-and-foremost need to continue on the path of developing strong measurement theory, as a key part of our overall theory.

That is, we'll argue that how to measure ILD for a particular research topic can be considered an essential research question, worth writing full papers about. In this context, we'll discuss examples of potential research questions to study that directly relate to how to measure psychological processes.

Multilevel mixture vector-autoregressive modelling

Anja Ernst, Marieke Timmerman, Casper Albers
University of Groningen

With the rising popularity of intensive longitudinal research, the modelling techniques for such data are increasingly focused on individual differences. We present mixture multilevel vector-autoregressive modelling which extends the multilevel vector-autoregressive model by including a mixture model to identify individuals with similar dynamic processes. This exploratory model identifies mixture components where each component refers to individuals with similarities in means, autoregressions, and cross-regressions while allowing for some inter-individual differences on these attributes. The proposed model is illustrated in an empirical example on affective data from the COGITO study. These data consist of samples for two different age groups of over 100 individuals each who were measured

for about 100 days. We demonstrate the advantage of exploratory identifying mixture components by analysing these heterogeneous samples jointly.

Dynamic Item Response Theory: An Approach to Analyze Polytomous Time-Series Data

Sebastian Castro-Alvarez, Laura F. Bringmann, Rob R. Meijer, Jorge N. Tendeiro
University of Groningen

Studying psychological dynamics has never been as easier as it is today. The accessibility to electronic devices and the novel methodologies available have allowed researchers to comprehend psychological processes at the individual level. However, there are still great challenges to overcome as, in many cases, collected data are more complex than the available models are able to handle. For example, most methods assume that the variables in the time series are measured on an interval scale, which is not the case when Likert- scale (categorical polytomous) items were used. Ignoring the scale of the variables can be problematic and bias the results. An approach that appropriately models polytomous data is the item response theory (IRT) framework. Yet, IRT models to analyze time series data are scarce. In this study, we present a set of IRT models, which are ideal to analyze individual polytomous time series. These models are extensions of the partial credit model (PCM) and the graded response model (GRM). By introducing these models, we also aim to bring all the advantages that IRT has in cross-sectional settings to intensive longitudinal settings. Thus, the proposed models allow studying the interaction between the person and the items over time. This will indicate which items are more informative given the state of the person at a certain point in time, and the range between the states of the person are more accurately measured given the set of items used in the study.

Burden and Bias in Adaptive Assessment: Comparing strategies for real-time adaptation of assessment timing

Timothy R. Brick

The Pennsylvania State University

The intensive individual data collected by ambulatory assessment approaches can provide enormous benefits for understanding human behavioral, emotional, and cognitive processes. Even after careful selection of assessment tools, however, ambulatory approaches that require active intervention (e.g. smartphone-based surveys or tests) may still impose a nontrivial burden on the participant, leading to dropout, inattentive answering, and oversimplified responding. These intensive ambulatory approaches must therefore carefully balance the data requirements of their analysis tools against the burden that data collection places on participants. One especially challenging case presents itself in the face of relatively rare but high-stakes states, such as suicidal ideation, panic episodes, or drug craving states. Survey too infrequently and the phenomena of interest may be missed; survey too frequently, and participants may cease to answer altogether.

One approach to improve this tradeoff is to identify time periods of interest by using data mining tools to monitor and classify passively- collected data from wearable physiology monitors and smartphone sensors, triggering adaptive assessments at those timepoints. However, this approach raises questions about missing data, estimation bias, and the systematic limitations of the data mining tools in use. In this talk, I present several approaches to addressing these problems, and compare different strategies for adaptive assessment planning under a variety of simulated conditions.

A Review of Explicit and Implicit Assumptions When Providing Personalized Feedback Based On EMA Data.

IJsbrand Leertouwer¹, Angélique O. J. Cramer¹, Jeroen K. Vermunt¹, Noémi K. Schuurman²

¹Tilburg University, ²Utrecht University

In a personalized feedback procedure, summaries of participants' EMA-measurements are presented to them in order to promote insight in their psychological functioning. Underlying this procedure are some fundamental assumptions. Specifically, it is assumed that (1) people systematically do not represent all their true experiences into recollections of those experiences, (2) those true experiences are measured in EMA, and those recollections are measured in retrospective assessment, (3) there will be a difference between EMA- and RA measurements as a result of the previous, and (4) summaries of EMA-measurements can be used to change participants' recollections of their experiences. In this presentation, we will formalize these assumptions in simple expressions, and discuss empirical evidence for each of them. We believe that all of these assumptions require further investigation, in order to ensure that the personalized feedback procedure is based on a relevant difference between representative data sources, that actually increases participants' insight.

Conference Agenda

Session

P1: Poster Session 1

Time: **Wednesday, 30/June/2021: 8:00pm - 9:00pm**

Presentations

Physiology and affect in daily life.

Denise Johanna van der Mee, Eco J.C. de Geus

Vrije Universiteit Amsterdam, Netherlands, The

Decades of research have shown a relationship between the autonomic nervous system (ANS) and emotions in controlled laboratory environments. Unfortunately, these laboratory studies have limited ecological validity. To test whether findings hold in real life, we recorded ANS activity and subjective feelings during 24h of participants' everyday life. ANS data was collected with the Vrije Universiteit Ambulatory monitoring system. Emotions were recorded hourly between 07:30pm - 21:30am with an iPod questionnaire. We used the root-mean- square-of-successive-differences (RMSSD) as indicator of parasympathetic nervous system(PNS) activity and the number of non-specific skin conductance responses per minute (ns.SCR) as indicator of sympathetic nervous system (SNS) activity. From the questionnaire, three indicators of emotions were derived: positive affect, negative affect, and the feeling scale. Data with at least 5 repeated measures during low physical activity were available for 52 participants (54.72% females), with a mean age of 22.1 (range = 18 - 31, SD = 3.20). Multilevel analyses were performed for each of our three subjective feeling measures as outcomes, the two ANS indicators (separately) as level 2 predictors and participant ID as level 1 predictor. The results showed that ns.SCR was positively associated with positive affect ($p < .001$) and the FS ($p < .001$) but negatively associated with negative affect ($p = .004$). RMSSD was negatively associated with positive affect ($p = .005$) and the FS ($p = .001$). We conclude that in real life, in contrast to laboratory findings decreased PNS activity and increased SNS activity – the hallmark of fight-flight response - are mainly associated with the experience of positive emotions.

Association of daily life stress with the cortisol awakening response over a 14-months stress phase

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The objective of the prospective-longitudinal and quasi-experimental JurSTRESS project is to contribute to the understanding of the biopsychological mechanisms mediating the well-known association between chronic stress and the risk for several disorders.

In this project, 471 law students from Bavarian universities are studied over a 14-months period. The experimental group (EG) consists of students experiencing a long-lasting and significant stress phase, namely the preparation for the "Erste Juristische Staatsprüfung", while law students assigned to the control group (CG) are studied over an equally long period without particular stress exposure.

In the present analysis, we focus on the association of daily life stress with the cortisol awakening response (CAR) over this long-lasting stress phase. The CAR is a well-established marker of cortisol regulation in psychoneuroendocrinology. To investigate stress-related alterations in the CAR, we included 204 students, 97 subjects from the EG and 107 from the CG. Stress perception in daily life is measured with repeated ambulatory assessments on six sampling points (T1 – T6), with the first assessment taking place twelve months prior to the exam. T1, T2, T5 and T6 consist of two consecutive sampling days, whereas T3 and T4 - both close to the exam - measure stress perception on one day. Subjects complete ten electronic queries on each sampling day. The CAR is assessed via saliva samplings after awakening, +30 and +45 minutes on the first day of each sampling point. Since data collection is not fully completed, results will be presented at the conference.

Assessing daily stressors over the telephone versus the internet: Translating the Daily Inventory of Stressful Events

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Daily experiences such as stressors and affect are a primary target for ambulatory and intensive assessments such as daily diaries. However, such tools vary widely in the wording of items and the mode of administration (e.g., telephone calls, smartphones) that simultaneously makes it impossible to disentangle the impact of these two factors in understanding patterns of reporting for exposure to and severity of daily stressors. Participants may not share upsetting experiences with an interviewer via telephone or skip through items in a self-administered internet-based assessment to finish more quickly. The goal of the current study was to determine whether mode (telephone vs. internet) influenced reporting of daily stressors (exposure and severity) and negative affect among younger adults. To specifically examine administration differences in reporting, the Daily Inventory of Stressful Events (DISE) was used in each mode. The DISE consists of seven events (e.g., arguments, work overloads) and participants (ntelephone=19, ninternet=48; Mage=22.4, SD=3.14) indicated which stressors occurred, the severity of the stressor, and their negative affect each day for 8 consecutive days. Compliance was slightly higher in the internet diary (96% vs. 88%). For stressor reporting, the proportion of days with at least one stressor was similar across modes (telephone=52%; internet=50%, $p=.88$) as was the appraised severity (Mtelephone=1.75, SD=.67; Minternet=1.96, SD=.50, $p=.17$). Negative affect was also similar across modes (Mtelephone=.47, SD=.44; Minternet=.58, SD=.47, $p=.38$). These results provide preliminary evidence that administration of the DISE through telephone versus internet did not impact reporting of exposure to and severity of daily stressors.

Daily-life stress in 22q11DS: examining affective and psychotic reactivity to stress in adolescents and young adults using the Experience Sampling Method

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22q11.2 deletion syndrome (22q11DS) is a genetic disorder, characterized by high rates of schizophrenia. Emotional response to minor daily-life stressors is thought to have a role in the development of psychotic disorders, especially in vulnerable individuals. Only one recent study has examined reactivity to daily-life stress in 22q11DS using the Experience Sampling Method (ESM), and showed that adults with 22q11DS showed higher levels of perceived stress related to daily-life events than HCs but did not differ in affective or psychotic reactivity to stress. In the current study, we aim to investigate affective and psychotic reactivity to stress in a younger sample of adolescents and young adults with 22q11DS.

The present study includes participants with 22q11DS as well as healthy controls (HC), aged 12-30 years. Data is currently being collected. Perceived stress as well as affective and psychotic reactivity to daily-life stressors were assessed using ESM. Questionnaires were used to assess coping strategies and the SIPS interview was used to assess attenuated psychotic symptoms in the 22q11DS group.

We hypothesize that participants with 22q11DS would show more perceived stress and an altered affective and psychotic reactivity to daily-life stressors compared to HCs. We also hypothesize that coping strategies mediate the relationship between stress and affective and psychotic reactivity. Finally, we hypothesize that elevated affective and psychotic reactivity to stress would be associated to more severe psychotic symptoms in 22q11DS.

The current study adds to the growing literature on stress reactivity in daily life and its role in psychosis.

Do neural responses to acute stress predict chronic stress perception in daily life over 14 months?

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The objective of the prospective-longitudinal and quasi-experimental JurSTRESS project is to contribute to the understanding of the biopsychological mechanisms mediating the well-known association between chronic stress and the risk for several disorders.

In this project, 471 law students from Bavarian universities are studied over a 14-months period. The experimental group (EG) consists of students experiencing a long-lasting and significant stress phase, namely the preparation for the "Erste Juristische Staatsprüfung", while law students assigned to the control group (CG) are studied over an equally long period without particular stress exposure.

In the present analysis, we focus on the predictive value of neural responses to acute stress for stress perception in daily life over 14 months. Thus, the fMRI paradigm ScanSTRESS was applied to 123 students from the JurSTRESS sample at study entry, including 60 subjects from the EG and 63 subjects from the CG. ScanSTRESS consists of two runs with stress and control conditions and it prompts the subject to solve arithmetic and rotation tasks while being evaluated by an observation panel. Stress perception in daily life is measured with repeated ambulatory assessments on six sampling points (T1 – T6), with the first assessment twelve months prior to the exam. T1, T2, T5 and T6 consist of two consecutive sampling days, whereas T3 and T4 - both close to the exam - measure stress perception on one day. Subjects complete ten electronic queries on each sampling day. Since data collection is not fully completed, results will be presented at the conference.

Stress and recovery measured with heart rate variability: Do the findings of laboratory research translate to daily life?

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Stress is a prevalent theme in our daily lives and can lead to numerous negative health effects. In laboratory research, the physiological impact of stress has been extensively studied with objective measures such as heart rate variability (HRV). Recently, the vagal tank theory emerged from past laboratory HRV research as a promising new theory of stress and recovery. The theory makes predictions about adaptive HRV levels surrounding stressful events. However, there is a lack of studies investigating whether findings from laboratory research translate to naturalistic stressful events in daily life. In this study, for the first time, we aim to investigate if the predictions of the vagal tank theory about HRV during stress reactivity and recovery are supported with data from daily life. Fifty-five students wore the ecgMove 4 sensor to measure an electrocardiogram for four days. This was used to calculate HRV. Additionally, participants filled out bi-hourly questionnaires about their stress experience and reported stressful events by tapping on the sensor to mark this point in time. The physiological signal before, during and after the marked stressful events will be segmented, and then analyzed using multilevel modelling. We expect the predictions of the vagal tank theory about HRV during stress reactivity and recovery to be supported with our data from daily life. The findings of this study have the potential to pave the way for better understanding of stress and recovery in daily life.

Most common stressors and reappraisal techniques in student population – an Ecological Momentary Assessment and Intervention study

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Common stressors for the student population have been identified in past research. However, most of these studies were conducted in the United States, using interviews or open-ended surveys to collect data. In this study, we used an Ecological Momentary Assessment (EMA) and Ecological Momentary Intervention (EMI) approaches to collect data on the Western-European population. This was to maximize ecological validity and to identify all day-to-day stressors faced by students. Reappraisal is a way of coping with stress by thinking about the positive ways one could re-interpret a stressor. Reappraisal reduces distress and is associated with positive effects on physical and mental health. Recent research suggests that reappraisal is a heterogeneous strategy, consisting of multiple subtypes. The aim of this study was to look at the association between stressors and reappraisal strategies. To test this, 73 students of higher education institutions in Switzerland, mostly from the greater Zurich area were instructed to provide a description of a stressful event that they experienced, and three reappraisals of each of the events, at least three times per day, for 7 consecutive days, with the use of the mobile app. Results are based on 1450 descriptions of

stressful events and 4165 reappraisals. They show that stressors like social problems (e.g. fighting with a family member) and lack of resources (e.g. not having enough time to get ready) occur more often than the other. Furthermore, the different reappraisal strategies were used with different frequency, depending on the type of stressor.

A Psychobiological Approach to Teacher Stress by applying Ambulatory Assessment Techniques

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Teaching is a demanding task. Compared to other professions, teachers report elevated levels of chronic stress and psychosomatic illnesses. Chronic occupational stress of teachers also affects the teaching quality and therefore, the students' performance, and it has major economic effects. According to teachers, the primary stress factor within the classroom and the main reason for leaving the profession and early retirement are aggressive and non-aggressive forms of classroom disruptions.

The research on teacher stress relies mainly on self-reports and, therefore, assesses stress on purely subjective perception. Since physical processes also accompany stress, we want to take a multimodal approach and examine teacher stress psychologically as well as physiologically throughout several days. The results of our pilot study show different psychological and physiological parameters within workdays and free days. The cortisol awakening response and the total HRV were significantly higher on the workdays than on a free day. Self-reported stress during workdays reached its highest point at midday while saliva markers showed increasing alpha-amylase and decreasing cortisol concentrations during the course of the day.

An ambulatory assessment design allows our participants to follow their regular daily routine. That way, we can investigate stress levels to

different times throughout the day and compare it intraindividual and interindividual between workdays and free days. Exploring psychobiological and physiological variables by applying ambulatory assessment techniques enhances our understanding of stress, provides valuable information for a health-promoting school environment and contributes to primary and secondary stress prevention in teachers.

Feeling worried, restricted, and lonely: Ecological momentary assessments reveal psychological mechanisms of COVID-19-related distress

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COVID-19-related economic and health worries, exposure to COVID-19 information and social and physical distancing can increase mental health problems. Yet, it is unclear how vulnerable individuals' daily experiences relate to their mental health status. We launched an ecological momentary assessment (EMA) study to explore if and how daily worries, feelings of restriction, loneliness and information exposure affects mental health. We investigate a vulnerable population by focusing on people experiencing high psychological distress and loneliness amid the COVID-19 pandemic. We conducted a multilevel regression analysis, with COVID-19 worries, information seeking, feeling restricted and loneliness during the last hour as predictors and momentary negative mood as the outcome. The first level was individuals' score and second level was the group score. COVID-19 worries ($b = 0.09$, $t(1273) = 2.01$, $p = .0447$), feelings of restriction ($b = 0.074$, $t(1273) = 2.21$, $p = .0348$), and loneliness ($b = 0.26$, $t(1273) = 12.17$, $p < .0001$) significantly predicted momentary negative mood. COVID-19 information seeking was not a significant predictor ($b = 0.0208$, $t(1273) = 1.00$, $p = .3196$). To conclude, we found that feelings of loneliness, COVID-19 restriction, as well as COVID-19 related worries increased momentary negative mental health. However, we did not find that exposure to COVID-19 information did have a negative impact on mental health.

Do women with differing levels of trait eating pathology experience daily stress and body dissatisfaction differently?

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Introduction: Stress has been found to predict both body dissatisfaction (BD) and disordered eating (DE) patterns. As the mechanisms are not clear and have yet to be explored in daily life, this study was set to 1) explore the concurrent and lagged relationship between stress and BD in individuals with different levels of trait eating pathology (EP) and 2) investigate whether maladaptive coping moderated these relationships. **Method:** 107 female participants (mean age = 26.92) completed an online survey about stress, coping strategies and trait EP. Participants used a smartphone app to report on state stress, BD and DE six times a day for seven days. **Results:** Individuals with elevated trait EP experienced a significantly higher frequency of stress events ($b = 0.04$). Participants' use of maladaptive coping significantly increased state stress ($b = 0.41$), but this effect was not moderated by EP. Participants' state stress and BD measured at the same time point (concurrent assessment) were significantly related ($b = 0.13$). Either stress or BD at the previous time point did not significantly predict changes in the other (lagged assessment, $b = 0.02$, $b = -0.09$, respectively). The aforementioned state-based associations were not moderated by trait EP (R^2 values ranged from .01-.10). **Conclusions:** Women with more severe EP were found to experience stress more frequently. Maladaptive coping strategies were related to stress, but not moderated by EP. The association between stress and BD from concurrent but not lagged assessment highlights the importance of assessing and targeting momentary stress levels.

Assessing Temporal Dynamics of Mood and Physical Activity with Machine Learning in Moderately to Severely Depressed Individuals

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Major depressive disorder (MDD) is a debilitating disease that impacts the daily lives of roughly three hundred million people worldwide. Unfortunately, the high prevalence of this disease is not matched with low severity. One of the primary contributors adding to this severity is that affected individuals can generally be characterized by persistent low mood. This generalization, while both truthful and informative, fails to capture the details of daily life with MDD. Often, the mood of moderate and severely depressed individuals fluctuates from day to day and even within a day. Given this, physical activity has been proposed as an acute intervention to boost subsequent mood. However, evidence shows that the effects of activity may extend beyond these immediate shifts in mood. In this analysis, a machine learning approach is taken to predict mood at five time points (immediate response – two days later) in the future and evaluate how the predictive accuracy of light, moderate, and heavy activity changes over time. The results of this modeling indicate that passively sensed activity can better predict mood the following day vs. mood directly after activity. Additionally, bursts of vigorous activity seem to be indicative of better subsequent mood but sustained moderate activity typically indicated mood elevation the following day. This discovery gives a further understanding of the dynamic relationship between activity and mood beyond acute effects. Additionally these time sensitive relationships can help guide expectations as well as treatment plans for those who are undergoing a physical activity therapy for MDD.

Dynamic Psychosocial Risk and Protective Factors Associated with Mental Health in Emergency Medical Service (EMS) Personnel

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Emergency medical service (EMS) personnel have a heightened risk for posttraumatic stress disorder (PTSD) and major depression necessitating a greater understanding of the risk and protective factors that operate each day to confer this risk. This study examined dynamic psychosocial factors and their relationship with daily mental health symptoms among EMS workers. The psychosocial factors examined consisted of occupational stressors, sleep disturbance, social conflict, meaning made, recovery activities, social support, and perceived prosocial impact. Seventy-nine EMS workers completed a daily assessment for 8 days. On average, workers reported working $M = 3.75$ shifts that were $M = 12.43$ hours in duration. On average within each person, daily occupational stressors were associated with elevated daily PTSD symptom severity ($b = 0.13$, $SE = 0.06$, $p = .023$). Social conflicts were associated with greater depression symptom severity ($b = 0.75$, $SE = 0.14$, $p < .001$); the meaning made from day's stressors ($b = -0.17$, $SE = 0.05$, $p = .002$) and the recovery activities engaged in ($b = -0.30$, $SE = 0.07$, $p < .001$) were associated with lower daily depression symptom severity. Occupational stressors and social conflicts are key risk factors related to the daily

expression of PTSD and depression symptom severity in EMS workers. The meaning made from the day's challenges and the recovery activities engaged in may protect against depression. These results reveal several dynamic psychosocial factors that aid in understanding daily experiences that shape mental health outcomes among EMS personnel.

Temporal Relation of Symptoms in Patients with Borderline Personality Disorder and Depressive Disorders

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Core symptoms of borderline personality disorder include highly reactive and intense mood reactions, impulsive and self-harming behaviors, unstable, intense and unstable interpersonal relationships, as well as fear of abandonment. In recent years, researchers have focused on the investigation of the temporal effects of these symptoms using electronic diaries that result in multiple momentary ratings of symptoms. Although numerous studies have investigated affect dynamics in patients with borderline personality disorder, fewer studies have investigated the temporal interplay of affect and other borderline personality disorder symptoms. Addressing this issue, we present data from two electronic diary studies that investigate the temporal interplay of aversive tension and (a) perceived rejection, as well as (b) dissociative experiences in patients with borderline personality disorder and depressive disorders. The studies include healthy comparison groups, use high sampling frequencies (prompts every 15 minutes for 12 consecutive hours), and sufficiently large samples (each $n > 100$). Data were analyzed using dynamic structural equation modeling and the statistical software Mplus. The approach allows to separate interindividual between-person differences (traits) from within-person fluctuations around this value, as well as to investigate interindividual differences in autoregressive and cross-lagged associations. In addition, measurement error and varying time intervals between measurement occasions can be taken into account. We also discuss potential disadvantages of our statistical approach.

Combination of inpatient and mobile intervention after discharge for disorder-specific risk perception - design and methodology of an RCT with schizophrenia and alcohol patients.

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After release from inpatient treatment, patients with psychiatric disorders experience a high relapse risk. Typical for patients with alcohol use disorder are hypo-risk attributions and drinking relapses and for patients with schizophrenia hyper-risk attributions and non-adherence to prescribed antipsychotics. We report design and methods of a study that aims to study risk perception and behavior in both patient groups in the context of critical real-life situations after discharge using ecological momentary assessment (EMA) and ecological momentary intervention (EMI).

In a randomized-controlled trial, the two patient groups receive a standardized disorder-specific group therapy or control intervention during inpatient treatment and subsequently participate in EMI for four weeks after discharge. The interventions contain the following elements: motivation to reduce risk behaviors, awareness for individual risk situations and coping behaviors. The EMI will employ daily mental contrasting and implementation intentions (MCII) to keep developed motivation and coping responses active. In an analogue schedule, inpatient control groups focus on cognitive exercises, continued by a control EMI. After discharge participants report daily for four weeks on their risk behavior, risk perception and critical situations using a mobile-based EMA. Questionnaire data on risk behavior, motivation to change is collected pre and post the group therapy and 4-weeks after the EMA/EMI period.

We expect the combination of inpatient and mobile intervention to produce a change of disorder-specific risk perception and behavior in critical real-life situations compared to the control groups. We hypothesize that alcohol and schizophrenia patients will show comparable trajectories of risk perception and behaviors.

Combined Pharmacotherapy and Evidence-Based Psychosocial Cannabis Treatment for Youth Reduces Selection of Cannabis-Using Friends

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Background: Theoretical models of behavior change argue that youth should decrease their time with cannabis-using friends and increase their time with non-using friends during treatment. Informed by behavior-change models of recovery and socialization and selection models of peer influence, the current study examined whether combining evidence-based psychosocial treatment with adjunctive pharmacotherapy helps youth decrease their affiliations with cannabis-using friends and increase their affiliations with non-using friends during cannabis misuse treatment. Methods: Sixty-five regular users (51% male), ages 15 to 24 years, participated in a double-blind randomized clinical trial that tested the effects of motivational enhancement and cognitive behavioral therapy (MET-CBT) plus topiramate or placebo on cannabis craving and use. Ecological momentary assessment data, collected via smartphones throughout the six-week intervention, assessed youths' time with cannabis-using and non-using friends, cannabis use, and craving in daily life. Multiple group multilevel structural equation modeling tested study hypotheses. Results: Across conditions, greater time spent with cannabis-using friends promoted greater cannabis use and craving the next day (socialization effect). In turn, cannabis craving, but not use, promoted continued selection of cannabis-using friends. Multiple group analyses indicated that this indirect effect was only supported in the placebo condition due to the selection piece of this cycle not being significant for youth who received topiramate. Neither cannabis craving nor use were associated with time with non-using friends the next day. Conclusions: MET-CBT and adjunctive topiramate pharmacotherapy interrupted youth selection processes. This finding suggests that changing peer affiliations could be one mechanism by which treatments can work.

Two weeks Ambulatory Assessment of craving as predictor of 5-years addiction treatment outcome

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Introduction: Addiction is a chronic condition characterized by attempts to stop or reduce use followed by relapse. One main objective of treatment is to prevent relapse by targeting craving, an unwanted intense desire to use, reported as a major risk factor for relapse. Craving fluctuates within hours and may be captured by Ecological Momentary Assessment (EMA). The predictive value of craving on addiction outcomes has only been studied over short periods of time (1 month to 2 years) whereas treatments may be more long-term (5 to 10 years). Objective: Examine whether craving variations at the beginning of an addiction treatment was associated with long-term outcomes (abstinence/non-abstinence). Methods: Craving intensity change was collected with a two-week EMA study among participants initiating outpatient treatment for Substance Use Disorders (DSM-5) in a French addiction clinic. Subjects received a follow-up assessment at 5 years or more after inclusion. EMA craving data was analyzed with Hierarchical Linear Models. Results: Stronger decrease in craving intensity was associated to more abstinence at 5 years ($n=39$; $b=0.08$; $p=0.043$). Discussion: Our results suggest that craving trajectory at the beginning of addiction treatment may provide an important indicator of long-term treatment outcomes. This has potential implications for personalized treatment.

Insight-craving association among patients initiating addiction treatment: an EMA study.

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Context: Craving, an intense fluctuating desire to use, is a major risk factor for relapse and a key target for addiction treatment. Because craving is an individual experience, capacity to report craving could be influenced by insight level. Low insight is defined as poor recognition of one's mental illness, disability to self-evaluate symptom severity, linked to less memory capacities, and has been reported as common in addiction. Studies suggest that low clinical insight could be linked to more rapid relapse, but association with craving remains unknown. Ecological Momentary Assessment (EMA) is particularly relevant to capture craving variation over time and limits influence of memory bias. Objective: Examine the link between insight level and craving among patients beginning addiction treatment. Methods: Participants initiating outpatient treatment for substance use disorder (DSM-5) completed a two weeks EMA study. Patients described

craving intensity both in real-time (EMA) and retrospectively over past month at inclusion and insight level with modified Hanil Alcohol Insight Scale (m-HAIS). Data were analysed using Hierarchical Linear and non linear Modeling (HLM) Program and Spearman tests. Preliminary results: Lower insight level was found associated with higher craving intensity in EMA ($n=8$; $b=-0.30$; $p=0.008$), and but not with retrospective craving ($n=8$; $p=0.170$; $p=0.688$). Discussion: This study highlights the advantage of ambulatory assessments to explore individual experiences such as craving. Future studies should explore the role of cognitive and memory deficits in discrepancy between current and retrospective assessment.

Dynamic modeling of mediators of change during an online-intervention for social anxiety in adolescents

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Previous randomized-controlled trials have shown that adolescents with social anxiety disorder benefit from psychotherapeutic online- interventions in terms of decreasing severity of anxiety. However, little is known about the mechanisms of change of these interventions. Maintaining factors of social anxiety postulated in the model of Clark and Wells may function as potential mechanisms of change of these interventions. Therefore, our aim is to identify and model these factors in mediation models in a sample of young people with both subclinical social anxiety and social anxiety disorder participating in our online-intervention. In our online-intervention the hypothesized maintaining factors are targeted directly and assessed repeatedly in the natural social environment of our participants using an ecological momentary assessment procedure. To this aim, we use an adapted version of the social phobia weekly summary scale as well as two items measuring automatic thoughts and self-esteem. Participants answer these questions three times a day for the duration of eight- week, i.e. during the whole online-intervention. We will model these factors as mediators of the association between intervention and social anxiety and present preliminary results at the SAA conference.

Exploring the dynamics of daily self-control episodes – a daily diary study across multiple achievement phases in trainee teachers

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Self-control is one of the most important prerequisites for goal accomplishment. This might be especially relevant for the pursuit of relevant goals in daily life. We investigated daily self-control process variables defined in the integrative self-control theory (SCT) across repeated achievement phases (demonstration lessons) among trainee teachers. Beyond linear associations among SCT variables we also explored curvilinear associations across days across phases, and between persons. For example, resistance might increase with increasing desire strength. This investment might however inverse at a certain point in order to conserve resources. Additionally, we investigated the time course of self-control. Two hypotheses were contrasted: Higher self-control might be recruited across time because of increasing goal salience or training effects. In contrast, exhaustion might result in reduced self-control effort and success across time.

In our daily diary study, each participant was prompted twice a day (morning and evening) for the 10 days preceding each of their six demonstration lessons (i.e., Level 2 personally relevant performance situations). We recorded NLevel1 = 8069 evening assessments (SCT variables) of NLevel3 = 183 trainee teachers. Data were analyzed with multilevel analyses.

The results of our preliminary analyses suggested that there were curvilinear association between desire strength and resistance, and between resistance and procrastination. The investigation of time courses yielded a quite complex picture of increases in desire strength, decrease in resistance and procrastination across phases of self-control that were partially qualified by curvilinear time effects and at times opposed to time courses across days preceding each demonstration lesson.

Capturing Circadian influence on intrusive re-experiencing in trauma survivors' daily lives with ecological momentary assessment

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Background: The core clinical feature of posttraumatic stress disorder (PTSD) is recurrent re-experiencing in form of intrusive memories. A great number of biological processes are regulated by internal biological "circadian" clocks, but to date the effect of these 24-hour biological cycles on intrusive re-experiencing has not been investigated. Ecological momentary assessment with an intrusion diary enables collecting these intrusive memories right at the time when they occur in trauma survivor's daily life.

Objective: As a first milestone towards assessing the presence of such rhythms with ecological momentary assessment we examined effects of time of day on frequency and characteristics of intrusive re-experiencing.

Methods: Fifty trauma survivors reported intrusive memories for 7 consecutive days using ecological momentary assessment in their daily life. Participants recorded their re-experiencing symptoms as they occurred; all entries were timestamped. We investigated time-of-day dependent effects on frequency, distribution and emotional characteristics of intrusive re-experiencing in the overall sample as well as in PTSD versus Non-PTSD.

Results: In general, the frequency of intrusive memories showed a marked daily variance that peaked at 2pm. The PTSD group showed higher levels of intrusive re-experiencing in the early morning, afternoon and late evening. Intrusion characteristics did not follow a circadian pattern.

Conclusion: Findings from the ecological momentary assessment of intrusive memories contribute to a better understanding of their everyday occurrence and characteristics and point to the added value of examining their time-dependent effects, which can directly inform prevention and intervention science.

Social Jetlag, self-control and Bedtime Procrastination in daily life: a diary study on determinants of bedtime procrastination

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Background: Bedtime procrastination describes postponing bedtimes without external reasons. Current literature focuses on two explanations: lack of self-control and social jetlag, the discrepancy between social and biological clocks. Most studies investigating bedtime procrastination are cross-sectional, thus, limited information about determinants of bedtime procrastination in daily life exists. The

present study aims to investigate self-control and social jetlag as determinants of bedtime procrastination in daily life.

Methods: A total of 184 participants (144f, age: $m= 33.96$) filled out the seven-day daily diary study (82.43% compliance). The base questionnaire assessed dispositional self-control, sleeping patterns on workdays and work free days (MCTQ) and dispositional bedtime procrastination. The daily questionnaires assessed situational self-control (SSCCS), intended bedtimes and daily sleep patterns. We operationalized bedtime procrastination in two ways: as the discrepancy between intended and actual bedtimes (quantitative bedtime procrastination) and self-reported bedtime procrastination. We analyzed our hypothesized multilevel models using R.

Findings: Situational self-control did not predict quantitative bedtime procrastination. However, high daily self-control slightly decreased the likelihood of self-reported bedtime procrastination ($p = 0.08$). Interestingly, social jetlag on weekdays predicted quantitative bedtime procrastination negatively ($p=.05$).

Discussion: These findings do not support an association between situational self-control and quantitative bedtime procrastination. However, low situational self-control might predict incidences of self-reported bedtime procrastination.

Selfie-Objectification: An Ecological Momentary Assessment study on the Relationships between Selfie and Body Dissatisfaction and Disordered Eating Behaviours

Xinyue Liu¹, Sarah Louise Eddy¹, Sarah Elizabeth Giles¹, Jade Portingale¹, Shanshan Liu¹, Matthew Fuller-Tyszkiewicz², Isabel Krug¹

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Selfie sharing on social networking sites (SNS) has become increasingly popular over the last decade. Despite its many benefits, selfie- posting has been

suggested to predict negative body image and disordered eating symptoms. To date, little is known about the impact of selfie-posting on body image and eating disturbance in the context of everyday life. The current study utilized an Ecological Momentary Assessment (EMA) design to investigate the effects of selfie-posting on self-objectification, body image and eating behaviours. A further aim was to assess whether media literacy and lifetime self-posting frequency moderated any of the proposed relationships. Participants (n = 300) completed the baseline questionnaire of lifetime selfie-posting frequency and media literacy. During EMA phase, participants reported their state selfie-posting behaviours, state self-objectification state body dissatisfaction, and urges to engage in disordered eating behaviours (i.e., dietary restraint, unhealthy eating and binge eating) six times a day for seven days. Multi-level modelling demonstrated that state selfie-posting predicted greater state self-objectification, reduced body dissatisfaction and urges to engage in dietary restraint. However, no association was found between state selfie-posting and urges to eat unhealthy food or urges to engage in binge eating. Media literacy and baseline selfie-posting frequency did not moderate the proposed relationships. These findings add to previous research by suggesting the actual effects of selfie-posting on body image and eating behaviours in everyday context. Nevertheless, future EMA studies with a more thoughtful design are needed to further clarify these associations.

The effects of Appearance-based Comments and Non-appearance-based Evaluations on Mood, Body Dissatisfaction and Disordered Eating: An Ecological Momentary Assessment Study in College Students Shanshan Liu¹, Jade Portingale¹, Xinyue Liu¹, Sarah Louise Eddy¹, Sarah Giles¹, Matthew Fuller-Tyszkiewicz², Isabel Krug¹

1The University of Melbourne, Australia; 2Deakin University

The current study used ecological momentary assessment (EMA) to investigate the effects of positive and negative appearance-based comments, social evaluations and performance-based evaluations on mood, body dissatisfaction (BD) and disordered eating behaviours (DE). The study also examined whether trait distress tolerance moderated these effects. A total of 301 participants first completed a baseline questionnaire containing measures of trait variables. Participants were asked to report on their state mood, BD and their momentary experience of appearance-based comments, social and performance-based evaluations and their urge to engage in DE six times a day for 7 days. Results indicated that receiving negative appearance-based comments significantly predicted BD but not negative mood, and that positive comments decreased levels of negative mood and BD. Negative social and performance-based evaluations increased levels of negative mood and BD, while positive evaluations had the opposite effects. Compared to appearance-based comments and performance-based evaluations, social evaluations led to the biggest changes in negative mood (b_{negative} = .83, b_{positive} = -.97) as well as BD (b_{negative} = .40, b_{positive} = -.39), but not DE. Finally, among all between-person differences, trait distress tolerance only moderated the relationship between positive social evaluations and negative mood. Overall, the results suggest that receiving negative feedback, especially negative social evaluations, may lead to detrimental outcomes, while positive feedback might be protective. Additionally, the effects of non-appearance-based evaluations (i.e. social and performance-based) may be generalised to appearance-based concerns (e.g. BD), but do not necessarily translate to DE in a non-clinical population.

Do Food Delivery Services Impact on Disordered Eating During the Coronavirus Pandemic? An Ecological Momentary Assessment Study

Sarah Louise Eddy¹, Shanshan Liu¹, Jade Portingale¹, Xinyue Liu¹, Sarah Elizabeth Giles¹, Matthew Fuller-Tyszkiewicz², Isabel Krug¹

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Fluctuations in food accessibility can lead to eating pathology. This study looked at food delivery services (like UberEats) in the context of the coronavirus pandemic and widespread social isolation, examining the role of convenience in disordered eating (DE) behaviours. Utilising ecological momentary assessment (EMA), the study investigated the relationship between state-based mood, loneliness, body dissatisfaction and the urge to engage in DE, and the trait-based moderating effects of food delivery usage, frequency, and negative urgency. Three hundred and one participants (82.2% female) completed a baseline questionnaire and were characterised as either current food delivery users (72.8%) or non-users (27.2%). Using a smartphone application, participants then completed state-based assessments at six random time points per day for a total of seven days. Multilevel modelling showed that negative mood preceded the urge to engage in binge eating and unhealthy eating, and both negative mood and loneliness preceded greater body dissatisfaction. While no moderating effects were found, food delivery frequency and negative urgency intensified body dissatisfaction. These results highlight loneliness as a key factor impacting on body image and should be considered as a target for early intervention. These initial findings concerning food delivery services suggest that a higher frequency of use may negatively impact body image. Further investigation into this novel area of research is required to determine whether food delivery services directly impact on body image and DE in both the general community and in high-risk eating populations.

The relationship between the menstrual cycle, anxiety and inhibitory control – moderating role of oral contraceptives

Melanie Kowalczyk, Izabela Krejtz, Monika Kornacka

SWPS University of Social Sciences and Humanities, Poland

Women are twice as likely to suffer from generalized anxiety disorder than men. This may be related to their experience of hormonal fluctuations with levels of estradiol and progesterone varying through the menstrual cycle.

The aim of the project is to monitor the fluctuations of anxiety levels and inhibitory control throughout the menstrual cycle, in women

cycling naturally and in women taking combined oral contraceptives (OC). We will be examining a possible moderating role of OC in the relationship between the menstrual cycle and anxiety levels as well as inhibitory control. Participants will provide intensive repeated measures using ecological momentary assessment (EMA) and daily diaries. Each participant will be provided with her own individual menstrual cycle calendar which will be divided into 3 phases: menstrual, follicular and luteal phase. In each phase the daily diary measures will be taken for 5 consecutive days, which will amount to 15 days. The EMA will be carried out on a phone application, 3 times a day. Participants will answer a series of questions about their daily functioning: momentary mood valence, momentary rumination, and daily satisfaction with life. In the evening, a longer diary assessment will be conducted on the Qualtrics platform. The diary measures will be 3 items chosen from different scales adapted for daily administration. Finally, an Emotional Stroop task will be administered through the Inquisit 5 web platform. We will examine how participants' daily functioning is related to hormone fluctuations. The project is in process.

The effect of social interactions on anxiety and cardiovascular responses

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Social interactions affect our well-being and functioning considerably. However, it is a challenge to reconstruct social interactions authentically in the laboratory. Ambulatory Assessment allows us to study the impact of social interactions on body and mind in the most authentic setting: everyday life.

In our on-going study, we use smartphones and portable electrocardiogram (ECG) sensors to investigate the effects of different interaction partners and settings on state anxiety and related changes in heart rate (HR) and heart rate variability (HRV). Our participants (aged 18-35, male and female) answer six randomly timed surveys a day on five consecutive days.

We expect higher anxiety (state and trait) to relate positively to HR and negatively to HRV. For high anxiety, we assume that increases in perceived similarity and familiarity of the interaction partner result in higher HR and lower HRV, reflecting increased stress levels and decreased adaptivity. An opposite effect is expected for low anxiety (lower HR, higher HRV). Overall, we expect more potent effects of direct contact compared to social media interactions. Excluded from this are individuals with high social anxiety. Here, we expect stronger anxiety-reducing effects of virtual interactions.

Responding to the current challenges of the COVID-19 pandemic, we additionally relate the mechanisms under investigation to the fear of virus transmission during face-to-face interactions, overall social distancing compliance, and related feelings of loneliness.

Applicant Fairness Perceptions During the Selection Process: Evidence from an N-of-1 Analysis

Sabrina Kryś, Udo Konrad

Kiel University, Germany

Previous research on applicant reactions during a selection process has mainly used variable-centred approaches (i.e., many applicants across one or more

points in time), seldom considering change over time and/or assuming that propositions can be generalized to each and every individual. We thus employed a person-specific approach (i.e., one applicant across many points in time) to address if results from both levels of analysis converge. Drawing on the two-paradigm view of organizational justice and the dynamic model of organizational justice, we captured applicants' event and entity fairness perceptions during the entire selection process. Recent research has shown that applicants' fairness perceptions decrease on average during the selection process. We therefore examined whether the same time trend can also be found on the person-specific level for both types of fairness perception. Furthermore, we argued that entity fairness perceptions showed a more pronounced inertia than event fairness perceptions, because entity fairness perceptions are characterized by a rather stable trait-like character. We present preliminary results of a time-series N-of-1 analysis using one applicant who participated in an online diary study over 41 days. The results showed that fairness perceptions decreased over time, and significant autocorrelations were observed for both fairness variables, with entity fairness being more inert than event fairness. Results are discussed in terms of methodological limitations, theoretical implications, and the utility to manage recruitment processes.

Having to work from home: work engagement, well-being, and basic need satisfaction in Corona times

Hannah M. Schade, Yan Fan, Jan Digutsch, Thomas Kleinsorge

Leibniz Research Center for Working Environment, Germany

During the Corona pandemic, many employees were asked to start working from home for an extended time, thus requiring flexible adaptation. The current study investigated N = 199 employees, 56% of them female, who were followed over the course of two working weeks in which they reported once daily on their well-being and productivity as well as background variables, mainly basic need satisfaction. In multilevel models of growth, we identified a positive trend for all both affect, work engagement, and detachment. Greater competence need satisfaction and greater compensation tendencies predicted better work engagement and affect, detachment was improved by greater segmentation preference. Everyday life working from home was illustrated in temporal network models exploring dynamics between the variables assessed. Interestingly, older employees indicated greater levels of competence need fulfilment when working from home than younger ones. Everyday life working from home was illustrated in temporal network models exploring dynamics between the variables assessed. Overall, results indicate that individuals adapted well to the challenge, which is discussed in the framework of Selective Optimization and Compensation.

WORKCOACH: An innovative aftercare tool for vocational rehabilitation graduates combining coaching interviews with an ambulatory monitoring

Elisabeth Maria Riedl¹, Anna Maria Moraß¹, Regina Franziska Schmid¹, Wolfgang Dings², Joachim Thomas¹

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Funded by the pension insurance Baden-Württemberg, the project WORKCOACH tests a six-month-follow-up care for vocational rehabilitation graduates, combining coaching interviews with an accompanying smartphone-supported monitoring. In the daily monitoring, the participants record their current situation and well-being. These data are screened twice a week for acute need for help. Furthermore, the monitoring data provide the basis for the regular telephone coaching sessions, which are held at two-week to four-week intervals. The focus of the coaching sessions is to strengthen the individual resources of the participants and to support them solution-orientedly in case of difficulties. The follow-up care lasts six months.

Thirty people participated in the first three waves of the survey, while two persons had to cancel their participation due to longer term hospitalization. The final sample consists of 28 participants that provided daily measurements for 2961 working days. The mean compliance rate was at 66 %. Multilevel longitudinal analyses show a curvilinear growth in the psychological well-being variables for the job searching participants. The participants directly entering a job after the vocational training measure experienced an increase in depression, dissatisfaction and stress in the first months on the job. However, in the course of the coaching, an improvement of the well-being variables could be achieved, which can be interpreted in terms of a successful adaptation process. WORKCOACH is an innovative aftercare tool that provides low-threshold and tailor-made support. Its benefit is also supported by qualitative feedback from the participants: "WORKCOACH gives you a feeling of security in the background".

Conference Agenda

Session

P2: Poster Session 2

Time: Thursday, 01/July/2021: 3:30pm - 4:30pm

Presentations

Assessing perceptions of memory functioning using intensive repeated measures designs: Are assessments biased by missing data?

Jacqueline Mogle¹, Jennifer Turner¹, Ruixue Zhaoyang¹, Laura Rabin², Robert Stawski³, Nikki Hill¹

¹Pennsylvania State University, United States of America; ²Brooklyn College, United States of America; ³Oregon State University, United States of America

Retrospection bias is a limitation of traditional assessments of self-perceived memory functioning as individuals struggle to remember things they forget. Assessing self-perceived memory functioning on a daily basis is a potential solution, however, compliance with an intensive daily diary protocol also relies on memory (i.e., remembering to complete surveys) potentially replacing retrospective bias with bias from missing observations. We examined whether person-level differences in total number of reported memory lapses were related to missed daily diaries across a two-week period. We used data from two diary studies (Study 1: n=257, Mage=46.53, SD=11.02, 65% female; Study 2: n=320, Mage=77.19, SD=4.97, 67% female) which included a self-initiated evening diary of retrospective memory lapses (forgetting past information) and prospective memory lapses (forgetting to do something). We used total number of lapses of each type to predict the likelihood of missing any survey in generalized multilevel models. Diaries were missed on 18% and 16% of days in the two studies, respectively. Number of memory lapses did not predict likelihood of survey missingness (ps>.45) in study 1. However in study 2, greater numbers of prospective (OR=1.77, p<.01) and retrospective (OR=1.60, p<.01) lapses predicted greater likelihood of missing any survey, even after accounting for age and gender. An individual's tendency to report memory lapses appears to be related to missing data in an intensive diary protocol, specifically among older adults. Future research should consider the role of age in compliance with intensive protocols and whether prompted surveys reduce the relationship between missingness and self-perceived memory functioning.

Frequency of Memory Lapses is Associated with Less Daily Disruption but More Concern in Everyday Life

Jennifer Renee Turner¹, Jacqueline Mogle¹, Nikki Hill¹, Ruixue Zhaoyang¹, Laura Rabin²

¹Pennsylvania State University, United States of America; ²Brooklyn College, United States of America

Aging is associated with normative and non-normative cognitive changes that may include greater occurrences of memory issues. Older adults may attend to daily evidence of these changes as indicators of greater perceived risk leading to negative cognitive outcomes, such as Alzheimer's disease, yet this association has mixed evidence. Conversely, memory lapses are linked to poorer social, cognitive, and physical functioning (e.g., forgetting one's medication impacts health). The goal of this study is to disentangle negative perceptions (i.e., concern) stemming from memory lapses from impact on daily functioning (i.e., disruption) using two 14-day experience-sampling studies. Across both datasets, a total sample of 561 participants ages 25-93 years (Mage=63.07; 66% women; Myears education=14.86; n=94 with MCI diagnosis) used smartphones to report whether they experienced any retrospective (e.g., someone's name) or prospective (e.g., attending an appointment) memory lapses each day and how disruptive (0-100) those lapses were judged. Lapses were reported on approximately 43% of all assessment occasions; two or more lapses were reported on 15.4% of those occasions. Multilevel analyses indicated a similar pattern for both studies: on days when participants reported more lapses, they also reported greater levels of self-reported concern; disruption also increased with frequency of lapses, but these effects were smaller. Thus, experiencing multiple memory lapses in one day may trigger negative self-evaluations, even in the absence of greater disruption of daily functioning. Overall, concern resulting from memory lapses may heighten fear of cognitive deficits leading to worse functioning compared to direct impact resulting from lapses.

Mobile based experimental paradigms: daily N-back performance and physical exercise

Gregor Wilbertz, Stephan Heinzel

Free University of Berlin, Germany

Using behavioral performance and reaction time (rather than self-report) to measure specific mental processes, experimental paradigms are a cornerstone of psychological research. Recently, they have been implemented on mobile devices. For instance, ecological momentary assessment using mobile task paradigms provides the possibility to track mental processes of individuals within their daily routines. Here, we present data from a 5-minutes working memory task (N-back) completed on participants own smartphones at ten consecutive days and analysed with respect to physical exercise. In N=144 subjects task performance (i.e. % correct trials) in 2-back and 3-back blocks was significantly better within 4 hours after the end of a physical exercise session compared to the individual mean. Specifically, performance declined linearly across 6 hours after the end of the physical activity session until it reached baseline. Regarding reaction time, there was a statistical trend for faster responses in 0-back blocks after sport sessions as well as a significant linear decline in the following hours. These results are in line with the enhancing effect of physical activity on cognitive capacity. This also illustrates the validity of behavioral data collected via smartphone based experimental task paradigms. It is expected that future research will leverage the rich repertoire of established experimental paradigms to investigate mental processes with high methodological standards outside the lab.

Insights into Daily Problem-Solving Experiences and Their Relation to Different Cognitive Ability Performance Scores

André Kretzschmar

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Research on Complex Problem Solving (CPS) ability has provided a considerable body of evidence for its criterion validity in recent years. Previous studies have focused primarily on academic achievement in school and university. However, there is no empirical evidence to date on whether performance in CPS tasks is also relevant to problem-solving in everyday life. To close this gap, in this explorative study about 300 students were asked daily on five consecutive days via ambulatory assessment if and how they had solved an everyday problem in the last 24 hours. For this purpose, almost 50 questions were developed, which are supposed to reflect different problem-solving behaviours. In addition, a broad test battery of cognitive ability tests (i.e., CPS tests and fluid reasoning measures) was used. The results show that there are significant correlations between cognitive abilities and specific problem-solving behaviours. Interestingly, these associations differ in part depending on the performance assessment used in the cognitive ability tests. For example, behavioural assessments of the problem-solving strategies used show different relations with specific problem-solving behaviour in everyday life compared to traditional performance scores (i.e., number of correctly solved tasks). The study, thus, shows for the first time that CPS ability is also significant for the solution of everyday problems - an assumption that has been in the air since the beginning of CPS research. At the same time, the study emphasizes that a differentiated assessment of cognitive abilities is useful and necessary to gain deeper insights into problem-solving behaviour.

Predictors of completion speed for ecological momentary assessment surveys

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The use of intensive, multiple observations in ecological momentary assessment (EMA) allows for study of temporal patterns and momentary processes that influence behavior but may also lead to response fatigue in participants. Careless responding (CR) occurs when participants respond to surveys inattentively. A potential objective measure of CR for EMA is fast survey completion. The purpose of the study was to examine if when the EMA survey was completed and participant personality traits could predict speed of survey completion. In the TIME Study, participants complete 4-day bursts in which random signal-contingent prompts are delivered to personal

smartphones every hour during dynamic waking hours. Participants (N=89, Mage= 22.2, SD= 2.6) completed 15,304 EMA surveys (172 person mean). The Ten Item Personality Measure was completed online during baseline. Survey completion speed was calculated as the amount of time it took participants to complete 11 affect items in the survey and log-transformed in the model. Predictors included time of day the survey was delivered (morning, afternoon, evening), number of survey reprompts (0-2), day in the study (range=1-214), and personality traits (extraversion, emotional stability, open-mindedness, agreeableness, and conscientiousness). Average completion time for the affect items was 49.6 s (SD= 55.0 s). Results of the linear mixed model indicate that response speed was slower for prompts completed in the evening (B=1.05, 95% CI [1.02-1.08] and reprompted surveys (B=1.22, 95% CI [1.19-1.26]). Detection techniques for CR should begin to be applied to EMA research to improve the quality of the data collected in intensive protocols.

Quantifying activity to study healthy ageing

Stylianios Paraschiakos¹, Arno Knobbe², Eline P. Slagboom¹, Marian Beekman¹

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While, nowadays, people generally live longer, they are increasingly facing health issues, leading to a reduction in functionality and quality of life along with an increase in medical costs. Sedentary lifestyles among elderly mount to 10 hrs inactivity per day. Hence combined caloric intake/physical activity interventions are applied to encourage the elderly to follow a more active and healthy lifestyle. These need to be carefully monitored.

The Growing Old TOgether (GOTO) study introduces such an intervention, where a 13-weeks lifestyle program was applied, with a target of 12.5% caloric restriction and 12.5% increase in energy expenditure through an increase in physical activity, in 164 older adults (mean age=63.2 years; BMI=23-35 kg/m²). Quantifying the changes in physical behaviour is of utmost importance in order to investigate their effect on health gains.

Using data from wrist and ankle activity accelerometers (wearables) and machine learning models, we were able to recognize the different activities performed and to report their frequencies and durations both in baseline and after the 13-weeks intervention. To quantify these observations, we built activity profiles that we intend to associate with changes in physiological parameters of health.

Can motivational messages change older adults' momentary motivation of being physically active? A micro randomized-controlled pilot trial in older adults

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Thirty percent of persons aged 65 or older aren't sufficiently physically active. Implementation intentions have been found to effectively enhance physical activity, but effects vary greatly. Motivation is assumed to moderate implementation intention effectiveness. In this study, we investigated whether strengthening motivation before forming an implementation intention, and before enacting implementation intentions can enhance their effectiveness. 35 older adults aged over 64 were randomly assigned to an intervention or a control group. The intervention group first generated 15 motivational messages and then formed implementation intentions to be more physically active. The control group only formed implementation intentions. Participants then wore an accelerometer for 28 days and filled in an electronic evening diary. Participants in the intervention group additionally received their motivational messages on randomly selected days before the planned activity. We will analyze the data with multilevel modeling, to address the nested data structure. If the results are consistent with the postulated hypotheses, participants should be more physically active on days with motivational messages than on days without a message. Further, participants in the intervention group should be on average more physically active and constantly active during the intervention period than the control group. If the hypotheses are confirmed, future interventions could include motivational messages to enhance physical activity.

Age Differences in Affect Reactivity in Response to Daily-Life Stressors

James Walter Miller, Gloria Luong

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Emotion regulation (ER) is broadly defined as the processes by which individuals modulate their affective experiences to best fit their situational contexts. Several developmental lifespan theories suggest that as individuals age, they accumulate expertise on how to effectively employ ER strategies to preserve their emotional well-being when dealing with stressful situations. The goal of the present study was to examine how ER strategy use in response to daily-life stressors is related to positive affect (PA) and negative affect (NA) reactivity (i.e. the difference in an individual's affect when dealing with a stressor, compared to affect in a stressor-

free period), and to what extent this relationship differs by age.

Using data from the Health and Daily Experiences (HEADE) Study, younger adults ($n = 27$, aged 20-35 years) and older adults ($n = 85$, aged 57-90 years) completed seven days of ecological momentary assessment (EMA) surveys administered six times per day at semi-randomized time points via smartphone. Across all participants, the average number of ER strategies used in response to stressors was not related to NA or PA reactivity. However, for older, but not younger adults, average number of ER strategies used was related to greater NA reactivity ($r = .26$, $p < 0.05$) and PA reactivity ($r = -.26$, $p < 0.05$). Thus, using multiple ER strategies may differentially modulate stress reactivity for people of different age groups, with older adults experiencing greater affective reactivity when using more ER strategies compared to younger adults. These findings suggest that the adaptability of ER strategies may vary with age.

RealExperienceInsight: A smartphone app to conduct survey and experimental research

Sabrina Stöckli, Bettina Höchli, Claude Messner

University of Bern, Switzerland

We introduce RealExperienceInsight (REI), an ambulatory assessment smartphone app platform that will enable behavioral and social scientists to remotely administer experiments and surveys in the field. REI will allow researchers to integrate surveys created in third-party software (e.g., Qualtrics, Unipark) and to collect data from smartphone built-in sensors. It will be possible to schedule surveys and reminders, based on dates/times as well as on events (e.g., after 10,000 steps). REI will be able to collect data from other smartphone apps. REI will be available for Android/iOS and works with an easy-to-use interface and requires no programming from researchers.

REI is developed in three stages. First, the outlined app is programmed. Second, external researchers are called in for trial runs (beta stage) to improve REI. Third, we will launch an open call to participate in a project that aims to evaluate and compare REI with conventional methods (e.g., paper-pencil diaries). REI is expected to advance behavioral and social sciences by facilitating the collection of ecologically valid data. REI's user-friendliness helps to tackle some of the digital and computational challenges currently facing researchers interested in society and human behavior and enables these researchers to engage with computationally demanding methods. While the technical specification with professional app developers has been completed, we are currently raising additional money for the comprehensive app programming. Crowdfunding within the scientific community is scheduled.

Using a Telegram Chatbot as Cost-Effective Software Infrastructure for Ambulatory Assessment Studies with iOS- and Android-devices

Michael Barthelmäs, Marcel Killinger, Johannes Keller

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We present an innovative and cost-effective approach to run ambulatory assessment (AA) studies on participants' smartphones via Telegram-Messenger. Our approach works both for Android- and iOS-devices. The population of potential participants in a given country or region consists of all individuals who (a) are in possession of a smartphone, (b) are willing to install Telegram-Messenger, and (c) live in an environment providing constant connection to the internet. In our new approach to AA, participants are asked to subscribe to a Telegram chatbot that provides them with links to brief surveys at specified points in time in their everyday life via short notifications. We developed a userfriendly python script that allows for the flexible editing of the chatbot's settings, e.g., the number of surveys per day. Every common survey software designed for mobile devices can be used to present surveys to participants. This means that data collection takes place exclusively via the selected survey software, not via Telegram. With our approach, AA studies can be carried out among iOS- and Android-users cost-effectively and reliably while data security is ensured. Initial data from a pilot study show that studies of this kind are feasible and the procedure is accepted by participants. Our python script is licensed under General Public License (GPLv3) and therefore freely available and editable: <https://github.com/Raze97/Telegram-Survey-Bot>

A Study of the Feasibility of Non-Contact Ecological Momentary Assessment with Experienced and Naïve Participants

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Background: Smartphone app-based ecological momentary assessment (EMA) without face-to-face contact between researcher and participant ('non-contact EMA') is a valuable data collection method when geographical, time, and situational constraints (e.g., COVID-19 restrictions) prevent in-person research. However, little is known about the feasibility of this method.

Objectives: To run a non-contact EMA study with a sample of mostly older, experienced and naïve EMA participants in order to assess feasibility as a function of (a) past EMA experience, and (b) age.

Methods: Participants were recruited via email invite. Seventy enrolled in the study and 47 completed it. Twenty-six 'completers' had prior EMA experience and 21 were naïve. Participants took part in one week of EMA and an 'exit' interview. Markers of feasibility were enrolment rate, completion/withdrawal rate, response rate, requesting assistance, and willingness to re-participate in non-contact EMA.

Results: The experienced EMA group demonstrated significantly higher enrolment and completion rates than the naïve group, but response rates were similar. Although 14 participants retrospectively reported issues with survey alerts, only 3 sought timely assistance for this issue. Older participants were more likely to report experiencing this issue. All 47 completers said that they would participate in non-contact EMA in future. Post-hoc analyses revealed that IOS users returned a higher response rate than Android users.

Conclusions: Non-contact EMA is feasible, although participants with past in-person EMA experience, younger participants, and IOS users may perform better. Limitations of this study include a small sample size and failure to assess the reasons for non-participation.

Less is more: Resources and arguments for the use of simple one-button wearables in Ambulatory Assessment studies

Selina Volsa¹, Stefan Stieger¹, David Lewetz¹, Bernad Batinic²

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Ambulatory Assessment is a suitable method for bringing research from the lab into more naturalistic settings. However, while repeated measurements have the benefit of higher temporal resolution, they simultaneously create the downside of increasing burden for participants. We present a technical solution for a more optimal implementation of Ambulatory Assessment by aiming to maximize accuracy and participant compliance, i.e., a simple wrist-worn one-button wearable as well as a software implementation to administer this device.

This "less is more" approach should be beneficial for example in event-based sampling designs where participants' responsibility, and hence participant burden is increased. The ease of use of these wearables should reduce participant burden, thereby improving data accuracy and quality.

We test this hypothesis in an ongoing study by comparing the results of a wearable group versus a smartphone group. All participants are instructed to log their laughter events over a period of four weeks. First, preliminary results support our hypothesis. We found a significantly higher number of events being logged in the wearable group, indicating an improvement in data accuracy over the smartphone group.

While this method may not be suitable for more complex study designs, some designs, e.g. those focused on event counting, could benefit from increased compliance, and hence improved accuracy.

Developing a quality assessment tool for Experience Sampling Method items using a Delphi Study methodology

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The Experience Sampling Method (ESM) has exponentially grown in popularity over the last decades. Surprisingly, however, there is currently no gold standard for evaluating the quality of ESM items and many ESM items have not been psychometrically validated. This represents a serious threat to the validity of ESM research. The Experience Sampling Method (ESM) Item Repository is a multi-stage, open science initiative to increase transparency in ESM research by facilitating sharing of ESM items in a public repository. As part of Phase II of the ESM Item Repository project, we have established an international panel of ESM experts to develop a quality assessment tool for ESM items, using a Delphi study methodology. Recruitment of expert panellists took place in October 2020 and the first round of the Delphi process is currently in progress. The preregistered Delphi study comprises three stages. In Stage 1, ESM expert panellists will be

asked about the quality criteria that they use to evaluate ESM items and the resulting criteria will be compiled into a list. In Stage 2, panellists will be asked to evaluate these criteria and provide arguments agreement or disagreement with the criteria. In Stage 3, experts will be given the chance to revise their evaluations based on the arguments provided anonymously by other experts. Finally, agreed criteria will be used to develop a final quality assessment tool for ESM items.

Browsing and Reusing the ESM Item Repository

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¹Eindhoven University of Technology, Netherlands, The; ²Utrecht University, Netherlands, The

The ESM Item Repository is an initiative by Kirtley et al. (2019) to create a catalogue of response items in longitudinal methods, to ultimately understand their properties, usage and quality. In its first 'Warts and all' phase, entries in this repository allow us to consider the range of response items and their parameters in actual research settings, where there is still a lack of a uniform, formal way of describing items. Identical items might be described in different ways by different researchers. Using data from the ESM Item Repository as an example, we consider how a formal, uniform, and computationally tractable representation of items could enable machine readability for various software applications. In this work we show how such a version can be used to generate fully functional questionnaires using our open source HTML5-based protocol-representation and protocol-execution components. This would allow a user to casually browse the repository's contents, as well as export them, either as immediately executable code for reuse in a study, or as data, in various formats, for

entry into other programs. Finally we build an additional component that lets an author deploy a specific item or a questionnaire only by referencing the corresponding paper's DOI and the item's name.

Willingness to participate in smartphone mobile-data-collection studies: Evidence from Switzerland

Alexander Seifert

FHNW, Switzerland

Background: Today, many people use mobile devices such as smartphones for self-tracking, and more and more researchers are using smartphones for studying the daily lives of participants; however, to what extent is the general population willing to participate in smartphone data-collection studies?

Aims: Considering this background, we examine the use of smartphones and the willingness to participate in mobile-data-collection studies. We focus on three questions: (1) How often are smartphones used? (2) Are people open to participating in smartphone studies?

(3) Are those interviewed willing to provide their smartphone-tracked data for research purposes?

Methods: The study, which will be conducted in November 2020, is based on an online and paper-pencil survey of 1,200 people aged 16 years and older living in Switzerland. The survey will be written in all Swiss languages, covering all parts of the country.

Results and Conclusions: Since the survey has not yet been conducted at the time of submission, no results can be presented yet. The presentation of results will take place at the conference.

Exploring reliability and effect sizes of digital biomarkers for Parkinson's disease in the m-Power dataset

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Objective

Digital biomarkers (DB) measures are a promising technology for symptom monitoring in Parkinson's disease (PD). Despite extensive application in recent studies test-retest reliability and longitudinal stability of DB has not been well addressed in unsupervised and self-administered setting.

Method

We utilized the largescale m-Power dataset to establish the test-retest reliability and longitudinal stability of features of gait, balance, voice and tapping tasks in PD patients and healthy volunteers. Mann Whitney U test were computed to find the most discriminative ($p < 0.05$) features between PD and healthy volunteers (HC) at baseline. Intraclass Correlation Coefficients (ICC) were then computed to estimate the test re-test reliability and find the most reliable subset of features. Repeated-measure ANOVA were applied to test for longitudinal stability in PD and HC as well as for group-by-time interactions, and PD medication effects for the most reliable features for each task.

Result

Among the most discriminative features of each task, features selected from tapping and voice tasks had good to excellent test-retest reliability and medium to large effect sizes. Nevertheless, analysing the longitudinal stability revealed significant alterations over time across a variety of features and in particular for the tapping task. Only few features across all tasks were sensitive to medication effects.

Conclusion

Our results indicate the need for further development of more controlled, sensitive and reliable DBs for application in self-administered remote studies in PD patients. Motivation, learning and medication may cause a variation in the performance that may hamper the applicability of DB measures in longitudinal settings.

A Parallel Test of the SCRAM-CAM Ankle Monitors Ensuring Accuracy and Reliability.

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Background. Studies validating the transdermal alcohol concentration (TAC) as measured by the SCRAM-CAM, test the monitor against self-reports or breath alcohol concentration (BrAC). This study aims to provide further evidence of the accuracy of the TAC as measured by SCRAM-CAM monitors by testing two monitors in parallel.

Methods. Participants (N=23) received four standard drinks while wearing one SCRAM-CAM on each ankle measuring TAC. Gender and age information was recorded, and weight and height measures were taken to calculate BMI.

Results. A positive correlation between the TAC data points in general ($r=.699$), Peak ($r=.579$), and area under the TAC curve (AUC) ($r=.554$) was observed. Random slope multilevel regression models revealed that the strength of the relationships between the TAC values were not significantly influenced by sex, age, and BMI.

Conclusions. Results show that TAC measured by SCRAM-CAMs worn on the left and right showed a fair correlation, but the correlations between Peak and AUC values were unexpectedly low. This study highlights a concerning amount of room for error, which may have significant implications on the use of the SCRAM-CAM. Further work is needed testing the reliability of the TAC data as measured by two TAC monitors.

Associations Between Daily Activity Self-Appraisals and Domains of Neurocognitive Impairments: An Ecological Momentary Assessment (EMA) Study

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Objective: To investigate the impact of neurocognitive impairments (NCIs) on self-appraisals of cognitively (i.e., instrumental activities of daily living and objective activities) and socially demanding activities in participants' everyday environments.

Method: Community-dwelling individuals (N=168) with mild-to-moderate stroke (age=60.6±10.9 years; time since stroke=3.7±2.6 years; 54.2% male) completed a lab-based neurocognitive assessment battery to identify subdomain-level NCIs in: language, episodic memory, working memory, executive function, processing

speed, and visuospatial function. Participants self-appraised daily activities via EMA on a 1-to-7 scale for 14 days, 5 times daily. We calculated grand means of daily activity self-appraisals and estimated effect sizes to compare magnitudes of self-appraisal differences between groups with and without NCIs.

Results: 87% of participants demonstrated NCI in at least 1 cognitive subdomain. Individuals with NCIs in episodic memory, executive function, working memory, and processing speed reported increased assistance needed to complete cognitively and socially demanding activities, with small-to-moderate effect sizes ($d=0.29-0.69$). The largest effect sizes were found in the working memory subdomain ($d=0.69$). Participants with and without language and visuospatial NCIs demonstrated no differences in self-appraisal of assistance

needed to complete cognitively and social demanding activities.

Conclusion(s): Stroke survivors living in the community manage enduring NCIs in episodic memory, executive function, working memory, and processing speed that impact ability to participate in cognitively and socially demanding activities. Rehabilitation researchers and clinicians may consider post-stroke interventions targeting these functions to improve survivors' ability to independently perform complex activities.

The effect of physical activity in primary school on observed learning behaviour, self-reported learning experiences, and academic emotions

Christina Heemskerk

University of Bern, Switzerland

Aim: to investigate the relationship between self-reported learning experiences, physical activity (PA), and learning behaviour in primary school pupils.

Method: 101 children (Mage 9.3, SD 0.6, 60 females) took part in 6 intervention sessions. They reported learning experiences (enjoyment, difficulty, tiredness, positive and negative affect) at the start, middle, and end of two classroom lessons, separated by a Physical Education lesson. They were observed every 30s during classroom lessons, and behaviour recorded as 'on-task', 'passive off-task', or 'active off-task'. Participants wore an accelerometer for 24h leading up to every session. We used multilevel SEM to analyse intra- and inter-individual differences in behaviour, learning experiences, and PA.

Results: Inter- and intra-individual factors differentially affected children's learning experiences and behaviour. Whilst BMI z-score positively predicted of passive off-task behaviour, gender strongly predicted of both on-task and active off-task behaviour. Year group negatively predicted enjoyment of PE lessons and the post-PE classroom lesson. Regularly active children found PE lessons less tiring and more enjoyable, and reported less classroom tiredness. Situational fluctuations in PA, learning experiences, and behaviour were recorded. Lesson enjoyment, self-reported tiredness, and positive and negative affect influenced classroom behaviour. Light, moderate, and vigorous PA during PE lessons influenced subsequent learning experiences and behaviour.

Conclusion: PA can be a tool to increase pupils' on-task behaviour. Acute PA influences behaviour both directly and indirectly through experienced positive and negative affect, enjoyment, and tiredness. Moreover, when children are regularly active it alters their learning experiences in school; they perceive less tiredness and more enjoyment.

Event-triggered ambulatory assessment of sedentary behaviour among military college students

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Objective: To map environmental, behavioural, and social context of sedentary behaviour among military college students, using event-triggered ambulatory assessment.

Methods: Eleven military college students (age 20 to 25 years, all males) participated in a 7-day ambulatory assessment of their sedentary behaviour. All participants wore a wrist-worn Fitbit Inspire HR activity monitor wirelessly connected to the mobile app HealthReact installed on their smartphones. Whenever the Fitbit detected a sedentary episode of at least 30 minutes, it triggered a short questionnaire consisting of four questions mapping the environment ("Where are you?"), behaviour ("What are you doing?"), social context ("With whom?"), and physical feelings (momentary fatigue).

Results: A total of 360 questionnaires (range 11 to 44 per participant) were triggered, of which 293 were responded (81%; range 48% to 100% per participant). Two-thirds of all sedentary episodes happened at home (195 of 293, 67%) where sitting was mostly associated with leisure screen time (64 of 195, 33%), eating (38 of 195, 19%), and school-related screen time (32 of 195, 16%). The remaining sedentary episodes happened in public transport (13%), at school (9%), and in public spaces (7%). Half of all sedentary episodes happened while participants were alone (49%). There was no effect of the context on the participants' level of momentary fatigue.

Conclusion: Understanding the context of sedentary behaviour of military college students can help to design future effective interventions targeting sedentary behaviour in this population.

Associations between daily handwashing and incidence rates in Germany during the COVID-19 pandemic

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Objectives. Effective handwashing can prevent infectious diseases, including SARS-CoV-2 infections. During the COVID-19 pandemic, the frequency of handwashing might be linked with factors reflecting the severity of the pandemic such as COVID-19 incidence rates. This study aims to investigate how the frequency of daily handwashing changes across 12 weeks from summer until autumn 2020 and how this change is moderated by daily COVID-19 incidence rates.

Design. As secondary analyses of an ecological momentary assessment study, $n = 53$ German participants were observed between 12th July and 6th October 2020. The frequency of daily handwashing was assessed using daily end-of-day questionnaires. Daily COVID-19 incidence rates in Germany were retrieved from the national institute for public health.

Methods. Multilevel models were fit, followed by analyses determining the moderator's region of significance.

Results. COVID-19 incidence rates in Germany were low at the beginning of data collection but increased over time up to 2639 infections on 6th October. On average, participants significantly increased their daily handwashing frequency by 1.32 across 12 weeks, which was moderated by daily incidence rates. Post-hoc analyses revealed positive same-time handwashing associations with incidence rates up to 26th August (with 1576 infections per day), whereas this turned non-significant for later study days.

Conclusions. Due to its high presence in the media, people in Germany are well aware about COVID-19 incidence rates, which could be one factor for participants' increases in handwashing. However, significant handwashing-incidence rate associations can diminish over time. Underlying psychological mechanisms of these associations should be further tested.

Daily links between perceived enjoyment and the enactment of hand washing plans: Does social context matter?

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Background: Handwashing can prevent the transmission of infectious diseases, including SARS-CoV-2. Forming an action plan in which handwashing is linked to new situational cues (e.g., arriving at work) can help to promote engagement in context-specific behavior (i.e., plan enactment). For sustainable behaviour changes, individual (e.g., perceived enjoyment of the behaviour) and social factors are highly important. In the context of handwashing before and during the second wave of the COVID-19 pandemic in Germany, we examined how links between perceived enjoyment and the enactment of handwashing plans were moderated by factors of social context.

Methods: In secondary analyses of an ecological momentary assessment study across 12 weeks, individuals initially formed an action plan linking their handwashing to a new situational cue. A total of 79 participants (Mage=24, range=18-48) reported daily on their plan enactment and perceived enjoyment of hand washing. Social context comprising descriptive norms and received social support towards

handwashing was assessed four times throughout the study.

Findings: Two-level models showed that perceived enjoyment was linked to more plan enactment of daily hand washing. Factors of social context moderated the

link between perceived enjoyment and plan enactment, indicating that perceived enjoyment was a stronger correlate of plan enactment when lower levels of descriptive norms and received support were reported.

Conclusion: Results may be interpreted as a compensatory effect: When individuals perceive their social context as less influential for their handwashing, adherence to their self-set handwashing plan might be more strongly linked with factors of intrinsic motivation such as perceived enjoyment.

Development of mental imagery-based Ecological Momentary Intervention to increase reward sensitivity

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Resilience has emerged to a key construct in the area of stress, adversity and mental health. It is of great relevance in the current global COVID-19 pandemic, which may lead to increases in the prevalence of mental disorders. There is an urgent need to develop and disseminate therapeutic strategies to help people maintain their psychological well-being. However, very often the capacity of the therapeutic facilities is limited, and face-to-face meetings are not being held due to safety measures. One of the answers to the current situation is the Ecological Momentary Intervention (EMI) approach, allowing for delivering treatment in the daily life of patients and clients, outside of the healthcare facilities, for instance with the use of smartphones and mHealth apps. Here we describe the development and feasibility testing of a new app targeting reward sensitivity to increase mental health and resilience. Development of our app is based on recent findings that assign reward sensitivity to a key role as a resilience factor. Imager is an EMI that consists of repeated training sessions, involving mental imagery of both past and future rewarding activities based on scenarios adapted directly from the user's life, and of a self-monitoring module. Mental imagery training has been proved effective in treating, for instance, depression, and is known as a "cognitive vaccine" against affective disorders. Imager is currently undergoing feasibility testing, of which we will present the results and discuss their implications as well as the potential dissemination strategies.

Effects of Chronic Ethnic Discrimination in the Daily Life of Turkish Immigrants Living in Austria: 30-day Ambulatory Assessment Study

Andreas Goreis, Urs M Nater, Ricarda Mewes
University of Vienna, Austria

Objective: Chronic ethnic discrimination is associated with negative mental and physical health outcomes in ethnic minority groups. It is assumed that suffering from repeated discriminatory events leads, over time, to psychological consequences such as higher perceived stress, higher negative affect, and lower positive affect. Higher stress reactivity to non-discriminatory stressors, such as daily hassles, as well as anticipation and avoidance behavior regarding discriminatory events, may further contribute to the overall burden for affected individuals. We investigated the impact of chronic ethnic discrimination and discriminatory events in the daily lives of Turkish immigrants living in Austria, using an ambulatory assessment design.

Methods: N=90 male Turkish immigrants (n=60 who experienced chronic discrimination and n=30 who experienced rare discrimination) were equipped with iPods and reported discriminatory events for 30 days. Perceived stress, perceived discrimination, negative and positive affect, daily hassles, anticipation and avoidance behavior, as well as rumination with regard to discriminatory events were assessed each evening. Multilevel analyses were conducted.

Results: In preliminary analyses of n=16 participants, a total of 27 discriminatory events were reported. Event-based analyses showed that on days when discriminatory events occurred, participants in both groups reported a higher reactivity to daily hassles (p=.028) and higher avoidance behavior (p=.001) than on days when no events occurred. Detailed between-group analyses and time-lagged models will be reported upon completion.

Conclusion: Investigations of the direct and indirect psychological consequences of discriminatory events in daily life are important and may promote the understanding of the link between chronic ethnic discrimination and health.

Age Differences and Similarities in Nostalgia Frequency and Associated Affective Outcomes Using a Lifespan Sample

Jennifer Renee Turner¹, Jennifer Tehan Stanley²
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Nostalgia is conceptualized as a bittersweet, autobiographical memory experience that has been theorized to increase across the lifespan (Batcho, 1995; Wildschut et al., 2006). Though nostalgic remembrance is viewed as ubiquitous, its specific features (e.g., frequency and resultant affect) have primarily been explored using retrospective measures. The present study sought to address this prior limitation by examining the theorized relationship between age and nostalgia using a lifespan sample (N = 108; ages 18-78 years; 60% women) in a two-week experience-sampling study. Participants were prompted to respond twice-daily to a survey on their smartphone. Participants indicated whether they had experienced nostalgia within the last 12-hours and reported the emotional outcomes associated with the nostalgic experience using the PANAS (Watson et al., 1988). Multilevel analyses found support for the increasing rates of nostalgia at every life stage: young adults reported nostalgia approximately 11% of all surveys, middle-aged 26%, and older adults 41%. Experiencing nostalgia was further associated with both positive and negative affective outcomes for all ages, suggesting nostalgia evokes emotional blending. These results are interpreted through a socioemotional framework and provide foundational support for the differential functions of nostalgia with age, including refinement of emotional blending (e.g., Charles et al., 2018) and fostering perceptions of social support.

Conference Agenda

Session

P1-D2: Paper Session 1 - Day 2 (Depression)

Time: Thursday, 01/July/2021: 4:45pm - 6:00pm

Presentations

Overnight affective dynamics and sleep characteristics as predictors of depression and its development

Olga Minaeva, Sandip V George, Anna Kuranova, Marieke Wichers, Harriette Riese, Sanne H Booij

University of Groningen, University Medical Center Groningen, Groningen, the Netherlands Study Objectives

We examined i) the difference in overnight inertia (carry-over of evening affect to the next morning) for positive (PA) and negative affect (NA) between individuals with a past, current and no depression; ii) how sleep duration and quality influence overnight affective inertia in these groups, and iii) whether overnight affective inertia predicts depression development.

Methods

We used data of 579 women from the East-Flanders Prospective Twin Survey. For aim 1 and 2, individuals with a past (n=82), a current (n=26), and without a (lifetime) depression (n=471) at baseline were examined, and for aim 3 individuals who did (n=58) and did not (n=319) develop a depressive episode at 12 months follow-up. Momentary affect was assessed 10 times a day for 5 days. Sleep was assessed with sleep diaries. Affective inertia was operationalized as the influence of affect_{t-1} on affect_t. Linear mixed-effect models were used to test the hypotheses.

Results

Overnight affective inertia was not associated with depression, neither was it differently associated with sleep characteristics in the different depression groups. However, sleep duration and quality were more negatively associated with morning NA (controlling for prior evening NA) in both depression groups and the currently depressed group, respectively, compared to the never depressed group. Overnight affective inertia did not predict the development of depression at

follow-up.

Conclusions

Depression and sleep characteristics might be more related to mean affect levels rather than to more complex emotion dynamics measures. Replication of these findings, preferably with time-series across more days are needed.

Experiences with an ecological momentary intervention involving self-monitoring and personalized feedback in depression: a qualitative study

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Whereas several studies have focused on the acceptability, feasibility, and efficacy of Ecological Momentary Interventions (EMI) comprising systematic self-monitoring and personalized feedback in the treatment of depression, very little is known about how patients perceive the usefulness of such EMIs. A recent trial in patients with a clinical depression (ZELF-i) did not find statistical evidence that an EMI impacted clinical or functional outcomes beyond the effects of regular care. In contrast, 86% of the participants who completed the intervention would recommend it to others. In this add-on study, we used in-depth interviews (n = 20) to better understand the EMI's personal and clinical benefits. A thematic analysis of the interviews generated six areas of impact. In line with the trial results, few patients reported behavioral changes or symptom improvement over time (self-assessments mainly amplified momentary mood). The most often mentioned benefits were an increase in self-awareness (e.g., taking more notice of present experiences), insight (e.g., better understanding of mood dynamics), and self-management (e.g., stronger sense of control over complaints). A minority of the participants reported that the EMI instilled more structure in their days. This study indicates that the EMI might have brought patients benefits that were not adequately covered by the trial's main outcome domains. This suggests we are currently using too limited a view when evaluating EMIs.

Variations in the complexity of actigraphy data and its relationship to depression.

Sandip Varkey George, Yoram K Kunkels, Arnout C Smit, Harriette Riese, Sanne H. Booij, Marieke C Wichers

University Medical Center Groningen, Netherlands, The

The relative ease of measurement and low patient burden associated with estimation of physical activity data makes it a powerful dataset for ambulatory assessment of individuals. These advantages imply that changes in physical activity patterns in these datasets may be determined in real time. Such changes in physical activity levels are one of the most recognizable features of depression.

In this work we conduct recurrence quantification analysis to explore how recurrences of patterns in physical activity differs between depressed and non-depressed individuals, using data collected as part of the MOOVD project. We find significant differences ($p < .05$) in multiple recurrence based complexity measures between the depressed and non depressed groups. Our results seem to suggest that the mean duration of recurrent physical activity patterns and the diversity associated with these periods are less in depressed individuals as compared to a non-depressed group.

We will also present preliminary results on whether the changes in these quantifiers precede a transition towards a depressive episode. For this we use a sliding window approach to calculate recurrence quantifiers from actigraphy data leading up to a depressive transition. This analysis is currently being conducted using data from the TRANS-ID project.

Elucidating the comorbidity of PTSD and depression: An examination of bidirectional dynamic relations in daily life

Talya Greene^{1,2}

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While it is known that PTSD and depression are highly comorbid, there is little known about the dynamic relationships between these two phenomena in daily life. The current study examined the micro-longitudinal bidirectional relations of PTSD and depression using experience sampling data in order to elucidate their comorbid relations.

A general population convenience sample of participants (n=91) who had previously been exposed to at least one traumatic event, reported twice daily for 17 days on PTSD and depression symptoms via their smartphone. A bivariate VAR(1) dynamic structural equation model was used to examine the cross-lagged associations between these two diagnostic constructs (using Mplus vs. 8.1).

There were strong contemporaneous associations between the symptomatology of the two phenomena. Examining the temporal relations,

it was found that within-person elevations in PTSD symptoms predicted within-person increases in depression symptoms at the next measurement point (~12 hours later), but elevations in depression symptoms did not predict subsequent elevations in PTSD symptoms. This points to potential mechanisms of comorbidity and suggests that worsening PTSD symptoms could be the driver of this relationship. This has implications for the way that we both conceptualise and treat comorbid PTSD and depression.

Smartphone usage, burnout and family time: A study protocol for a mobile sensing - experience sampling study

Anne Milek, Katharina Salo, Nicolas Hoberg, Lisanne Pauw

University of Münster, Germany

The digitalization is rapidly changing family environments, however, not much is known how using the smartphone in everyday life alters couple and family dynamics on a daily basis. In this talk, we would like to present a study protocol, about a currently ongoing project using objective (mobile sensing) and subjective means (ESM) of assessing the bidirectional effects of smartphone usage and the quantity and quality of shared family time. We plan to recruit 180 families and (a) monitor their daily everyday family interactions in naturalistic settings,

(b) assess physiological stress markers (e.g., heart rate variability), as well as (c) assess subjective measures with regard to individual (e.g., depressive symptomatology, emotion regulation), couple (e.g., co-parenting skills, intimacy, dyadic coping) and juvenal functioning (e.g., child adjustment problems). The couples will install the movisensXS app, which uploads sensor information on physical proximity, captures ambient sounds, and allows study-specific self-report entries multiple times a day (6 x) on the variables of interest. With this project, we hope to get valuable insights under which conditions the use of smartphones might enrich or impair family interactions to derive specific recommendations for couples and families.

Conference Agenda

Session

P2-D2: Paper Session 2 - Day 2 (Health Behavior Change)

Time: Thursday, 01/July/2021: 4:45pm - 6:00pm

Presentations

Associations between intention-behaviour gaps of eating and physical activity in dieting young adults

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Introduction: Maintaining or reducing body weight goes along with intentions to limit food intake and to increase energy expenditure (e.g. by increasing physical activity) to reach a neutral or negative energy balance. However, such dieting intentions are not always translated into behaviour, resulting in intention-behaviour gaps (IBG). The present study aimed at examining the relationship between eating- and physical activity-IBG and at testing a moderating role of individuals' perceived dieting success, which might influence the implementation of both behaviours.

Methods: After completing the Perceived Self-Regulatory Success in Dieting Scale (PSRS), 81 dieting individuals (86% female) took part in a 14-day smartphone-based ecological momentary assessment study. Every evening, they retrospectively reported the extent of goal- congruent eating behaviours (EB) and physical activities (PA) for the respective day and estimated their intentions to engage in these two behaviours for the upcoming day. By subtracting realised behaviours from intentions, we calculated IBG for EB and PA and further analysed the data with multilevel models.

Results: Larger EB-IBG were associated with larger PA-IBG. Moreover, this association was significantly moderated by the PSRS, in that especially unsuccessful dieters reported larger EB-IBG on days with larger PA-IBG.

Discussion: Deviations from intentions in EB and PA appear to co-occur in dieting individuals, who might have similar difficulties in implementing both health relevant intentions, probably because of superordinate factors, such as daily stress or self-efficacy. Furthermore, less successful dieters might have applied an all or nothing principle, whereas more successful ones might have been more flexible in their implementations.

Maybe so, maybe no? – Temporal (in)stability of smokers' intention to quit as a key component of self-regulation

Christopher M Jones, Benjamin Schüz

University of Bremen, Germany

Temporal stability of intentions has been viewed as a key component of individuals' ability to guide behavior over time and in the face of potential challenges. However, studies to date have relied on only few measurement occasions to assess stability and neglected potential environmental challenges (e.g. cues). We use data from two Ecological Momentary Assessment (EMA) studies to assess stability with higher temporal granularity and examine whether stability moderates the intention-behavior relationship by altering individuals' stimulus control.

107 daily smokers logged every cigarette smoked and reported momentary intentions to quit, individual and environmental cues right after smoking and at random (non-smoking) time points during the day. Trait self-control and nicotine dependence were assessed at baseline.

Multilevel logistic regression models show no association of day-level intention or intention stability (operationalized as Mean Squared Successive Distance; MSSD) with cigarettes smoked per day. We additionally computed AUC-ROC values (for a model predicting type of assessment (smoking vs random) from momentary cues) to assess day-level stimulus control. Here, intention stability moderated the association of intention and stimulus control with higher instability and stronger intentions associated with more control. Higher mean intention stability was associated with less trait self-control.

While we do not find intention stability to moderate the intention-behaviour relationship directly, it might play a key role by altering stimulus control and thus the self-regulatory process shaping behavior. Surprisingly, we find instability associated with more stimulus control. In contrast to former conceptualizations, instability might thus be interpreted as motivational flexibility / adaptability aiding self-regulation.

Smoking cessation with smartphone applications: Preliminary results of a randomized controlled trial

Philipp Schwaninger, Corina Berli, Urte Scholz, Janina Lüscher

University of Zurich, Switzerland

Background: Smoking remains one of the biggest public health threats. Smartphone apps offer new promising opportunities for supporting smoking cessation in daily life. This randomized controlled trial (RCT) investigated the effectiveness of an app that encourages smokers to quit smoking with the help of a social network member ('buddy') in daily life.

Methods: A total of 162 adult smokers participated in this RCT. Around a self-set quit date (7 days before the quit date and 20 days after) and 6 months later, participants of the intervention (IG) and control group (CG) reported on daily smoking abstinence and cigarettes smoked per day (CPD) in end-of-day diaries. Daily smoking abstinence was verified via daily exhaled CO assessments. In addition to the assessments, the IG used the SmokeFree buddy app, a multicomponent app that in particular facilitates social support from a buddy.

Findings: Both groups significantly reduced their CPD from the baseline to the follow-up diary phase. Multilevel analyses revealed no significant intervention effect on self-reported and CO-verified daily smoking abstinence at the quit date, 3 weeks and 6 months later. However, in the IG CPD was decreased at the quit date and 3 weeks later compared to the CG.

Discussion: This is the first study testing the effectiveness of the SmokeFree buddy app. The primary outcome measure was verified with daily CO assessments and the intensive longitudinal data allowed to investigate temporal developments of intervention effects. Preliminary results are discussed in the context of apps as digital interventions to promote smoking cessation.

Metacognition in Daily Self-Control Conflicts: Results from Two Experience-Sampling Studies

Sebastian Bürgler¹, Rick Hoyle², Marie Hennecke¹

¹University of Siegen, Germany; ²Duke University, USA

In self-regulated learning, metacognition has been recognized as an important factor for success. Here, metacognition includes metacognitive knowledge (one's knowledge about one's own cognition or cognition in general) and metacognitive regulation (controlling one's thinking or learning, for example through monitoring one's behavior and the effects it produces). We investigated the role of metacognition in a different domain, namely for the successful resolution of daily self-control conflicts, that is, conflicts where a person has to initiate an aversive task, persist in an aversive task, or inhibit an unwanted impulse in response to a temptation. In a 10-day experience sampling study, eight times per day, N = 226 participants reported on experienced daily self-control conflicts, their metacognitive knowledge about these conflicts, their use of metacognitive regulation (monitoring) with regards to these conflicts, and how successful they were at resolving them. Results support the hypothesis that both metacognitive knowledge with regard to daily self-control conflicts as

well as self-monitoring during these conflicts is associated with a higher level of self-reported success in dealing with them. In a second experience sampling study with N = 503 participants, we replicated these findings and additionally investigated the effects of the two remaining components of metacognitive regulation (planning for an upcoming self-control conflict and evaluating and reflecting upon a past self-control conflict). Results support the hypothesis that all aspects of metacognition are related to the self-reported success in handling daily self-control conflicts.

Distraction during Consumption and Hedonic Compensation

Stephen Lee Murphy¹, Floor van Meer², Henk van Steenbergen², Lotte van Dillen², Wilhelm Hofmann¹

¹Ruhr-University Bochum, Germany; ²Leiden University, Netherlands

Distraction during consumption (e.g., eating, media/audio) may hinder consumption enjoyment and thus important outcomes including the amount consumed. Yet, it remains unknown whether any hedonic shortfall resulting from distracted consumption may stimulate an increased need for consumption after the consumption episode - to compensate for this hedonic shortfall. This pre-registered study (<https://osf.io/cuzvt/>) examines this possibility by investigating whether distracted consumption promotes a greater need for immediate gratification after consumption has finished and a shorter period until subsequent consumption. This study will also examine whether individuals experiencing greater distraction on average during food consumption will, via the proposed mechanisms, evidence greater Body Mass Index increases from baseline to post-assessment four months later. The 220 participants recruited to this study will receive 49 questionnaires over seven days (10,780 questionnaires across participants) via SurveySignal and Qualtrics online platforms. Multi-level Structural Equation Modelling and Network Analyses will be used to assess proposed effects. Data collection is currently ongoing, with data fully analyzed by March 2021. Interestingly, pilot data supports our hypothesis that more distracted consumption promotes hedonic compensation; increased distraction during consumption predicted lower than expected consumption enjoyment ($r = -0.20$), which predicted lower consumption satisfaction ($r = 0.28$), which predicted a greater need for more gratification post-consumption ($r = -0.31$), which predicted a shorter period until subsequent consumption ($r = -0.17$). The present study findings will contribute to a burgeoning literature demonstrating the potential consequences of distracted consumption, and will help better inform policymakers aiming to reduce overweight and obesity in society.

Conference Agenda

Session

S1-D2: Symposium Session 1 - Day 2

Time: Thursday, 01/July/2021: 4:45pm - 6:00pm

Presentations**On the Path to Well-Being: Investigating the Role of Everyday Behaviors**Chair(s): **Ramona Schoedel** (LMU Munich, Germany)Discussant(s): **Felix Schönbrodt** (LMU Munich)

The day begins with the alarm clock ringing. Still tired we turn it off, annoyed that we cannot sleep in. At breakfast we argue with our partner because he wants to meet up for lunch, but we would rather spend the time alone at the yoga class. On the way to work we listen to our favorite playlist to lighten our mood and we look at the Facebook feed. As soon as we see our friends' sports posts, we decide to skip lunch and instead take our yoga routine to the next level.

This is what an ordinary morning in our everyday lives could look like, including the ups and downs of our affective well-being. However, psychological research has neglected the role of everyday behaviors for decades. Unobtrusive data collection methods using smartphones open the path to various new study designs, some of which we will present in our symposium.

More specifically, in talk 1 we use mobile sensing data to investigate day-night activity patterns. In talk 2, we present a dyadic experience sampling approach focusing on partners' regulation strategies when dealing with interpersonal motivational conflicts. In talk 3, we combine active and passive sensing to study music choices. Finally, in talk 4 we illustrate how interval contingent experience sampling can be used to investigate social media use and perfectionism. The talks highlight the importance of investigating the role of everyday behaviors as illustrated in our introductory example, and their role on the path to individuals' well-being.

*Presentations of the Symposium***Social Jetlag in the Wild: Intra- and Interindividual Differences in Day-Night Activity Patterns****Ramona Schoedel¹, Florian Pargent¹, Markus Bühner¹, Clemens Stachl²**¹LMU Munich, ²Stanford University

Sleep has long been recognized as one of the most essential human behaviors. For example, people show differences in sleep-wake timing on both an inter- and intra-individual level. A well-known phenomenon in this context is the so-called social jet lag: People adapt their sleep-wake behavior during the week to their social obligations. However, this adaptation does not correspond to their naturally occurring sleep-wake timing. As a result, they accumulate sleep debt during the week, which they then make up for at the weekend. So far, the majority of studies have focused on self-report questionnaires, which make it difficult to investigate how inter- and intra-individual differences in sleep-wake timing unfold in daily life. Therefore, in this talk we will propose mobile sensing as a complementary approach, since smartphones now allow to record high-frequency behavioral data from everyday life over long periods of time.

For this purpose, we analyzed the data of 597 participants from a 30-day data logging study with Android smartphones. In a first step, we extracted behavioral indicators for day-night behavior patterns. Based on these variables, we investigated whether demographics, personality traits, and intra- and interindividual differences in the duration of night-time smartphone inactivity during the week are related to the duration of night-time smartphone inactivity at the weekend. To raise awareness of the novelty of the smartphone sensing approach and its limitations, we report our results depending on the many degrees of freedom we were confronted with during data preprocessing.

On different regulation strategies of closeness and distance in intimate relationships**Caroline Zygar-Hoffmann¹, Birk Hagemeyer², Sebastian Pusch², Felix Schönbrodt¹**¹LMU Munich, ²FSU Jena

How do individuals work out what portion of their free time is dedicated to their intimate relationships (e.g., sharing time with their partner, being close to them) compared to worthwhile alternatives (e.g., pursuing a hobby independently, having time for oneself)? The fit between the partners' needs surely plays a role in this case (when both have a strong momentary desire to be together, this probably will not cause a conflict), but in case of a misfit of momentary desires, couples might use different ways of inter-individually regulating those aspects in the relationship that concern both partners. Similar to the "dominance" and "synchrony" regulation strategies introduced by Bischof (2014), some couples could develop a routine to focus on the needs of the more dominant, the more vulnerable, or the generally needier partner in the relationship, while others might seek a balance between both partners' needs and work out solutions based on the strength of the different needs. The use of different regulation strategies might then be a factor explaining differences in relationship satisfaction between individuals, demonstrating the need for finding constructive solutions to satisfying individuals' needs in the case of motivational conflicts.

The talk uses data from experience sampling studies spanning up to four weeks with a minimum of 61 participating couples, that assessed the partners' state and trait desires, situational constraints, as well as the distribution of time spent together throughout the day. The results highlight the occurrence of different regulation strategies in relationships and their consequences for individuals' satisfaction.

Does your music choice reflect your current emotional state?**Larissa Sust, Ramona Schoedel**

LMU Munich

Listening to music is a ubiquitous behavior in our everyday lives. Given the large variety of musical styles, psychologists have long aimed to discover what our musical choices reveal about ourselves. In the past two decades, this research has focused on whether music preferences are related to interindividual differences in personality. However, these studies reported only small and inconsistent effects. Furthermore, stable personality traits can hardly account for the observation that an individual's music preferences are not stable but vary over time and situations. Therefore, we take a complementing perspective assuming that variable psychological states might play a role in music preferences. In particular, the choice of music might reflect emotional states right before music listening. For example, the listener's current mood might be mirrored by the valence of the music they choose.

Our talk explores these assumptions based on a naturalistic study ($N > 150$) by integrating two forms of ambulatory assessment into a custom smartphone application. We extracted participants' music choices from their smartphones' music listening records via a mobile sensing functionality. In addition, we collected participants' self-reported emotional states prior to music listening by experience samplings. Over a study period of 14 days, this procedure provided us with repeated measures of participants' matched music-choice and mood units. We will present and discuss results regarding different facets of music choice, e.g., the valence or energy of music. This study grants first insights into the relationship between individuals' natural music listening and their emotional states.

Social Media Use and Perfectionism in Daily Life**Fenne große Deters, Margarita Gladkaya, Hanna Krasnova**

University of Potsdam, Weizenbaum Institute

In the last years, both social media use as well as perfectionism of students have increased (Curran & Hill, 2019; ourworldindata, 2020). Content on social media is biased towards an overly positive presentation of oneself and one's life (Reinecke & Trepte, 2014). This warrants the question, whether exposure to social media influences perfectionistic tendencies. Perfectionism can have a heavy toll on well-being (Hill & Curran, 2015). Therefore, it is important to understand whether social media use contributes to rising levels of perfectionism.

A 12-day experience sampling study was conducted. Experience sampling allows us to study feelings and behaviors as they happen in daily life and helps to distinguish between inter- and intraindividual effects. Participants received invitations to short surveys at random times within six intervals between 10:00 in the morning and midnight. Participants were asked to report how much they had used Instagram and Facebook since the last survey. Three items captured different facets of state perfectionism. The final sample consists of 7411 data points across 124 individuals. Applying multilevel modeling, we tested if social media use in the previous period predicts the current state of perfectionism, when controlling for state perfectionism in the previous period. Between-day lags were excluded from the analysis. Results indicate that both Instagram as well as Facebook use predict increased levels of state perfectionism.

Integrating short-term fluctuations and between-person differences: Methods and empirical applications

Chair(s): Andreas B. Neubauer (DIPF | Leibniz Institute for Research and Information in Education, Germany)

Discussant(s): Gertraud Stadler (Charité - Universitätsmedizin Berlin)

In various areas in psychology, the notion that daily experiences are an important ingredient to understanding between-person differences has gained momentum. The talks of this symposium focus on the questions how between-person heterogeneity in within-person phenomena can be assessed and how this heterogeneity can be linked to between-person differences in traits and future outcomes. Pasquini et al. examine if compliance rates in an ambulatory assessment run-in period (i.e., a test period before the actual ambulatory assessment) predict study compliance in a measurement burst design. Utilizing a Bayesian approach, they show that run-in compliance predicts across-burst study compliance. Wrzus et al. tested the hypothesis that longitudinal changes in the within-person coupling of stress and negative affect are associated with longitudinal changes in trait Neuroticism in a measurement burst. Their results confirmed this expectation and showed that the size of this association varied across age. Also targeting the link between neuroticism, daily hassles and daily distress, Bolger et al. illustrate how heterogeneity in causal within-person effects can be approached using 2-1-1 mediation models. Lastly, Neubauer et al. introduce a model to integrate momentary experiences and longitudinal change. They use simulated and empirical data to highlight the drawbacks of 1-1-2 mediation models and introduce an alternative approach to predict longitudinal change in an outcome from heterogeneity in within-person effects. Collectively, the talks in this symposium illustrate the central importance of understanding heterogeneity in within-person phenomena.

Presentations of the Symposium

Run-in as a predictor of within burst adherence and longitudinal attrition **Giancarlo Pasquini¹, Christian C. Luhmann¹, Martin J. Sliwinski², Stacey B. Scott¹**

¹Stony Brook University, ²Pennsylvania State University

Non-response in ecological momentary assessment (EMA) studies may reflect influences of the sample (e.g., participants' education or work schedule) or study design (e.g., number of surveys or items per survey; Smyth & Stone, 2003). These may bias analyses if non-response is systematic but treated as missing completely at random (Courvoisier et al., 2012). Longitudinally, attrition may exacerbate these biases (Collins, 2006). Participants (Mage=46, range=25-65) completed two EMA bursts (burst 1: N=259; burst 2: N=175; inter-burst interval: ~9 months) in which they completed 5 prompted self-report surveys via smartphone for 14 consecutive days at each burst. Following design recommendations, participants completed a "run-in" period prior to the first burst to train on the protocol (Hufford & Shiffman, 2003). This analysis tested whether the number of surveys completed during the run-in (range: 8-55, mean=20.79) predicted adherence in the study periods (bursts 1 and 2, attrition between bursts). Bayesian logistic regressions indicated that participants who completed more run-in surveys completed slightly fewer burst 1 surveys (posterior mean slope: -.002, 95% credible interval [-.005, .002]), more burst 2 surveys (mean slope: .009, 95% credible interval [.004, .014]), and had a higher probability of attrition after burst 1 (mean slope: .023, 95% credible interval [-.002, .048]). Results suggest that adherence behavior during the run-in period is predictive of adherence and retention in a measurement burst study. For studies not using a run-in period, these results may suggest that adherence behavior early in the time series predicts later patterns of adherence and retention across the study.

Longitudinal coupling of momentary stress reactivity and trait neuroticism: Specificity of states, traits, and age period

Cornelia Wrzus¹, Gloria Luong², Gert G. Wagner³, Michaela Riediger⁴

¹Ruprecht Karls University Heidelberg, ²Colorado State University, ³Max Planck Institute for Human Development and German Institute of Economic Research

(DIW Berlin), ⁴Friedrich Schiller University Jena

Personality traits like neuroticism show both continuity and change during adolescence and adulthood, with most pronounced changes occurring in young adulthood. It has been assumed, but not sufficiently examined, that trait changes occur gradually over the years through the accumulation of daily experiences. The current longitudinal study examined the link between changes in average momentary stress reactivity and changes in self-reported trait neuroticism, whether the link is specific to stress reactivity and neuroticism, and whether this link is stronger in adolescence and young adulthood compared to later periods in adulthood. In a measurement-burst design over six years, 581 participants (50% male) between 14-86 years of age completed up to three waves (T1 – T3) of Big Five trait questionnaires and experience-sampling assessments. During each 3-week experience-sampling period, participants reported their momentary affect and occurrences of hassles on average 55 times. Latent change models showed that increases over time in affective reactivity to daily hassles predicted corresponding increases in neuroticism. This effect was consistent from T1 to T2 as well as from T2 to T3, and most pronounced in young adulthood. Importantly, the results were specific to associations between stress reactivity and neuroticism because (a) changes in frequency of hassles in daily life did not predict changes in neuroticism, and (b) stress reactivity did not consistently predict changes in the other Big Five traits. The findings, especially the specificity of state-trait linkages, help to inform theoretical models that outline how short-term states might contribute to gradual longer-term changes in traits.

Identifying heterogeneous mediating processes using ambulatory assessment data

Niall Bolger¹, Katherine Zee¹, Jean-Philippe Laurenceau²

¹Columbia University, ²University of Delaware

Ambulatory assessment studies, by allowing investigators to collect repeated-measurements of variables as they influence one another over time, can be powerful tools for understanding intervening processes. Yet they also, allow investigators to identify causal effect heterogeneity across participants. In this talk, we will illustrate how to use data from ambulatory assessment studies to combine the study of 2-1-1 mediation with the study of heterogeneity in a daily diary study linking neuroticism, exposure and reactivity to daily stressors and daily distress.

Predicting between-person differences from within-person effects: A multilevel structural equation modeling perspective

Andreas B. Neubauer¹, Florian Schmiedek¹, Annette Brose²

¹DIPF | Leibniz Institute for Research and Information in Education, ²Humboldt University Berlin

The idea that daily experiences drive longitudinal change has permeated psychological research in various areas (e.g., personality and developmental psychology). In this regard, it is often assumed that the within-person effect of a time-varying predictor X on a time-varying outcome M drives the long-term development in a third outcome Y. While at first glance, such a mechanism seems to propose a mediation (1-1-2 mediation), a closer look reveals that this process requires additional considerations that go beyond previous elaborations on multilevel mediation. As we will demonstrate, neither the indirect effect computed via the Level-1 effect of X on M, nor via the Level-2 effect of X on M are necessary or sufficient for the conceptual model (within-person effects drive between-person differences) to hold true. A model that additionally assumes a directed path from the random slope variable to the average level in Y via M fully accounts for the proposed effect of time-varying X on Y via M. Findings from a simulation study show that the central parameters of this model can be recovered well using Bayesian estimation and that misspecifications in the model lead to biases in the anticipated direction. They also show that controlling for mean levels in M may lead to biases in the estimated total effect. We will illustrate the model using data from the COGITO study, targeting the question if the occurrence of daily stressors (X) longitudinally predicts inter-individual-difference in change in depressive symptoms (Y) via daily experiences of negative affect (M).

Using Ambulatory Assessment to Understand Lifespan Development and Healthy Aging **Chair(s): Christina Röcke** (University of Zurich, Switzerland), **Alexandra M. Freund** (University of Zurich) **Discussant(s): Christina Röcke** (University of Zurich)

Ambulatory assessments including active and passive sensing provide unique ways to obtain information on perceptions and behavior in the context of individuals' daily lives. As such, these approaches provide ecologically valid data that can inform our understanding of the short-term dynamics underlying many lifespan developmental and aging phenomena and that complement the more traditional long-term longitudinal perspectives. The symposium provides examples of recent approaches to ambulatory assessments in lifespan developmental and healthy aging research. The first paper by Cardini and Freund examines the motivational model of recovery and indicates that daily positive mood, the absence of opportunity costs and the perception of time contribute to daily recovery experienced by young adults during summer vacation. The second paper by Blanke et al. investigates predictors of adaptation to major life events during midlife, assessed longitudinally over two occasions, indicating that short-term dynamics of stress reactivity had greater predictive value than trait-level resilience. Luo and Röcke focus on late life within-person associations between momentary activities and momentary cognitive ability in a sample of healthy older adults, aiming to disentangle the temporal dynamics of this association. Finally, using data spanning young to older adulthood from the National Study of Daily Experiences, Charles and colleagues show that greater diversity of activities in daily life positively relates to a range of well-being indicators. Together, the four papers showcase a wide range of implementations of ambulatory assessment designs that provide novel insights into traditional lifespan and aging research.

Presentations of the Symposium

Daily Ambulatory Assessment of Recovery During Vacation in Young Adults

Brian B. Cardini, Alexandra M. Freund

University of Zurich

Leisure experiences impact recovery from everyday life demands. Testing a recent motivational model of recovery, we examined if this also applies to recovery from accumulated strain during a vacation. In the current diary study, 147 university students reported their daily recovery, mood, opportunity costs, and subjective time perception over 21 consecutive days (2342 observations) during the summer break. Multilevel analyses showed that students reported higher recovery on days when they were in a better mood and perceived lower opportunity costs than usual. These results held after controlling for the passage of time and well-established covariates of recovery (i.e., psychological detachment, relaxation, mastery, and control). Supporting the motivational model of recovery, positive mood, the absence of opportunity costs and, to a lesser degree, the perception of time passing quickly contribute to daily recovery during a vacation.

Longer-term Change in Affective Distress is not Predicted by Trait Resilience but by Everyday Short-term Processes in Midlife

Elisabeth S. Blanke¹, Florian Schmiedek², Annette Brose³

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³Humboldt-Universität Berlin & German Institute for Economic Research, Berlin, Germany

Resilience describes adaptation in the face of adversity, commonly inferred from trajectories of well-being when major life events have occurred. Alternatively, it was conceptualized as a trait, facilitating adaptation through stable individual characteristics. Such characteristics may also translate into stress-regulatory processes in everyday life. In the present study, we combined these perspectives on resilience. Our sample consisted of N = 132 middle-aged adults (Mage = 51 years), who experienced major life events in between two waves of a longitudinal study. We implemented latent change regression models in a multi-level structural equation modeling framework to predict change in affective distress across the waves, indicating individual differences in resilience-related adaptation. As predictors, we investigated trait resilience and its potential everyday correlates (stressor exposure, stress reactivity, mindful attention and acceptance, and positive reappraisal). The latter were measured using the experience-sampling methodology (T = 70 occasions). Unexpectedly, trait resilience did not predict adaptation to life events. Yet, comparatively more adaptive trajectories were associated with lower stress reactivity in everyday life. Additionally, higher levels of mindful acceptance and reappraisal predicted more favorable trajectories, but not above and beyond stress-related processes. Higher mindfulness and positive reappraisal, as well as lower negative affect, were also related to higher trait resilience. Overall, while trait resilience translated into indicators of resilience in everyday life, it was not predictive of resilience-related adaptation. Instead, the results point towards the importance of seeking potential precursors of longer-term changes in well-being in daily life.

Duration of Effects of Everyday Activities on Cognitive Abilities in Older Age

Minxia Luo, Christina Röcke

University of Zurich

Research has shown that actively engaging in everyday activities can be protective for cognitive decline in older age. Most studies have assessed aggregated activities engagement over weeks or months and examined their effects on concurrent and subsequent cognitive abilities over years, providing little information on the duration of the effect of a single activity on cognitive ability. A recent study examined effects of everyday activities on subsequent cognitive abilities over 3-4 hours. Its findings showed that the lagged effects were nonsignificant, which suggested that the effects may last less than three hours. To understand duration of protective effects of everyday activities on cognitive abilities, a study with more frequent assessments of everyday activities and cognitive abilities is needed. The talk present such a study in which a total of 150 healthy older adults aged 65 and over completed ecological momentary assessment surveys seven times per day (i.e., approx. every 1.5-2 hours) over 15 days. Current everyday activities were assessed with a questionnaire on the momentary presence or absence of 12 different activities, including listening to music, social interactions, sports activity, and volunteering, etc. Cognitive ability was assessed with a smartphone-based working memory test (i.e., two trials of a numerical memory-updating task). Multilevel modeling will be used to examine the concurrent and lagged within-person and between-person effects of activities on cognitive abilities. Results could offer recommendations for older adults regarding engaging in everyday activities as a pathway to maintaining their cognitive abilities in daily life.

Greater Variation in Daily Life is Related to Multiple Indicators of Well-being Across Adulthood

Susan T. Charles¹, Soomi Lee², Emily Urban-Wojcik³, David M. Almeida⁴

¹University of California, Irvine, USA, ²University of South Florida, USA, ³University of Wisconsin-Madison, USA, ⁴Pennsylvania State University, USA

Ambulatory assessments have provided new information about the environments and behaviors that shape our lives. Findings from both non-human animal and human studies reveal that living in environments offering greater enrichment and novelty is linked to higher levels of both psychological and cognitive well-being. In a series of studies using data from the National Study of Daily Experiences (NSDE), a substudy of the Midlife in the United States (MIDUS) longitudinal study, we examined activity diversity, defined by the number of daily activities as well as how evenly spread was the amount of time in each activity across each day. Participants included men and women ranging from 28 to 84 years-old. We present results indicating that greater activity diversity is related to higher levels of psychological well-being, higher levels of cognitive functioning, better sleep health, and greater hippocampal volume. We discuss potential mechanisms tying activity diversity to these different indicators of well-being, and we suggest future directions for research in ambulatory assessment of daily environments and behavior.

Daily Diaries within Organizations: Challenges and New Developments

Chair(s): Petra L. Klumb (Universität Fribourg, Switzerland), **Soomi Lee** (University of South Florida)

Discussant(s): Petra L. Klumb (Universität Fribourg, Switzerland)

An increasing number of organization researchers is becoming interested in studying the temporal dynamics of processes unfolding in the work and private spheres. Daily diaries are often used to capture dynamic processes in naturally occurring daily contexts of workers. Yet collecting diary data comes with several challenges, such as high cost and participant burden. This symposium aims at providing some guidance for future research by synthesizing methodological findings from four papers that used daily diaries or ambulatory assessments across occupational settings. Using multilevel factor score regression, Gahrman and colleagues model acute and background-level challenge- and hindrance-related processes of time pressure and unfinished work in a sample of retail employees. Rigotti and Mühlenmeier demonstrate the analysis of clusters of temporal trajectories and illustrate it with concrete data sets. With unconditional multilevel models, Lee examines the amount of variability in sleep, stress, and well-being data in a sample of healthcare workers and recommends design options by the type of variables that may allow a more efficient data collection. Finally, Vahle-Hinz investigates intra- individual strain trajectories using ambulatory heart-rate data collected in a sample of public-utility and transport-company employees (Study 1) as well as civil servants (Study 2). At the end of these presentations, the discussant, Reis, will summarize the methodological contributions and discuss challenges and opportunities for future diary research across occupational settings with a specific focus on temporal aspects.

Presentations of the Symposium

Challenge-Hindrance Effects of Time Pressure and Unfinished Work Tasks on Vigour from a Within- and a Between-Person Perspective

Caroline Gahrman¹, Manuel C. Voelkle², Petra L. Klumb¹

¹Universität Fribourg, ²Humboldt Universität zu Berlin

Stressors in organizations can have positive and negative effects. Recent developments in the challenge-hindrance stressor framework emphasize functional boundary-conditions and within-person mechanisms determining the context-specific appraisal of an occupational demand as either challenging or hindering. We aimed to replicate, generalize, and extend research by Baethge et al. (2018) on differential effects of short-term and background-level stress exposure. In a sample of 75 male retail employees, we explored within- and between- person effects of time pressure and unfinished work tasks on vigor. We assumed the demands to initiate challenging effects on vigor at the within-person day-level and proposed hindering effects at the between-person level assuming them to reflect relatively stable differences in background-stress exposure. To address measurement-errors at different levels of analysis in small samples we employed multilevel factor-score regression. Results largely contradicted our hypotheses. In contrast to Baethge et al. (2018), we found hindering effects of time pressure on vigor not only at the between- but also at the within-person day-level of analysis and also hindering effects of unfinished work tasks on vigor at the within-person day-level. Unexpectedly, results revealed a positive between-person association of unfinished work tasks and vigor. There was no evidence of interactions between levels of analysis. Including aggregated between-person differences in daily-diary studies adds to the understanding of functional processes investigated

in organizations.

Baethge, A., Vahle-Hinz, T., Schulte-Braucks, J., & van Dick, R. (2018). A matter of time? Challenging and hindering effects of time pressure on work engagement. *Work & Stress*, 32(3), 228–247. <https://doi.org/10.1080/02678373.2017.1415998>

Expanding the Options: Design and Statistical Models in Diary Studies to Capture Temporal Dynamics

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Diary studies, focussing on within-person effects, have become quite common over the last years in organization studies. However, we still lack knowledge about the role of temporal dynamics. Mostly the focus so far has been on within-person effects, that is how deviations from a person's own standard predicts states on the same day or week. For quite a time, centering level-1 variables by the person mean was the most common technique. In recent years, latent aggregation within the Multilevel Structural Equation Model Framework has become a new standard. Furthermore, separation of measures (over the day), and where possible including autoregressors to predict change in certain states within the same day or for the next day can be seen as further improvements. Yet another trend is controlling for systematic temporal variation (mainly in dependent variables) by including linear and non-linear time variables as covariates. Still, only few studies so far have used diary studies for modelling temporal dynamics, using latent growth curve analysis to derive trajectories of fatigue within a day, or sleep quality over the working week. On the basis of several data sets, we will present how to study clusters of temporal trajectories by means of latent growth mixture models, and the application of time continuous modelling as potential pathways that expand our options to investigate temporal dynamics. We will conclude with recommendations on how to best match research question, study design, and statistical treatment of data.

Daily and Momentary Variability in Sleep, Stress, and Well-Being Data from Healthcare Workers

Soomi Lee

University of South Florida

Daily and momentary assessments have been used in research on organizations. These methods involve high costs and participant burden due to intensive measurement time points. Examining different levels of variability in occupational health variables may guide the design of effective methodology for different types of variables. This study examined individual-, day-, and moment-level variability in sleep, stress, and well-being variables in healthcare workers. Sixty-one nurses from a U.S. hospital (Mage=35.39±11.73) participated in 14-day smartphone-based ecological momentary assessments. Sleep, fatigue, physical symptoms, and work quality were assessed once/day. Daily affect and stressors/uplifts were measured 3×/day. Unconditional multilevel models were used to examine intra-class correlations of the variables. For sleep, fatigue, and physical symptoms, 61-85% of the variance were due to differences between days. For work quality, 59% of the variance were due to differences between individuals. For positive and negative affect, 51-56% of the

variance were due to differences between individuals; 12-15% were due to differences between days; 32-34% were due to differences between moments. For stressors/uplifts, 14-24% of the variance were due to differences between individuals; 5-13% were due to differences between days; 71-72% were due to differences between moments. Results may inform future studies planning to collect occupational health variables. Daily assessments seem desirable for sleep and physical health variables, whereas less frequent assessments (e.g., weekly) may be sufficient for work quality. Momentary assessments seem desirable especially for stressors and uplifting events. Further analyses will examine variance components between weeks and between workdays and non-workdays.

Relationship between workplace characteristics and physiological strain indicators – Time trajectories as a promising way for ambulatory assessment studies in organizations

Tim Vahle-Hinz

Psychologische Hochschule Berlin

The relationship between workplace characteristics and physiological strain indicators is deemed important because it may be a mechanism explaining the development of employees' ill health. The use of ambulatory assessments is a powerful tool to establish such relationships. However, in practice, studies linking workplace characteristics with physiological strain indicators have been proven to be challenging. In the present talk, I present data from two diary studies (Study 1 N = 55, 2 days; Study 2 N = 115, 5 days) aiming at establishing a link between workload (Study 1), and social support (Study 2) with heart rate variability (HRV). While Study 1 used HRV measures at night as a sleep indicator, Study 2 used the time trajectory of HRV to relate it with the lunch break. Study 1 failed to establish a relationship between workload and HRV, but Study 2 showed a moderating effect of social support on the physiological lunch break effect. Based on the experiences made in conducting these studies, I discuss lessons learned from using HRV as an indicator of physiological strain within diary studies at the workplace. Specifically, the results of Study 2 highlight that time trajectories might be a suitable way to put the measurement of HRV into meaningful context, while also align physiological measures within daily work life with physiological models of stress (e.g., allostatic-load model). Thus, time trajectories might provide a fruitful avenue for future studies aiming to establish a link between psychological workplace characteristics with physiological strain indicators.

Remote Assessment of Disease and Relapse in Major Depressive Disorder: Outline and first results

Chair(s): **F Lamers** (Amsterdam UMC)

Discussant(s): **Inez Myin-Germeys** (KU Leuven)

Within the RADAR-CNS (Remote Assessment of Disease and Relapse – Central Nervous System <https://www.radar-cns.org>) international consortium, the role of ambulatory assessment in predicting relapse is being studied in epilepsy, MS and major depressive disorder (MDD).

Data collection includes experience sampling measures (ESM), a passive app collecting data from smartphone sensors, an active app for Patient Health Questionnaire-8 assessments, cognitive assessments and a speech task, and collection of sleep, heart rate and physical activity via Fitbit Charge. Data is collected continuously over a period of two years.

In this symposium, we will first give you an overview of the RADAR-MDD study and the open-source platform developed within the consortium (<https://radar-base.org/>) (dr. Lamers), followed by three presentations of each of the participating sites (UK, Spain, Netherlands). Dr. Matcham (KCL) will present on the predictors of long-term usability and acceptability of remote symptoms measurement. Then, dr. Siddi (Cibersam, Barcelona) will present on using heart rate parameters as biomarker of depression. The last speaker is Sonia Difrancesco (PhD student, Amsterdam UMC), on the longitudinal associations between physical activity and depression. Discussant of the symposium is prof. Myin-Germeys (KU Leuven), work package leader in RADAR-CNS.

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Presentations of the Symposium

RADAR-CNS MDD study: Infrastructure and sample description

F Lamers¹, F Matcham², S Siddi³, AA Folarin², JM Haro³, BWJH Penninx¹, M Hotopf², on behalf of the RADAR-CNS Consortium⁴

¹Amsterdam UMC, ²King's College London, ³Parc Sanitari Sant Joan de Déu, Fondation Sant Joan de Déu, CIBERSAM, ⁴

Major depressive disorder (MDD) is a prevalent and disabling disorder, with a large percentage of people experiencing relapse. Early detection of relapse could help reduce the burden of disease and improve well-being. Remote monitoring technology (RMT) such as smartphones and wearables have the potential to detect early signs of relapse in people with depression. The aim of the RADAR-MDD study is to 1) determine the usability, feasibility and acceptability of RMT; 2) improve and refine clinical outcome measurement using RMT to identify current clinical state; 3) determine whether RMT can provide information predictive of depressive relapse and other critical outcomes.

The RADAR-MDD study is a multicenter observational study that aimed to include 600 persons with recurrent MDD across 3 countries (UK, Spain, the Netherlands). During a 2-year follow-up participants wear a Fitbit to collect data on physical activity, heart rate and sleep, and install multiple apps on their phones for speech tasks, cognitive tasks, ESM, assessment of depression symptoms and passive data collection through smartphone sensors. Data are collected through RADAR-Base, an open-source platform for real-time remote sensor data collection developed by RADAR-CNS.

In total, 623 persons are enrolled in the study. Average age is 46.6 (SD 15.3), 76% are female, educational level (in no. of years) is 16.4 (SD 6.5); mean IDS

score is 31.3 (SD 14.5). To date (follow-up is still ongoing), 207 relapses have been identified. During the presentation, we will introduce the RADAR-Base open source platform, the RADAR-MDD design and sample characteristics.

Predictors of long-term usability and acceptability of remote symptoms measurement in major depressive disorder (MDD): An interim analysis.

F Matcham¹, F Lamers², S Siddi³, A Ivan¹, K White¹, C Oetzmann¹, S Diffrancesco², G Lavelle¹, D Leightley¹, Y Ranjan¹, BWJH Penninx¹, JM Haro³, S Simblett¹, T Wykes¹, S Zorbas⁴, P Annas⁵, VA Narayan⁶, M Hotopf¹, on behalf of the RADAR-CNS Consortium⁷

¹King's College London, ²Amsterdam UMC, ³Parc Sanitari Sant Joan de Déu, Foundation Sant Joan de Déu, CIBERSAM, ⁴Greek Carers Network, EPIONI, ⁵H. Lundbeck A/S, Valby, ⁶Janssen Research and Development, ⁷-

There is increasing evidence highlighting short-term usability and acceptability of wearable technologies for symptoms measurement in chronic conditions. Longitudinal approaches need to identify different predictors of usability and acceptability as needs and expectations change with prolonged use. RADAR-MDD provides a unique opportunity to explore this.

Usability and acceptability were measured using the Post-Study System Usability Questionnaire (PSSUQ; [Lewis, 2002]) Technology Acceptance Model—Fast Form (TAM-FF; [Chin et al. 2008]).

623 participants with major depressive disorder (MDD) were recruited, with acceptability and usability assessments collected in 574 and

288 individuals at 3- and 12-months respectively. Baseline sociodemographic, technical, and clinical variables were entered into univariate regression models to identify predictors of perceived usability and acceptability of the RADAR-BASE mhealth system at 3- and 12-month follow-up.

Consistent predictors of reduced usability and acceptability included older age, higher levels of functional disability at baseline, and concurrent higher levels of disability and depression. Reduced predicted future use of RADAR-BASE was associated with higher levels of educational attainment, markers of socioeconomic status such as receipt of benefits and reporting having difficulties paying bills, and lower levels of concurrent anxiety.

Clinical and demographic variables at the time of being given the technology and trained in its use were the most consistent predictors of short- and long-term usability and acceptability, above and beyond previous experience of using technology. These results highlight subgroups of individuals who may need more support to find remote measurement systems useful and highlight important barriers to long-term acceptance and future use.

Using heart rate parameters during different periods (resting, activity during the day and night) as biomarkers of depression: preliminary findings.

S Siddi¹, R Bailon², F Matcham³, F Lamers⁴, I Giné-Vázquez¹, M Hotopf³, BWJH Penninx⁴, F Lombardini¹, S Difrancesco⁴, E Garcia², P Locatelli⁵, E Laporte⁶, S Kontaxis², J Aguiló⁷, MT Peñarrubia-Maria⁸, VA Narayan⁹, D Leightley³, AA Folarin³, Y Ranjan³, A Rintala¹⁰

¹Parc Sanitari Sant Joan de Déu, Foundation Sant Joan de Déu, CIBERSAM, ²University of Zaragoza & CIBER-BBN, ³King's College London, ⁴Amsterdam UMC, ⁵University of Bergamo, ⁶CIBER-BBN, ⁷Universidad Autónoma de Barcelona, CIBER-BBN, ⁸CIBERESP, ⁹Janssen Research & Development, ¹⁰KU Leuven

Alterations in heart rate (HR) may provide new insights into physiological signatures of major depressive disorder. This study assessed the validity of HR parameters during different periods associated with depression symptoms. Data were collected as a part of a remote technology study (RADAR-MDD). We used measures collected in 623 participants: depression symptoms (PHQ-8) every two weeks, HR during resting and activity periods during the day and night (Fitbit device). We analyzed HR data from the same day as the PHQ-8 was completed and one week before completion. Associations between the HR and depression severity were explored. We compared two depression groups (High vs low) using a PHQ-8 cut-off ≥ 10 in mean HR (mHR) data. Depression was positively related to a minimum hourly mHR across the completion day (day $r = 0.19$, and week $r = 0.21$, $p < 0.00001$) and mHR during the resting period the same day and the previous week of PHQ-8 ($r = 0.18$, $p < 0.00001$) but not to mHR during activity. At night, depression was positively associated with mHR (day and week, $r = 0.21$, $p < 0.00001$), especially with mHR during the resting period (day $r = 0.23$, and week $r = 0.24$, $p < 0.00001$). In fact, individuals with high depression reported high mHR compared to low in the resting period at day (day t -test=10.76 and week: t -test=10.78, $p < 0.00001$) and at night (day t -test=14.25, $p < 0.00001$; week t -test=15.39, $p < 0.00001$). These results suggest that HR parameters during the resting period, especially at night, may predict depression episodes and are correlated with depression severity.

Longitudinal association between actigraphy assessed physical activity and depression severity and new onset of depression: preliminary results

S Difrancesco¹, F Matcham², S Siddi³, M Hotopf², JM Haro³, BWJH Penninx¹, F Lamers¹, on behalf of the RADAR-CNS Consortium⁴

¹Amsterdam UMC, ²King's College London, ³Parc Sanitari Sant Joan de Déu, Foundation Sant Joan de Déu, CIBERSAM, ⁴-

Major depressive disorder is a prevalent disorder, often with recurrent episodes. Meta-analyses show that depressed persons are less physically active than persons without depression. Increasing evidence also suggests that physical activity (PA) may be used as depression treatment, and may prevent onset of new episodes. Wrist-worn actigraphy devices offer new opportunities for monitoring persons' PA continuously. The aim of the current study is to evaluate if PA is longitudinally associated with depressive symptoms and new onset of depression.

Fitbit data of $n=623$ RADAR-MDD participants from November 2017-September 2020 is used. Biweekly, PHQ-8 was filled out (no observations $> 10,000$) via smartphone to assess depressive symptoms, and every 3 months the CIDI-short form and IDS-30SR were filled out to establish presence or absence of a depressive episode.

Preliminary analyses showed that median daily step count was 6431 (IQR=4759) and average PHQ-8 score was 10.6 (SD=5.5). A small negative correlation between step count and PHQ-8 score was observed (-0.28). Machine learning and multilevel analyses are used study the associations between predictors (PA variables) and outcomes (depressive symptoms, new episode) over time, while accounting for covariates, including age, sex, educational level, study site and season. Analyses are currently ongoing.

Identifying early signs of recurring depression is important as it allows for earlier intervention and potentially preventing onset of a full-blown episode. Results of this study will provide new knowledge on the potential of PA as predictor of deterioration of depressive symptoms, and can therefore help shape future monitoring strategies and interventions for persons with depression.

The role of affective states in addiction symptomology and recovery: The potential and pitfalls of heterogeneity

Chair(s): **Samuel W. Stull** (The Pennsylvania State University)

Discussant(s): **David H. Epstein** (The National Institute on Drug Abuse Intramural Research Program)

Ambulatory assessment of affective states has complemented and extended laboratory research on addiction and affect. (For this symposium, we expansively define affect to include not just negative and positive feelings, but also constructs such as craving and stress.) This symposium presents recent ambulatorily obtained findings relevant to addiction and affect, with emphasis on heterogeneity within and between people, such that blanket statements are eschewed for more complex, conditional ones. This may be important for both addiction specifically and ambulatory assessment studies on affect more broadly. The first speaker will discuss what may be a surprising intactness of "mood brightening" in response to nondrug daily-life reinforcers in most people during the first months of addiction treatment. The second speaker will characterize complex, moment-level affective states (i.e., mixed affective states) using multilevel latent class analysis. The third speaker will describe affective improvements experienced by participants during a randomized trial of a behavioral intervention. Finally, the fourth speaker will demonstrate the translation of laboratory findings on affective mood states to "real-world" settings with ecological momentary assessment, including considering the generalizability of affect heterogeneity to all addiction patients. This latter speaker also serves as the discussant, and he will draw connections across all studies as they intersect with the session's main themes

—addiction, affect, and heterogeneity—and discuss implications for advancing research on the role of affect and addiction.

Presentations of the Symposium

It's Been a Pleasure: Subtle differences in event-related mood brightening in people with and without opioid use disorder

Samuel W. Stull¹, Jeremiah W. Bertz², Leigh V. Panlilio², William J. Kowalczyk³, Karran A. Phillips², Landhing M. Moran², Jia-Ling Lin², Massoud

Vahabzadeh², Patrick H. Finan⁴, Kenzie L. Preston², David H. Epstein²

1The Pennsylvania State University, 2The National Institute on Drug Abuse Intramural Research Program, 3Hartwick College, 4Johns Hopkins University

INTRODUCTION. The “mood brightening” effect—a temporary, event-related increase in positive mood—has been observed dynamically (with smartphone-based ecological momentary assessment, EMA) among people who report tonic (background) deficits in positive mood (i.e., people with anhedonia). Mood brightening might be expected to extend to opioid use disorder (OUD), in which reductions in positive mood are said to manifest specifically as loss of pleasure from nondrug rewards. **METHOD.** We used EMA to monitor mood and pleasant events throughout the day for four weeks in 54 people being treated for OUD and compared their EMA reports with those of 47 demographically similar controls. **RESULTS.** Tonic positive mood was lower in OUD patients than in controls, as we hypothesized (Cohen d's 0.85 to 1.32, 95% CIs 0.66 to 1.55), although, contrary to our hypothesis, tonic negative mood was also lower (d's 0.82 to 0.85, 95% CIs 0.73 to 0.94). As hypothesized, instances of nondrug pleasure were as frequent in OUD patients as in controls—and were not rated much less pleasurable (d = 0.18, 95% CI 0.03 to 0.35). Event-related mood brightening occurred in OUD patients (d's .18 to .37, CIs -.01 to .57) and controls (d's .04 to .60, CIs -.17 to .79); brightening before each event began earlier for controls than OUD patients, but faded similarly post-event across groups. **CONCLUSION.** Our findings add to the evidence that anhedonia does not rule out reactive mood brightening, which, for people with OUD, can be elicited by nondrug activities.

Momentary latent class membership during recovery from substance use disorder

Stephanie T. Lanza¹, Samuel W. Stull¹, Michael L. Dennis², Christy K. Scott²

1The Pennsylvania State University, 2Chestnut Health Systems Inc.

INTRODUCTION. Individuals recovering from substance use disorders are at high risk of using. Momentary risk factors include mood, craving, and pain, yet these experiences do not occur in isolation. We present latent class analysis (LCA) applied to ecological momentary assessments (EMA) to characterize momentary risk states and their association with perception that current feelings support recovery. **METHODS.** 198 adults who recently attended substance use disorder treatment (mean age 43.7; 60% male; 69% black) provided 5 daily assessments for 180 days. We examine data from the first two weeks (10,381 person-moments). Latent class indicators were: low- and high-arousal positive mood, low- and high-arousal negative mood, alert, bored, tired, craving, and pain; 81% of moments were characterized by feelings that support one's recovery. Models were estimated in SAS PROC LCA with a clustering variable to accommodate the nested data structure. **RESULTS.** Six risk states were identified: Activated Positive Mood (32% of moments); Calm Positive Mood (25%); Tired (9%); Activated Negative Mood (13%); Mixed I: Pain, Craving, Positive Mood (13%); and Mixed II: Pain, Craving, Negative Mood (9%). Compared to Calm Positive Mood, moments on which feelings were perceived as supportive to recovery were significantly more likely to be Activated Positive Mood and less likely to be Activated Negative Mood, Tired, or Mixed II: Pain, Craving, Negative Mood. **CONCLUSION.** LCA of momentary data provides a comprehensive assessment of individuals' risk state that could trigger a momentary intervention. Future work will predict an acute outcome (e.g., use in subsequent epoch) from risk state.

Stress, craving, and mood during work in a therapeutic workplace intervention for people who use heroin **Jeremiah W. Bertz¹, Samuel W. Stull², Leigh V. Panlilio¹, Kirsten E. Smith¹, Marie-Louise Murville³, David H. Epstein¹, Karran A. Phillips¹, August F. Holtyn⁴, Kenneth Silverman⁴, Kenzie L. Preston¹**

1The National Institute on Drug Abuse Intramural Research Program, 2The Pennsylvania State University, 3Delight Me Inc., 4Johns Hopkins University

INTRODUCTION. Employment has been associated with superior opioid use disorder (OUD) treatment outcomes. We previously found that people receiving methadone treatment reported improved affect during work at community jobs. Presently, we provided behavioral treatment for OUD in the form of access to a contingency-management-based therapeutic workplace (TW), and we used ecological momentary assessment (EMA) to measure participants' affect when at work in the TW and not. **METHODS.** Participants (n = 161; 55.9% male, 65.9% non-white) were employed in the TW for up to 110 days. At intake, participants were randomized to immediate TW access (Immediate Work, allowing them to work 4 hours/day Monday-Friday), or to a 4-week waitlist-delay (Delayed Work, providing payment but otherwise preventing TW access). Both groups had thrice-weekly urinalysis. EMA of participants' activities and affect and, for a subset (n = 61) of participants, quality-of-life questionnaires were administered via study-issued smartphones beginning one week after randomization. **RESULTS.** In linear mixed models, participants reported less stress, less opioid- and cocaine-craving, less negative mood, more positive mood, and more flow at work vs. elsewhere. Time off from work, either on weekends (Saturday/Sunday) or experimentally determined unexpected “vacation” days, was associated with more cocaine-craving, worse mood, and less flow. Group differences in affect and quality of life, however, were not clearly associated with Delayed Work participants gaining TW access. **CONCLUSION.** Participants experienced improved affect at work in the TW, but the waitlist-delay may also have had longer-lasting effects. These results help clarify how work could contribute to recovery from OUD.

They're people, not outliers: a big-tent approach to hypotheses and analyses in EMA data

David H. Epstein¹, William J. Kowalczyk², Kenzie L. Preston¹

1The National Institute on Drug Abuse Intramural Research Program, 2Hartwick College

INTRODUCTION. Our research group's EMA studies of people with OUD have led us to conclude that one-size-fits-all conclusions are perilous for almost any psychological or behavioral question. I will discuss that in the context of recent recommendations by myself and others (e.g., Davis-Stober and Regenwetter, Psychological Review, 2019, doi 10.1037/rev0000156) to frame or combine hypotheses in ways that leave no participant undescribed. To exemplify the approach, I will present EMA analyses in which we tested whether stress and drug cues have additive, more-than-additive, or competitive (mutually interfering) effects on craving, a question that had drawn surprisingly mixed answers in prior laboratory studies. **METHODS.** Outpatients (N=182) maintained on daily buprenorphine or methadone provided self-reports of stress, craving, mood, and behavior on smartphones for up to 16 weeks. In three randomly prompted entries per day, participants reported the severity of stress and craving and whether they had seen or been offered drugs. In random-effects models controlling for between-person differences, we tested effects of momentary drug-cue exposure and stress (and their interaction) on momentary ratings of cocaine and heroin craving. **RESULTS.** Heterogeneity was substantial: the Stress x Cue effect on craving was additive in most participants, more than additive in a sizeable minority, and competitive (less than additive) in a few. **CONCLUSION.** EMA data can be analyzed and presented so that the conclusions apply to every person in the sample. I will argue that this is usually preferable to stating conclusions to reflect only a majority response or a central tendency.

Parent-Child Interactions in Daily Life: Assessment and Outcomes

Chair(s): **Andrea Schmidt** (DIPF | Leibniz Institute of Research and Information in Education, Frankfurt, Germany), **Andreas B. Neubauer** (DIPF | Leibniz Institute of Research and Information in Education, Frankfurt, Germany)

Discussant(s): **William P. Fifer** (Columbia University, New York City, United States)

Historically, research on parent-child interactions has held a very prominent place in psychological research and there is ample evidence for the proposition that parent-child interactions are a central force driving child development as well as experiences of parents. The present symposium brings together timely research on parent-child interactions using ambulatory assessment. The first two talks describe current developments of assessment of parent-child interactions in infancy and adolescence. Van den Heuvel et al. introduce the Baby- related Anxiety and Behavior Inventory, a measure developed to capture momentary feelings and behaviors of mothers of infants (0-6 months) in everyday life. Janssen et al. present data from an ambulatory assessment study of parents and adolescents combining several daily self-report ratings and sensor based physical proximity readings between family members. The other two talks focus on the interplay of parent-child interactions with child and parental well-being. Specifically, Schmidt et al. target parent-child interactions during the early phase of the COVID-19 pandemic in Germany. Data from their daily diary study suggest that more negative parent-child interactions in response to daily stressors and homeschooling are associated with reduced parental and child well-being. Bülow et al. report findings from

an experience sampling study on adolescents. Results from dynamic structural equation models suggest lagged effects, with parent- adolescent interaction quality predicting subsequent adolescent well-being. Combined, the research presented in this symposium provides a snapshot of the possibilities of and future directions in ambulatory assessment approaches for understanding parent-child interactions from infancy through adolescence.

Presentations of the Symposium

The Baby-Related Anxiety and Behavior Inventory (Babi): An Experience Sampling Questionnaire

Marion I. van den Heuvel, Jessica Vergeer, Myrthe Boekhorst

Tilburg University, Tilburg, The Netherlands

The mother-infant relationship is foundational for children's socio-emotional and cognitive development. However, not all mothers are able to provide warm and

functional interactions. Approximately, 18-25% of mothers display anxiety in the early postnatal period, which could lead to the development of negative maternal characteristics, such as maternal hypervigilance and checking behaviors. These could lead to disturbances in the mother-infant relationship that may result in poorer child outcomes later in life. Since anxious dyadic interactions are likely subtle and only visible with micro-analytic approaches and naturalistic data collection methods, existing questionnaires will not suffice. By utilizing experience sampling methods (ESM) it will be possible to probe maternal-infant interaction patterns at home and more detailed than ever before.

In this study, we set out to develop and validate a novel questionnaire, the Baby-related Anxiety and Behavior Inventory (BABI), specifically targeted to mothers within 0-6 months after birth, related to maternal anxiety, worry about the baby, checking behaviors (i.e., whether the child is still breathing) and mother-infant interaction. To develop our questionnaire, started with screening for useful items in existing questionnaires about anxiety, stress, and worry. We then gathered information on pregnancy vlogs/blogs about additional themes. Next, we ran focus groups to gather input from mothers that have experienced postnatal anxiety in the past. For our final step, we consulted several experts in perinatal mental health. In this presentation, we will outlay our procedure for developing and validating our novel questionnaire and present findings from our focus groups.

Innovative Ways of Assessing Proximity and Parent-Adolescent Interactions in Daily Life

Loes H. C. Janssen, Bert Verkuil, Lisanne A. E. M. van Houtum, Mirjam C. M. Wever, Bernet M. Elzinga

Leiden University, Leiden, the Netherlands; Leiden Institute for Brain and Cognition (LIBC), Leiden, the Netherlands

Parenting and parent-adolescent interactions play an important role in adolescent development and well-being. Increasingly, it is acknowledged that both parents' and adolescents' perspectives are important sources of information. So far, researchers have relied mostly on retrospective questionnaires or observations, and information on parent-adolescent interactions in daily life is lacking. With ecological momentary assessments these processes can be assessed in daily life. As issues as nonresponse or social desirability can still have an effect on these assessments, a more objective measure of parent-adolescent interactions in daily life would also be valuable, e.g., based on GPS or Bluetooth signals to track proximity. Therefore, in the context of RE-PAIR, a multi-method study on parent-child interaction and adolescent depression, we 1) examined how both adolescents and their mothers and fathers perceive parenting behavior in daily life and whether discrepancies relate to adolescent daily mood, and 2) explored real-time parent-adolescent proximity based on Bluetooth low energy (BLE) beacons. 80 families, including 80 healthy adolescents (29 boys, 51 girls; Mage = 15.9) and 151 parents (79 mothers, 72 fathers; Mage = 49.4) completed multiple surveys a day for 14 consecutive days. Participants received their own beacon and the beacons automatically scanned for other beacons within the family every 5 minutes. Preliminary analyses showed that overall, parents reported significantly higher levels of parental criticism and low levels of parental warmth compared to adolescents. Further data analysis on the discrepancies and proximity is ongoing and results and implications will be presented during the conference.

Daily Links Among Homeschooling, Daily Stressors, Negative Parent-Child Interactions, and Affective Well-Being of Parents and Children During the COVID-19 Pandemic

Andrea Schmidt¹, Andrea C. Kramer¹, Annette Brose², Florian Schmiedek³, Andreas B. Neubauer¹

¹DIPF | Leibniz Institute of Research and Information in Education, Frankfurt, Germany, ²Humboldt University, Berlin, Germany, ³DIPF | Leibniz Institute of Research and Information in Education, Frankfurt, Germany; Goethe-University Frankfurt, Germany

In early 2020, governments around the world enforced school closures as a response to the rapid spread of the COVID-19 virus. This measure transferred children's learning process to their homes and required increased involvement of parents. Analyzing data of a 21-day diary study conducted between March and April 2020 in Germany (N = 562), we examined whether homeschooling and parents' involvement therein were linked to the quality of daily parent-child interactions and to the affective well-being of both, parents and children, over and above the effect of daily stressors. We found that on days when children were working on tasks for school, parents reported more negative parent-child interactions, lower parental and child positive affect, and higher child negative affect, but not higher parental negative affect. Furthermore, on days when parents were more heavily involved in their children's homeschooling, they reported more negative parent-child interactions and lower affective well-being of themselves and their children. These effects emerged over and above the effect of daily stressors on negative parent-child interactions and affective well-being. Negative parent-child interactions were also found to be linked to lower affective well-being of parents and children, and to partially account for the relation among daily stressors and affective well-being of parents and children. These findings illustrate one potential strain put on the parent-child dyad as a consequence of COVID-19-related school closures and emphasize the need for measures to better support school-aged children and their parents during homeschooling.

Within-Family Linkages of Quality of Momentary Parent-Adolescent Interactions and Adolescent Well-Being

Anne L. Bülow¹, Eeske van Roekel¹, Savannah Boele¹, Jaap J. A. Denissen², Loes Keijsers¹

¹Tilburg University, Tilburg, the Netherlands, ²Utrecht University, Utrecht, the Netherlands

Introduction: To date, very few studies are available on the short-term linkages between parenting and adolescent wellbeing (Boele et al, 2019). Momentary parent-adolescent interactions are therefore important to study as a precursor for adolescent well-being. Moreover, these short-term dynamic processes linking parenting to adolescent well-being may be unique to each family.

Method: Two intensive longitudinal studies were conducted. In the first study, adolescents (N = 124) received five to six questionnaires a day for 14 days (t = 74). 2281 interactions with parents were rated in terms of parental warmth and parent-adolescent conflict. Second, in an ongoing multi-informant diary study, adolescents and one of their parents (ca. N = 140) answered 100 daily diaries on the quality of their social interactions.

Results: Dynamic Structural Equation Modelling (DSEM) on ESM data indicated that affective well-being and the quality of parent-adolescent interactions were linked at the between as well as the within family level. Significant lagged effects suggested dynamic processes were present in daily life (from interaction quality to adolescent well-being). Furthermore, substantial variance in these effects indicated differences between families in the parental impact on adolescent well-being. Individual differences will be further explored in the daily diary data, which allows for idiographic models (n = 1 analyses).

Conclusion: Our first results confirmed substantial differences between families in the effect of parent-adolescent interactions on subsequent adolescent well-being in daily life. Future analyses (n = 1 analyses on 100 daily diaries) will provide further insights in how and why each family is different.

Date: Thursday, 01/July/2021

6:15pm

K2: Keynote 2

7:15pm

Chair: **Candice Odgers**, University of California, Irvine, United States of America

Leveraging digital tools to capture adolescents' daily lives: progress and pitfalls.

Over a decade ago we launched our first smartphone study with adolescents. The hope was that placing mobile phones in the hands of young people would rapidly advance what we knew about adolescents' behavior and mental health. Significant progress has been made over the last 10 years, but digital tools and devices have not yet delivered on their predicted revolution of adolescent health research.

This presentation highlights advances that have been made in the field of ambulatory and ecological momentary assessment with adolescents. Key – and surprising – lessons about the connections between adolescents' digital device use and their daily health are shared and new methods of passive and sensor-based data collection are showcased. Finally, the pitfalls and promises of collecting streaming data from adolescents' devices as they come of age in an increasingly digital world are weighed.

Conference Agenda

Session

P3-D2: Paper Session 3 - Day 2 (Affect Dynamics)

Time: Thursday, 01/July/2021: 7:30pm - 8:45pm

Presentations

Intraindividual variability in affect: A formalized, theoretical approach

Maria Wirth¹, Andreas Voss², Klaus Rothermund³

¹Friedrich Schiller University, Germany; ²Heidelberg University; ³Friedrich Schiller University, Germany

Studying the ebb and flow of affect in daily life provides important insights into psychological functioning and well-being. However, little attention has been paid to the sources and underlying processes of these short-term changes. We propose a model in which affect is conceptualized as the output of dynamic processes. Given that affect reflects transactions between an organism and its proximal environment, we relate the evaluative aspect of events in terms of their pleasantness or unpleasantness (iV, "valence") to fluctuations in momentary affective experience (dV, "affect"). The model explains affective experience as resulting from the cumulative effects of previous valent events ("accumulation principle"). The core of the model consists of parameters that moderate the relation between valent events and affective experience. These parameters reflect individual differences in the extremity of short-term changes (reactivity) and longer-term changes in affective experience (regulation) caused by positive or negative events. An empirical application of our model will be presented using data on everyday affective experiences from 315 individuals ranging in age between 14 – 86 years (Riediger, 2018). The results are in line with the view on old age as a time of gains in affective functioning: for older adults, the impact of positive events on affective experience persisted longer and older adults also reacted less strongly if they experienced daily hassles. We discuss potentials and limitations of the approach and close with an outlook on the broader implications for understanding emotional development.

An ecological momentary assessment approach to capture short-and long-term processes of emotion regulation dynamics in daily life

Zarah Rowland, Thomas Kubiak, Mario Wenzel

Johannes Gutenberg-Universität Mainz, Germany

Prior research has mostly focused on how effective individuals were in regulating their emotions over a short (e.g., up to 2 hours) or longer time period (e.g., from day-to-day). However, during these different time periods, several emotionally relevant events may occur, past events may still be relevant, or they may become relevant again (e.g., by remembering a situation). Different short- and long-term as well as external and internal events may influence emotion regulation over time.

To capture this interplay, we want to present an ecological momentary assessment framework, which combines event-, interval- and signal contingent sampling. 400 individuals will be asked to report emotionally relevant events in their daily lives as soon as they have occurred (event-contingent). Ten minutes after that, individuals will be asked to report on their current emotions and emotion regulation strategies (interval-contingent). Finally, using signal-contingent prompts, individuals will report what events are still relevant and how they regulated their emotions over the course of the past 2 hours, representing long-term processes. In this way, we can capture multiple events that may overlap with each other in daily life and can examine their associations with trajectories of emotional experiences.

We will be able to examine and identify several process- (e.g., emotion regulation goals), situation- (e.g., intensity and controllability of an event), as well as person-level moderators (e.g., depression and well-being) that are suggested to explain different emotion regulation episodes.

Changing Affect Dynamics: The Causal Impact of a Brief Stress Reduction Intervention on Negative and Positive Affect Dynamics in Daily Life

Yixia Zheng, Lachlan Anthony, Tammy Lim, Michael Zyphur, Peter Koval

University of Melbourne, Australia

Affect dynamics—patterns of fluctuations in people's emotional experiences—are often (implicitly) assumed to be stable trait-like characteristics. Thus, little is known about the contexts in which affect dynamics may change. The current study examines how dynamic features of both positive affect (PA) and negative affect (NA) change in response to a brief mindfulness intervention, which was delivered via smartphones to community sample (N=97) using a novel cross-classified design. Specifically, the mindfulness intervention was randomized at the within-person, between-person and between-time levels over a 10-day experience sampling study. Participants reported their momentary affect, rumination and mindfulness states. A bivariate structural equation model was used to estimate the moderating effect of the mindfulness intervention on several parameters of affect dynamics including PA and NA mean levels, autoregressive slopes and innovation variances, and cross-lagged associations among PA and NA. We hypothesized that, by reducing stress-related perseverative processes (e.g., rumination), the mindfulness intervention would reduce NA inertia; increase the buffering effect of previous PA on subsequent NA; and decrease the blunting effect of previous NA on subsequent PA. Result may suggest the potential of tailored stress-reduction interventions to promote healthy emotional profiles in everyday life. (word count: 191)

To engage or disengage? On the dynamic interplay between intrapersonal and interpersonal emotion regulation

Lisanne Sarah Pauw, Anne Milek

Münster University, Germany

While a wealth of research has demonstrated the importance of responsive support provision for healthy relationship functioning, much less is known about what determines how partners actually choose to regulate each other's emotions. When one partner experiences negative emotions, they may regulate their distress in various (adaptive or maladaptive) ways, which may signal different support needs to their partner. According to the Social Regulatory Cycle (Reeck, Ames, & Ochsner, 2016), partners first need to identify the other's distress and a need for regulation to select a regulatory strategy. Based on this theoretical framework, we first hypothesize that emotion regulation (ER) strategies directed at disengaging from the emotional experience (i.e., suppression and distraction) will elicit reduced regulatory efforts from the partner, since they do not openly communicate distress. Second, we predict that the use of adaptive strategies directed at engaging with emotional experience (i.e., reappraisal and acceptance) also negatively predict the partner's regulatory efforts, given that they do not signal a need for regulation. Finally, we hypothesize that the use of potentially maladaptive, engaging ER strategies (i.e., rumination and social sharing) elicit greater partner regulation, as these do clearly signal emotional distress and the need for regulation. We present the findings of an experience sampling study, in which 50 romantic couples were beeped simultaneously for 6 times a day, reporting on the strategies they used to regulate their own, and their partner's emotions. This study provides a first insight into the dynamic interplay between individual and interpersonal emotion regulation in daily life.

Daily Affect Dynamics Vary Across the Adult Lifespan

Hio Wa Mak, Stefan Schneider, Arthur A. Stone

University of Southern California, United States of America

Existing research suggests that daily emotional experiences improve with age across adulthood. While prior research has focused on positive affect (PA) and negative affect (NA), emphasizing the valence (positive-negative) dimension, Russell's (1980) circumplex model suggested that affect also varies on the arousal (low-high) dimension. The current study expands upon prior research by examining age differences in day-to-day affect dynamics (mean levels, variability, and inertia) of arousal in PA and NA using dynamic structural equation modeling. Data were from a prior study in which 492 adults aged 21 to 91 (Mean = 51.01, SD = 16.08) completed 21 daily surveys. Regarding mean levels, results showed that age had a negative, linear association with high-arousal NA ($\beta = -.28$, 95%CI [-.34, -.21]) and low-arousal NA ($\beta = -.19$, 95%CI [-.26, -.13]). A quadratic trend was evident for levels of high-arousal and low-arousal PA, both showing a J-shaped relationship with age. For variability, age was also negatively and linearly related to both NA and PA variability regardless of arousal (NA-high: $\beta = -.23$, 95%CI [-.29, -.17]; NA-low: $\beta = -.23$, 95%CI [-.29, -.17]; PA-high: $\beta = -.17$, 95%CI [-.24, -.11]; PA-low: $\beta = -.21$, 95%CI [-.27, -.14]). For inertia, high-arousal NA inertia decreased linearly with age ($\beta = -.14$, 95%CI [-.24, -.04]) whereas low-arousal PA inertia showed an

inverted U-shape across age. Overall, results support prior findings of older adults' higher well-being (more PA, less NA, less affect variability) and show age-related differences in inertia, providing a more nuanced picture of affect dynamics across adulthood.

Conference Agenda

Session

P4-D2: Paper Session 4 - Day 2 (Various 2: Application of ESM in Research and Practice)

Time: Thursday, 01/July/2021: 7:30pm - 8:45pm

Presentations

The relation between well-being and different measures of objectively assessed physical activity and sedentary behavior accumulation patterns

Lianne P. de Vries¹, Dirk H.M. Pelt¹, Gonneke Willemsen¹, Hidde P. van der Ploeg², Mai J. M. Chinapaw², Eco J.C. de Geus¹, Meike Bartels¹

¹Vrije Universiteit Amsterdam, The Netherlands; ²Amsterdam UMC, Vrije Universiteit Amsterdam, Amsterdam, The Netherlands

Well-being has been positively related to physical activity (PA) and negatively to sedentary behavior (SB). However, strong individual differences in the affective responses after exercise are reported. Until recently, most studies including an objective measure of PA/SB used a total or average accelerometry score, ignoring most of the richness of the data. Lately, it has been suggested that the accumulation pattern of PA/SB might be more predictive for health outcomes than a total score. For example, the number of bouts in which the total sedentary time is accumulated seems to be positively related to physical and mental health and the shape of the daytime pattern is suggested to matter.

In a sample of twins and their siblings (N=800; mean age=32.6, SD=8.5), we investigate the association between trait well-being and ambulatory assessed physical activity and sedentary behaviour in more detail. The participants wore an Actigraph accelerometer for 7 consecutive days. Participants indicated working times, enabling us to make a distinction between occupational and non-occupational PA/SB. We extract different measures of PA and SB (accumulation), including total PA/SB, fragmentation and mean length and number of PA/SB bouts and relate these to well-being traits. Furthermore, we apply multilevel models including hour segments as predictors. Finally, we cluster participants based on the intensity, duration, and timing of PA/SB accumulation and compare these clusters on their well-being scores.

These results will lead to further insights in the relation between well-being and daily patterns of physical activity and sedentary behaviour.

Pre-sleep rumination and mindfulness as predictors of sleep disturbance

Thomas Mäder^{1,2}, Dries Debeer³, Walter Karlen⁴, Erich Seifritz², Kim Felmingham⁵, Edward F. Pace-Schott⁶, Birgit Kleim^{1,2} ¹Department of Psychology, University of Zurich, Zurich, Switzerland; ²Department of Psychiatry, Psychotherapy and Psychosomatics, Psychiatric Hospital, University of Zurich, Zurich, Switzerland; ³Faculty of Psychology and Educational Sciences, KU Leuven, Leuven, Belgium; ⁴Mobile Health Systems Lab, Institute of Robotics and Intelligent Systems, Department of Health Sciences and Technology, ETH Zurich, Zurich, Switzerland; ⁵Department of Psychology, University of Melbourne, Melbourne, Australia; ⁶Department of Psychiatry, Harvard Medical School, Massachusetts General Hospital, Boston, USA

Background: Research has established significant links between rumination and sleep initiation disturbance, while the association with sleep maintenance disturbance is less clear. Mindfulness has been associated with better overall sleep quality. Both of these cognitive processes have rarely been studied as states during the sleep onset phase and little is known about how they interact in predicting sleep disturbance. We investigated the effects of pre-sleep rumination and mindfulness and their interaction on specific sleep indices in stress- exposed medical students.

Methods: We used diary and actigraphy measurements for seven consecutive days in a sample of 50 medical students during their first medical internship, a period associated with increased stress-exposure. Measurements included pre-sleep rumination and mindfulness, daytime stress, sleep onset latency (SOL), total sleep time (TST), weighted wake-up frequency (number of awakenings / TST), restfulness of sleep, and nocturnal heart rate (HR).

Results: Multilevel regression analyses showed a significant effect of pre-sleep rumination on diary- and actigraphy-based SOL, TST, weighted wake-up frequency, and diary-based restfulness of sleep. We did not find any main effects for pre-sleep mindfulness nor any interactions between pre-sleep rumination and mindfulness. Nocturnal HR was not significantly associated with either of the two pre-sleep processes.

Conclusions: Our findings suggest that pre-sleep rumination may be an important cognitive risk factor for sleep initiation and maintenance disturbance and may have a significant influence on the stress sleep relationship. This has implications for programs aiming to improve sleep quality and prevent serious consequences and chronification of sleep disturbance in at-risk populations.

Increase of excessive screen use behaviors in relation to COVID-19-related confinements – An ecological momentary assessment study

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¹Paris-Lodron-University of Salzburg, Department of Psychology, Division of Health Psychology, Austria; ²Centre for Cognitive Neuroscience, University of Salzburg, Austria

Introduction. COVID-19 evolved into a global pandemic and most countries enforced social confinements to reduce transmission. Meanwhile, addiction-related screen use habits increased during COVID-19 and negative consequences of such excessive screen use behaviors on mental and physical health are well documented. Yet, experienced confinements can vary on a daily basis within individuals and variation between individuals (e.g., age, sex, living alone) likely contributes to excessive screen use

Method. In total, 102 participants completed 14 days of ecological momentary assessment during a COVID-19 related lockdown in Germany and Austria. Participants indicated the extent to which they felt restricted by confinements in their social and work live, engagement in unusually high and intense levels of television watching, social media use, news consumption, internet surfing and gaming, and the level of experienced day structure.

Results. Higher experienced work confinements were positively associated with more social media usage in all participants, gaming in males, and news consumption in individuals living alone. Higher social confinements were positively associated with more television watching and social media consumption, especially in younger participants. Higher experienced day structure related to less television watching, gaming and internet surfing but more news consumption.

Discussion. The present study uncovers peaks in screen use behaviors associated with day-to-day changes in confinements in work and social life. Screen use behaviors increased with higher confinements within person, dependent on sex, age and living situation. This calls for targeted interventions and the present study points to potential low-threshold interventions in form of day structuring.

Medical cannabis use and pain: an experience sampling method

Sharon R. Sznitman¹, Talya Greene¹, Dennis Rosenberg¹, David Meiri²

¹University of Haifa, Israel; ²Technion, Israel

Objective: Randomized control trials show that medical cannabis (MC) has pain relieving effects, but very little research has tested associations of pain and MC use after long term treatment and through methods that have external validity outside of the experimental setting. This study examines association of pain and MC use in the daily lives of chronic pain patients that have been using MC for extended periods of time.

Methods: Seventy-eight chronic pain patients with MC licenses provided data on momentary experiences of pain, negative affect, fatigue and MC use three times per day over a 10 day period over their smartphones (nobservations = 1688). Mixed effects models examined the relations between within- and between-person experiences of pain, affect and fatigue and MC use.

Results: Within persons, elevated experiences of pain intensity and interference with activities were associated with greater intention to use MC within the next

hour. No evidence was found that time elapsed since last MC use was associated with levels of pain, negative affect or fatigue.

Conclusions: While long-term MC chronic pain patients intend to use MC in response to pain experiences, they may not achieve pain relief. More research is needed to examine whether continued MC use despite lack of pain relief is related to relief of symptoms of cannabis use disorders or other positive benefits such as general sense of well-being.

Perfectionistic Cognitions as Antecedents of Work Engagement: A Daily Diary Study Among Employees

Marcel C. Schmitt¹, Elisabeth Prestele¹, Dorota Reis²

¹University of Koblenz-Landau, Germany; ²Saarland University, Germany

Multidimensional perfectionism has mostly been examined as a stable personality trait in research. However, the development of measures to assess perfectionistic cognitions have made it possible to investigate state-like manifestations of perfectionism and their associations in a within-person approach. In the present daily diary study, we propose that daily perfectionistic cognitions comprise relevant transient personal characteristics for predicting daily work engagement in addition to and in their interplay with daily time pressure as a common job demand. To this end, 157 employees assessed the frequency of perfectionistic cognitions and the level of time pressure and work engagement during work on 15 consecutive workdays. As expected, multilevel regression analyses yielded a positive unique effect of perfectionistic strivings cognitions (PSC) and a negative unique effect of perfectionistic concerns cognitions (PCC) on daily work engagement. Moderation analyses suggested a U-shaped relation for high unique PSC and an inverted U-shaped relation between daily time pressure and daily work engagement for low unique PSC. Building on the Job Demands–Resources Theory, we propose that the dimension of perfectionistic strivings constitutes a personal resource and the dimension of perfectionistic concerns constitutes a personal demand in the prediction of work engagement.

Conference Agenda

Session

S2-D2: Symposium Session 2 - Day 2

Time: *Thursday, 01/July/2021: 7:30pm - 8:45pm*

Presentations

Psychobiological EMA Research in Women: Methodological Considerations and Recent Findings

Chair(s): Beate Ditzen (a) Ruprecht-Karls University, (b) Heidelberg University Hospital, Heidelberg, Germany), **Christine Kuehner** (a) Ruprecht-Karls University, Heidelberg; (b) Research Group Longitudinal and Intervention Research, Department of Psychiatry and Psychotherapy, Central Institute of Mental Health, Mannheim)

Discussant(s): Ulrike Ehlert (a) Department of Clinical Psychology and Psychotherapy, University of Zurich, Zurich, Switzerland; (b) URPP Dynamics of Healthy Aging Research Priority Program, University of Zurich, Zurich, Switzerland)

During the life course and across all cultures, women report considerable variability in sensitivity towards stress and alterations in negative mood. However, the extent to which women's greater lifetime exposure to reproductive hormone fluctuations contribute to their heightened prevalence of depressive disorders remains unclear. An observed increase in depressive symptoms during times of hormonal transitions (the menstrual cycle, pregnancy and birth, menopause) in some women suggests that underlying sex-steroid based dynamics may influence stress-sensitivity, behavior, and mood symptoms, but also points to individual differences in respective neurobiological sensitivity.

Our groups have worked on technological and statistical tools, which allow for a multilevel assessment of both psychobiological and subjective data in women's everyday life. Since recent years, there is notable improvement in such combined ecological momentary assessments and analysis of the resulting multilevel data on an intra- and inter-individual level.

At the conference, we would like to critically discuss state-of-the art methods and upcoming trends, which can help to validly measure women's biological data in combination with their self-reported affect. Based on this, original data on self-report measures, hormone- sensitive assessments, and interventions will be presented. With this international endeavor (groups from Germany, Austria and Switzerland being involved) and including researchers at different levels of their career, we aim to broaden our network on women's mental health research with an emphasis on psychobiological and multilevel assessments in daily life.

Presentations of the Symposium

Wearable, multisensor, consumer devices for longitudinal research – the need for new and interdisciplinary approaches of analysis

Jessica Grub¹, Hannah Suess¹, Jasmine Willi¹, Daniele Dell'Aglio², Ulrike Ehlert¹

¹a) Department of Clinical Psychology and Psychotherapy, University of Zurich, Zurich, Switzerland; (b) URPP Dynamics of Healthy Aging Research Priority Program, University of Zurich, Zurich, Switzerland, ²Department of Informatics, Dynamic and Distributed Information Systems Group, University of Zurich, Zurich, Switzerland

Objective

Multisensor, wearable devices measuring physiological parameters in an ambulatory assessment are widespread, yielding great opportunities for research to collect big, time series data. Unfortunately, neither the devices' algorithms nor the raw sensor data are usually accessible for external parties, leaving a research gap on analyses on time series physiological data. This study aims to contribute in a broader perspective to the research gap on analyses of such data and more concretely to detect hot flushes when using a wearable device.

Methods

128 healthy female participants (40–56 years) of the Swiss Perimenopause Study participated in the physiological ambulatory assessment. For 180 nights, the women wore the smart wrist band AVA, a fertility- and cycle-tracking device, which measures physiological variables such as heart rate and skin conductance providing an output every 10 seconds. Additionally, psychological outcomes such as depressive symptoms and saliva and blood samples were collected over the course of participation.

Results

Time-series data calls for alternative, interdisciplinary approaches. Thus, a research cooperation with the in-house Department of Informatics was established. Two projects have since been carried out, yielding information about the characteristics of time series data and the (pre)processing needed, e.g. handling missing values and smoothing of the data. Furthermore, analyses such as time series clustering and an algorithm for sleep-wake-classification was conducted.

Discussion

These first approaches provide us with further insight on patterns within the data and the opportunity for sleep-quality measures. Ultimately, the gathered information shall enable us to detect hot flushes in subjects at different life stages.

How to study the menstrual cycle using ecological momentary assessment (EMA): The Heidelberg dysmenorrhea study

Katja M. Schmalenberger¹, Katharina R. van Stein¹, Maren Schick¹, Monika Eckstein¹, Tory Eisenlohr-Moul², Beate Ditzen¹ ¹a) Ruprecht-Karls

University, (b) Heidelberg University Hospital, Heidelberg, Germany, ²Women's Mental Health Research Program, Department of Psychiatry, University of Illinois at Chicago, Chicago, Illinois, USA

The menstrual cycle with its systematic ovarian hormone changes is capable of exerting psychological symptoms and painful menstrual cramps (i.e., dysmenorrhea); however, not all naturally-cycling individuals are affected. Given that individuals highly differ in their vulnerability to cyclical symptoms, the menstrual cycle is fundamentally a within-person process and should be treated as such in clinical assessment and study design. For this reason, repeated measures studies are the gold standard approach to cycle research, with daily or multi-daily (i.e., ecological momentary assessment/EMA) ratings of the outcome being the preferred method of data collection. However, despite decades of research on the physiological and psychological effects of the menstrual cycle, studies have not sufficiently adopted consistent methods for operationalizing the menstrual cycle which has resulted in substantial confusion in the literature and limited possibilities to conduct systematic reviews and meta-analyses.

The present talk introduces a set of integrative guidelines and standardized tools for studying the menstrual cycle using daily and multi- daily/EMA ratings. As an illustrating example, we present the Heidelberg dysmenorrhea study, in which naturally cycling individuals with dysmenorrhea and suspected endometriosis (planned N=48) are assessed via EMA regarding their perception of pain, stress, and social support. In parallel to the seven daily EMA questionnaires, participants provide saliva samples for determining daily cortisol profiles. One daily saliva sample serves to assess cycle phase and daily oxytocin levels. General advantages and limitations of EMA approaches in menstrual cycle research are discussed.

The bi-directional association between stress and sexual experience and behavior – an ecological momentary assessment study

Hanna M. Muees¹, Charlotte Markert², Urs M. Nater¹

¹University of Vienna, Institute of Psychology, Vienna, Austria, ²Justus-Liebig-University Gießen, Germany Background

Stress and sexual experience and behavior are important factors of everyday life and substantially contribute to health. Although some studies suggest a negative bi-directional association, there is also some contrasting evidence. This ecological momentary assessment study investigates the bi-directional association between sexuality (i.e., sexual desire and arousal) and stress (i.e., subjective stress) in a setting with high ecological validity.

Methods

Fifty-eight heterosexual healthy individuals in a relationship (29 women, M = 24.76 years old, SD = 2.96, Range: 19-31; 29 men, M = 24.28, SD = 3.09, Range: 20-32) were asked to complete data entries on a pre-programmed iPod 7 times a day over the course of 14 consecutive days. Nested data were analyzed separately for men and women using multilevel modelling in HLM.

Results

While there was no significant difference in subjective stress levels between men and women ($p = .799$), there were significant gender differences in sexual desire ($p = .005$) and sexual arousal ($p < .001$). Furthermore, subjective stress significantly predicted sexual desire ($UC = -0.06$, $p = .029$, Pseudo $R^2 = 0.217$) and sexual arousal ($UC = -0.05$, $p = <.001$, Pseudo $R^2 = 0.415$) in women at the following measurement point. No such effect was found vice versa or in men.

Discussion

Subjective stress predicted lower sexual desire and arousal in women. Hence, stress might play a role in women suffering from low sexual desire and arousal. No such effect was found in men. These findings should be considered appropriately in a clinical context.

Effects of cognitive emotion regulation strategies on mood and cortisol during daily life in women with Premenstrual Dysphoric Disorder

Sibel Nayman, Theresa Beddig, Christine Kuehner

a) Ruprecht-Karls University, Heidelberg; b) Research Group Longitudinal and Intervention Research, Department of Psychiatry and Psychotherapy, Central Institute of Mental Health, Mannheim

Background

Given the symptom cyclicity in premenstrual dysphoric disorder (PMDD), ambulatory assessment (AA) is ideally suited to capture psychological and physiological processes across the menstrual cycle in affected women.

Methods

Our study examines habitual emotion regulation (ER-) strategies in women with and without PMDD and their predictive value for mood and basal cortisol courses across the menstrual cycle in PMDD women. Women with PMDD and control women ($n = 61$ each) were compared regarding habitual rumination, mindfulness, expressive suppression and reappraisal. Momentary affect and basal cortisol activity were assessed over two consecutive days per cycle phase.

Results

Women with PMDD reported higher levels of rumination, lower levels of mindfulness and fewer use of both suppression and reappraisal strategies than controls. In women with PMDD, lower levels of rumination and higher levels of mindfulness and reappraisal predicted decreased negative and increased positive affect across the menstrual cycle. However, women with more favorable ER-strategies displayed stronger cyclicity in momentary mood, resulting in stronger mood deterioration in the late luteal phase, thereby resembling those women with more unfavorable ER-strategies towards the end of the cycle. Lower mindfulness predicted blunted basal cortisol activity, particularly in the late luteal phase.

Discussion

Our findings suggest that protective psychological factors are linked to improved momentary mood in women with PMDD but do not appear to protect affected women from cycle-dependent mood deterioration. Habitual mindfulness, on the other hand, seems to exert a beneficial effect on basal cortisol activity in women with PMDD, especially in the late luteal phase.

Investigating the social context in daily life Chair(s): **Laura Bringmann** (University of Groningen) Discussant(s): **Laura Bringmann** (University of Groningen)

The influence that an individual's social context and the individual's behaviours, thoughts and feelings have on each other is widely recognised. However, not much is known about their dynamic interplay in daily life. To study these dynamics, several methodological challenges need to be addressed.

In this symposium, we thus discuss how individuals' experience sampling reports of social contexts can be measured and modelled in new ways that do justice to the complex nature of intra- and interpersonal dynamics. The first speaker elaborates on how person-specific egocentric social networks can be integrated into experience sampling methodology. The second presenter shows how validly experience sampling data of the social context relate to passively recorded smartphone data. The third speaker demonstrates how social interaction dynamics measured through experience sampling methods can be modelled. The fourth presenter shows how a recently developed measurement approach through screen-records of individuals' everyday digital experiences (i.e., screenomics) provides novel insights into ongoing in-situ person-context transactions.

Overall, the four presentations contribute to a better understanding of the role and measurement of social contexts in daily life.

Presentations of the Symposium

Integrating personal networks into experience sampling

Marie Stadel, Laura Bringmann, Gert Stulp, Marijtje van Duijn

University of Groningen

The main interest of experience sampling research in psychology so far has been to investigate moment-to-moment fluctuations of psychological variables such as affect within an individual. Thus, a low emphasis is placed on the development of detailed dynamic social context assessments, despite the social context having a strong impact on these psychological variables. Present methods provide only limited data on social interactions (e.g. the social role of interaction partners as well as how the interaction was perceived by the participant). Relevant person-specific information about the interaction partner, for example how close the participant is to this person or whether their relationship is generally positive, are currently not captured. Moreover, multiple interactions with the same partner are also not linked to each other and effects of interacting with one specific person cannot be uncovered.

A complete social context assessment can be achieved by integrating personal network data collection into ESM. Such an integration provides rich data about participants' general social environment as well as person-specific assessment of social interactions. The presented study investigates whether such a method is practically feasible, i.e. how to implement it without burdening participant and

researcher too much. Specifically, we evaluate different approaches of collecting personal networks in combination with ESM by comparing the networks to structured interviews with the same participants about their social environment.

Multimodal measurement of the social environment and its dynamics via experience sampling methods, digital phenotyping, and egocentric networks.

Anna Langener, Laura Bringmann, Gert Stulp, Martien Kas

University of Groningen

The social environment is important for wellbeing, but the ability to capture the social environment has been challenging. First, different disciplines have

developed different methods that capture different parts of the social environment relevant for wellbeing. Research that attempts to capture these different aspects of the social environment simultaneously is lacking. Second, the social environment is a dynamic concept, yet most methods used involve static measures. Recent innovations have led to methodologies that are able to capture the dynamics (e.g. day-to-day social interactions) of the social environment. Psychologists, for instance, often use experience sampling methods (ESM) to study change within a person, the environment, and social interactions. Next, various disciplines are using digital phenotyping (based on, e.g., smartphones) to passively capture the social behavior and interactions of a person. Further, sociologists are starting to use egocentric networks in a dynamical way to integrate the change of an individual in a dynamic larger social context. Up to now, these methods have not been integrated. However, combining the strength of those methods might create a more accurate and feasible measurement of social dynamics and its relation to wellbeing. Therefore, in this study, we first evaluate how ESM, digital phenotyping, and egocentric networks are used to measure the social environment. Second, we investigate how those methods are combined. We propose that the integration of these methods will provide a way forward to assess the human social environment and its dynamics in a quantitative manner.

Modeling social interaction dynamics

Timon Elmer¹, Marijtje van Duijn¹, Tom Snijders², Nilam Ram³

¹University of Groningen, ²University of Groningen, University of Oxford, ³Stanford University

Social interactions are a fundamental part of everyday life. Despite the advancements in ambulatory assessment methods to measure social interactions, there is a lack of statistical methods that facilitate the modeling of those social dynamics. In particular, little has been done on how individual (emotional) states influence whether and with whom individuals socially interact. This article forwards a novel statistical model combining longitudinal methods and social network analysis methods to model the propensity for individuals to interact with certain interaction partners – informed by previous interaction dynamics and individual attributes (e.g., affect). Using the iSAHIB dataset (N = 150) in which social interactions (T = 64,112) and affect dynamics were measured using experience sampling methods (Ram et al., 2014), we illustrate to what extent this new model can advance the understanding of social-interaction dynamics in daily life.

The Human Screenome Project: Studying Digital Behaviors in Daily Life

Nilam Ram, Thomas Robinson, Byron Reeves

Stanford University

The variety of human experiences that can be mediated through mobile devices means that life emerges on our screens – digital life is... life. All of it is there. Once on a screen, individuals' interactions with other people and information can be paused, restarted, reordered, and atomized in any manner a user sees fit. Individuals build personalized threads of experience that cut instantly between different contexts and content – curating their digital experiences in real time as they select what and whom to engage with, for how long, and to what purpose. Inspired by the challenge of obtaining accurate and detailed information about what individuals actually consume and produce on their screens we have forwarded and developed a novel method for capturing everything that appears on an individual's smartphone and laptop – the unique record of an individual's everyday digital experiences – Screenomics (Reeves, Robinson, & Ram, 2020). In our quest to derive knowledge from and understand these ordered sequences of hundreds of thousands of smartphone and laptop screenshots obtained every five seconds for between one day and six months – screenomes – have become a playground for learning about computational machinery used to process images and text, machine learning algorithms, emergent taxonomies of behavior and context, qualitative inquiry, and the tension between N = 1 and N = many approaches. Using a selection of empirical examples, we illustrate how engagement with these new data is reshaping both how we do analyses and how we study the person-context transactions that drive human behavior.

Can we use early warning signals to foresee transitions in psychiatry? Evidence from four empirical studies

Chair(s): Arnout C. Smit (University of Groningen, University Medical Center Groningen, Interdisciplinary Center Psychopathology and Emotion regulation (ICPE), P.O. Box 30.001 (CC72), 9700 RB Groningen, the Netherlands), **Marieke A. Helmich** (University of Groningen, University Medical Center Groningen, Interdisciplinary Center Psychopathology and Emotion regulation (ICPE), P.O. Box 30.001 (CC72), 9700 RB Groningen, the Netherlands), **Fionneke M. Bos** (University of Groningen, University Medical Center Groningen, Interdisciplinary Center Psychopathology and Emotion regulation (ICPE), P.O. Box 30.001 (CC72), 9700 RB Groningen, the Netherlands), **Bennard Doornbos** (Department of Specialized Training, Psychiatric Hospital Mental Health Services Drenthe, Outpatient Clinics, Assen, The Netherlands), **Marieke J. Schreuder** (University of Groningen, University Medical Center Groningen, Interdisciplinary Center Psychopathology and Emotion regulation (ICPE), P.O. Box 30.001 (CC72), 9700 RB Groningen, the Netherlands)
Discussant(s): Inez Germeys (Department of Neuroscience, Research Group Psychiatry, KU Leuven, Leuven, Belgium)

Anticipating clinically relevant symptom changes is a major challenge in psychiatry. If psychopathology behaves like other complex systems, transitions in symptoms might be predicted from early warning signals (EWS). These signals manifest in the dynamics of momentary affective states, and can be monitored using ecological momentary assessment (EMA). For instance, preliminary studies in depression show that rises in EWS (specifically, autocorrelation and variance) anticipate transitions to depression. Importantly, EWS are hypothesized to universally apply to a multitude of psychiatric disorders in diverse stages of care. As such, EWS appear to be a promising tool for the personalized prediction of meaningful symptom shifts in psychopathology.

To systematically study EWS in psychopathology, all studies in this symposium employed ambitious high-frequency longitudinal EMA designs for several months, yielding 183-610 observations/person. To date, these are the first data sets that enable systematic study of prospective EWS to anticipate clinically relevant changes in diverse psychiatric populations. Specifically, we will examine whether EWS anticipate 1) the recurrence of depression in patients (n=56) that discontinued antidepressant medication, 2) symptom improvement in depressed patients (n=41) starting psychotherapy, 3) manic and depressive episodes in rapid cycling bipolar disorder patients (n=20), and 4) onset and progression of psychopathology high-risk young adults (n=122). Different methodological approaches, including moving window analyses and generalized additive models, were adopted to study EWS.

The theoretical implications and clinical utility of EWS as personalized warning signs in diverse psychiatric populations will be discussed.

Presentations of the Symposium

Do early warning signals precede transitions toward depression in individual patients?

Arnout C. Smit, Marieke A. Helmich, Laura F. Bringmann, Albertine J. Oldehinkel, Marieke Wichers, Evelien Snippe

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The vast majority of studies assessing the risk of depressive recurrence used only cross-sectional between-person risk markers. However,

as the changeable and dynamic nature of psychopathology is increasingly recognized, longitudinal within-person risk markers, such as increasing lag-1 autocorrelation and variance, may be highly relevant as well. These Early Warning Signals (EWS) have been demonstrated to signal upcoming transitions in a wide range of theoretical and empirical dynamical systems, which suggests they could potentially be a suitable tool to deal with the large heterogeneity found in depression. Being able to predict the recurrence of depressive symptoms in the near future for individual patients would be a major step towards preventing depression in clinical practice. The aim of this study is to examine whether EWS precede transitions toward higher levels of depressive symptoms in individual patients.

Intensive longitudinal data was obtained for 56 participants, using 5 EMA questionnaires daily for a continuous 4-month high-risk period: during and shortly after (gradual) antidepressant discontinuation (~592 completed questionnaires per participant). Thirty-three participants experienced a transition in depressive symptoms, allowing us, for the first time, to study if EWS systematically rise in individual patients before an increase in depressive symptoms. Seven separately obtained pilot cases showed promising results: in both patients with a transition the hypothesized EWS were found; in the majority of the five cases without a transition, EWS were absent. In this symposium I will present the results from the 56 participants for whom the data collection has recently been completed.

The rocky road to recovery: Do Early Warning Signals precede transitions towards depressive symptom improvement in individual patients?

Marieke A. Helmich, Arnout C. Smit, Marieke J. Schreuder, Laura F. Bringmann, Albertine J. Oldehinkel, Marieke Wichers, Evelien Snippe

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The path to depressive symptom improvement during therapy is very personal and often complex. This complicates evaluating the effectiveness of the therapy based on depressive symptoms alone, as many individuals experience periods of instability and discontinuous symptom change. To gain a better understanding of the dynamics that precede clinically relevant symptom shifts in depression, researchers have begun intensive monitoring of symptoms and momentary affect over time. Although the process of improvement is particular to each individual and can be hard to monitor, Early Warning Signals (EWS) in the form of lag-1 autocorrelation and variance in EMA time series, have been suggested as potential generic indicators of imminent symptom shifts. If EWS can indeed be found consistently, this could be a useful tool for treatment as it may provide patients and therapists with feedback about the effectiveness of the current treatment, even when depressive symptoms have not yet improved at the mean-level or are strongly fluctuating.

In the current study, we gathered individual intensive longitudinal timeseries data from 41 individuals undergoing psychological treatment to be able to investigate whether EWS indeed consistently occur before clinically relevant symptom improvements. Specifically, we test whether lag-1 autocorrelation and variance in momentary affect rises before the 28 identified transitions. Affect was measured five-times daily for a period of four months (521 observations per individual on average), and depressive symptoms were assessed weekly over six months. In this symposium, I will present the results and answer whether EWS indeed precede depressive symptom improvements.

Anticipating manic and depressive shifts in patients with bipolar disorder using early warning signals

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Patients with bipolar disorder experience rapid transitions to manic and depressive episodes, which remain difficult to predict. Smartphone monitoring of affect and symptoms using ecological momentary assessment (EMA) enables the study of early warning signals (EWS) to anticipate ensuing mood shifts. The present study investigated whether EWS can anticipate mood shifts in individual patients, and whether EWS could have clinical utility.

Twenty bipolar type I/II patients completed EMA questionnaires five times a day for four months (Mean=491 observations per person). Weekly completed symptom questionnaires on depressive (Quick Inventory for Depressive Symptomatology Self-Report) and manic (Altman Self-Rating Mania Scale) symptoms were used to determine transitions. EWS (rises in autocorrelation at lag-1 and standard deviation) were calculated in moving windows over 17 affective and symptomatic EMA states. Kendall's tau was calculated to detect significant EWS prior to transitions. Positive and negative predictive values were calculated to determine clinical utility.

Eleven patients reported 1-2 manic or depressive transitions. EWS were found prior to transitions, but also in patients without transitions. Averaged across momentary states, EWS improved the likelihood of detecting an impending mood shift by 9-16 percentage point above the transition prevalence in this sample. However, EWS in specific momentary states showed substantially higher predictive values ranging from 65-100%: cheerfulness, focusing ability, full of ideas, worry, energy, agitation, racing thoughts, and tiredness. Large individual differences in the utility of EWS were found. In conclusion, EWS show promise in anticipating manic and depressive transitions in bipolar disorder. Further confirmatory research is warranted.

Anticipating transitions in mental health in at-risk youth: a large-scale diary study into early warning signals

Marieke J. Schreuder, Catharina A. Hartman, Robin N. Groen, Arnout C. Smit, Marieke Wichers, Johanna T.W. Wigman University of Groningen, University Medical Center Groningen, Interdisciplinary Center Psychopathology and Emotion regulation (ICPE), Groningen, the Netherlands

Individuals' risk for drops in mental health is highest in early adulthood. Foreseeing such transitions by means of early warning signals (EWS) could considerably improve targeted early interventions. The present diary study investigated the sensitivity and specificity with which EWS anticipate drops in mental health in at-risk youth.

Young adults at increased risk for psychopathology (N=122, mean age 23.6 ±0.7 years, 57% males) completed daily questionnaires on mental states for six consecutive months. Change point analyses identified a drop in mental health in 17 individuals. EWS, operationalized as rising trends in the autoregressive coefficient of 36 negative mental states, were identified using generalized additive models. EWS preceded drops in mental health in ten individuals (59%; mean no. of EWS 2.3 ±2.3), but were also present in a matched subsample of individuals without such drops (N=17, 47% of whom showed EWS; mean 1.4 ±0.7). The sensitivity and specificity of EWS for each individual negative mental state ranged between 0-.12 and .88-1, respectively. EWS varied considerably in number, timing, and strength, between individuals and negative mental states.

In conclusion, EWS were seldomly detected, and therefore neither their presence nor their absence are informative of vulnerability to mental ill-health. Hence, rising autocorrelations cannot reliably warn for impending drops in mental health in at-risk youth. Future research should investigate the prerequisites for detecting EWS in the context of mental health, particularly with respect to the stability of pre- and post-transition phases, the magnitude of transitions, and the timescale at which EWS manifest.

Predictors of Affective Wellbeing in Emerging Adulthood: New evidence from ESM studies

Chair(s): Sakari Lemola (Bielefeld University, Germany), **Anu Realo** (University of Warwick)

In emerging adulthood – the stage of life between approximately 18-25 years of age – individuals are exposed to major social and academic challenges and evidence suggests that mental health problems often occur for the first time in this period. However, to date there is only limited understanding of the role of life-style choices (e.g., physical activity, social media use etc.) and coping strategies (adaptive vs. maladaptive) for affective wellbeing in emerging adults as a majority of existing studies relied on cross-sectional correlative research designs. To address this gap in our understanding of the predictors of affective wellbeing, this symposium brings together five studies that applied experience sampling methodology (ESM) to measure affective wellbeing and its potential predictors. In particular, these five studies examine whether and to what degree affective well-being is predicted by actigraphy measured physical activity (Y.M. Li et al., Bielefeld University), social media use at night as well as subjectively and objectively measured sleep quality, quantity and timing (A. Das-Friebe and A. Lenneis et al, University of Warwick), and mindfulness (K. Senker et al., Bielefeld University). Furthermore, two presentations are focused on the interplay between academic procrastination and positive and negative emotions (C. Gadosey et al. and T. Schnettler et al.; both Westfälische Wilhelms-Universität Münster).

Presentations of the Symposium

Bedtime social media use, sleep, and subjective wellbeing in young adults

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Background: Findings from primarily cross-sectional studies have linked social media use, sleep, and subjective wellbeing among adolescents and young adults. This study examined (a) the role of bedtime social media use for subjective wellbeing and (b) the role of sleep for subjective wellbeing on subsequent days.

Methods: Using a smartphone application, 101 undergraduate students (Mage = 19.70 years, SD = 1.09 years), completed daily questionnaires assessing the previous night's bedtime social media use and sleep variables (one measurement per day, questionnaire sent at 08:00), and momentary subjective wellbeing (five measurements per day, at randomly varying times between 08:00 and 22:00 on weekdays and 10:00 and 22:00 on weekends), for 14 consecutive days. Objective assessments of total sleep time and sleep efficiency were obtained via wrist-worn actigraphs. Data were analysed with multilevel models.

Results: Increased bedtime social media use did not predict subjective wellbeing on the subsequent day. Increased bedtime social media use was not associated with poorer sleep the same night. Subjective sleep satisfaction (but not objective sleep indices or subjective sleep duration) predicted all components of subjective wellbeing (i.e., positive affect, negative affect, and life satisfaction).

Conclusions: This study found that bedtime social media use is not detrimental to the sleep and affective wellbeing of healthy young adults. Further, our results

indicate that it is particularly the evaluative component of sleep—sleep satisfaction—that is most consistently linked with next day's subjective wellbeing.

*Ahuti Das-Friebel and Anita Lenneis have equally contributed to this study.

Being more physically active makes people less depressed

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Physical activity is associated with a number of positive health outcomes as well as improvements in Major Depressive Disorder (MDD) symptoms. Heterogeneity in MDD symptoms and physical activity was also reported. This study will look at the relationships between the timing of physical activity and within- and between-individual differences in MDD symptoms.

Methods

Experience Sampling Methodology (ESM) was used to measure real-time depressive symptoms. Healthy participants were asked to respond to mobile questionnaires five times per day for 14 days. Activity sensors recording 3-dimensional acceleration were used to measure physical activity levels before and after the participants responding to the mobile questionnaires.

Results

We found significant relationships between within- and between-individual differences in several MDD symptoms and the means of physical activity levels measured 30, 60, and 120 minutes before and after the participants reported their mood. More significant associations were found between the physical activity measured before the mood ratings and in within-individual differences in MDD symptoms.

Conclusions

Our results showed heterogeneity in MDD symptoms. Physical activity may be used as a potential indicator for upcoming MDD symptoms. Within- and between-individual differences provided varying information as observed in the associations in different MDD symptoms.

Daily mindfulness, motivational conflict, and stress in university students: An experience-sampling study

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University students have a lot of freedom in organizing their everyday lives, but often also feel stressed and torn between action opportunities. Mindfulness entails the self-regulation of attention on immediate experience and an open and non-judging attitude towards these mental experiences. It is positively related to well-being and to intrapsychic congruence. The aim of the present work is to examine the relationship of daily mindfulness, motivational conflict, and perceived stress in the everyday life of university students.

During a week of smartphone-based experience-sampling, 108 university students were asked five times daily about their momentary mindfulness and whether they experience motivational conflicts. Additionally, we assessed perceived stress each evening.

The relationship between daily mindfulness, motivational conflict, and perceived stress was analyzed on the daily level with multi-level analyses. Both aggregated daily conflict (i.e., feeling that one should be doing something else) and mindfulness (i.e., being non-judgmental) yielded an effect on perceived stress, even when controlling for between-person differences in study load, for example. Findings underline the relevance of mindfulness for perceived stress in academic contexts and thereby also show an approach to positively influence well-being in university students in the future.

It's a sham! Effects of academic procrastination on the mood during leisure activities

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Academic procrastination is associated with negative long-term effects on the well-being of students. Yet, procrastination is discussed as short-term emotion-regulation strategy to improve the current mood. Contrariwise, in initial experience-sampling studies, students reported negative emotions (e.g., feelings of guilt) when they delayed learning activities in favor of leisure activities. Until now, there is a lack of studies regarding the short-term associations between procrastination and students' mood particularly in students' everyday life. In the current study, we investigated the influence of delaying learning activities in favor of leisure activities on mood during leisure time. A total of 69 mathematics students participated in a ten-day experience sampling study during their final examination period with five randomized

surveys per day. First, students' mood was assessed by means of the multidimensional mood questionnaire. Then, students indicated their current activity (e.g., leisure activity: watching television) and reported whether they were currently delaying learning activities. The analyses were based on N = 599 leisure situations. Of these, students postponed learning activities in n = 204 situations, whereas in n = 395 situations no delay of learning activities was observed. Multilevel regression analyses revealed worse mood, higher fatigue, and higher restlessness in leisure activities with delay compared to leisure activities without delay. Consequently, procrastination in leisure time seems to be associated with impaired mood. Possibly, the improvement in mood due to procrastination is only very short-term.

Procrastination in exam preparation: the influence of academic emotions

Christopher K. Gadosey¹, Theresa Schnettler¹, Anne Scheunemann², Stefan Fries³, Carola Grunschel¹

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Emotions in academic contexts are important in the occurrence of academic procrastination. Attempts to regulate negative achievement emotions such as anxiety are associated with procrastination. However, researchers have not investigated the role of positive achievement emotions (e.g., hope) and epistemic emotions (e.g., confusion). We examined how within-person variations in students' exam-related emotions (i.e., anxiety, hope, and confusion) and between-person factors (i.e., trait procrastination, gender, age, semester, and relevant exam) relate to state procrastination during preparations for a relevant end-of-semester exam. A total of N = 93 students participated in an experience sampling procedure for 10 days prior to the relevant exam. As expected, multilevel logistic regression analyses showed that higher state procrastination was associated with higher anxiety, lower hope, and higher trait procrastination. The association between hope and state procrastination was stronger when anxiety was lower. Confusion and demographic variables had no significant relation with state procrastination. Our research suggests anxiety and trait procrastination as possible risk factors for state procrastination, but hope as possible resource to reduce the urge to procrastinate.

Challenges of data-driven approaches to multimodal data integration for daily human activity

Chair(s): Iris Yocarini (Leiden University, Netherlands, The), **Daniela Gawehns** (Leiden University, Netherlands, The), **Stylian Paraschiakos** (Leiden University Medical Center, Netherlands)

The use of smartphone applications and wearable sensors provide us with tools for unobtrusive, continuous measurements on a high temporal resolution of (among others) a person's physical activity, stress levels, sleep, mobility, and social interaction patterns. This gives us additional ways to gather information compared to traditional self-reports. To accommodate the complex system of everyday life behaviour, experiences, and functioning with its biological, psychological, and social aspects, information on these different modalities is ideally combined. This symposium focuses on the integration of information from different modalities to measure and quantify human activities in daily life, thereby taking a data-driven approach. In such a multimodal data integration, several challenges exist that have only gotten little attention in the field of daily human activity; such as integrating different sampling rates across datasets, heterogeneity between people, and determining the point at which data integration is optimal (i.e., feature-level vs. decision-level fusion). Throughout the different talks in this symposium, examples are given of the challenges of multimodal data integration to model human activity throughout different settings. In each of these settings data from different sources, ranging from data from a smartphone application, accelerometers, gyroscopes, magnetometers, indirect calorimetry, GPS, photoplethysmography, and RDIF sensors, need to be combined to describe the activity for varying groups of people, such as children, elderly, and wheelchair users. In addition to specific studies with multimodal data, we present an open-labelled dataset with multimodal data.

Presentations of the Symposium

Integrating multimodal data in human activity recognition of wheelchair activities

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Human activity recognition (HAR) provides context information that has been shown to be valuable in energy expenditure estimation (EEE). This is also true for wheelchair activities performed by wheelchair users. Improved EEE (and HAR) is especially important for this population for which physical activity is limited and in which increased risk on obesity and associated risk of cardiovascular disease and mortality exist. Whereas monitoring physical activity may aid in increasing fitness levels, the sensor software used to track activity is mostly trained on non-wheelchair activities and therefore often inaccurate for wheelchair users. To date, most studies on HAR have mainly used sensor data from accelerometers, gyroscopes or magnetometers. However, recent developments in wearable photoplethysmography (PPG) also allow us to measure heart rate, an indication of the intensity level of the physical activity of the wearer. In this study, we assess the use of heart rate data in classifying wheelchair activities in addition to accelerometer data to improve HAR in wheelchair activities. To do so, we build a classifier using data from different modalities (i.e., from wearable accelerometers and a PPG) and evaluate different fusion models for the integration of these different data streams. To handle the different sampling rates in the different type of sensors, a decision-level (i.e., late) fusion technique is applied in which separate classification models are built for each modality. Subsequently, these different classifiers are merged through a meta-learner producing the final activity class.

Integrating Qualitative and Quantitative Data : Mixed Methods revisited from a Pattern Mining Perspective

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Mixed methods have been employed for a long time in the social, health, and behavioral sciences as a way to combine the best of two worlds, namely the reliability of quantitative methods and the expressiveness of qualitative data. In several research designs, the power of both types of methods are leveraged to inform each other or to be integrated. With more so called big data being collected within mixed- methods research, new data science methods, such as pattern mining, are now also employed to correlate, cluster and segment data. Often, the extracted patterns are not easily interpretable and most methods ask the researcher to take a multitude of decisions (from pre- processing to parameter settings such as cluster size or thresholds). These modeling choices influence the results of the pattern mining pipeline and easily propagate into the interpretation and conclusion of research papers. Data-driven methods that are employed to mine patterns in multi-modal data aggravate this issue by adding more dimensions and additional parameters. In this study, we show how qualitative information is not only integral to understanding and interpreting quantitative results, but is also needed to guide modeling choices made by the analyst. We will do this based on a case study in a Dutch nursing home, where wearables were used to collect activity data and data from fixed sensors and alarms were gathered in addition to observational, qualitative data that summarize the daily activities of residents at a dementia care ward.

Heterogeneous human daily life monitoring data integration, fusion and analysis for assessment and adverse event prediction

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Technological advances have made available enormous amounts of continuous data related to human activity and behavior. We present a real life sensing and intervention platform that was developed to better understand frailty of older people, provide quantitative and qualitative measures of frailty through advanced data analytics approaches on multiparametric data and predict short and long-term

outcome, risk of frailty and adverse events through a safe, unobtrusive and acceptable system for the ageing population. Data from physical, cognitive, psychological, and social domains are integrated and fused through various preprocessing techniques while a virtual patient model is used to provide a structured machine-readable representation (low- and high-level information) of a person's data. Physical activity recognition from wearable sensors is also performed as a step for physiological monitoring and assessment. In this talk we focus on data integration and fusion that happens at the data level, the feature level and the decision level as well as on big data analytics techniques that include multiple instance learning, deep convolutional neural networks, and tensor decomposition techniques that are used for assessment of frailty level and prediction of adverse events.

A Public Domain Dataset to Simulate Children's Free Play

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In free play children engage in physically and socially reinforcing activities offering unique opportunities for learning and socialization that are often not available in structured activities. However, studies using sensor data so far have mainly focused on the detection and analyses of movements in structured environments leaving unstructured activities such as free play understudied. Due to the complex nature of free play, one sensor type is not able to capture its quality. Therefore, a multi-modal approach fusing different sensor types is adopted. This approach has two advantages: Firstly, noise reduction methods can be improved. Secondly, methods that are able to map the complexity of free play in space, time and activity can be modified. To further develop these methods, a reliable dataset including free and structured play needs to be available. For this dataset, 15 participants wore three types of sensors including GPS loggers, motion sensors (accelerometer, magnetometer and gyroscope) and proximity sensors (RFID) and performed play activities in two protocols: structured and unstructured. Both scenarios are video recorded, and videos are used as ground truth in order to evaluate the captured data. Results of such data-driven approaches can be validated with labeled ground truth datasets. To the best of our knowledge, no such datasets exists for the sensor types that are employed here and more specifically, for children's unstructured interactions. A dataset simulating free play as well as structured activities will fill this gap and will enable researchers from different fields to validate and improve on their methods.

RNNs on monitoring Physical Activity Energy Expenditure in older individuals

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Quantifying physical activity energy expenditure (PAEE) of older people, has the potential to stimulate vital and healthy ageing by inducing behavioural changes and linking them to personal health gains. To be able to measure PAEE in everyday life, methods from wearable accelerometers have been developed, however, mainly targeted towards younger people. Since older subjects differ in energy requirements and range of physical activities, the current models may not be suitable for PAEE estimation. Because past activities influence present PAEE, we propose a modeling approach known for its ability to model sequential data, the Recurrent Neural Network (RNN). To train the RNN, we used the GOTOV dataset with 34 healthy participants of 60 years and older, performing 16 activities. We used accelerometers placed on wrist and ankle, and measurements of indirect calorimetry. After optimization, we propose an architecture consisting of an RNN with 3 GRU layers and a feedforward network combining both accelerometer and participant-level data. In this paper, we describe our efforts to go beyond the standard facilities of a GRU-based RNN, with the aim of achieving accuracy surpassing the state of the art. These efforts include switching aggregation function from mean to dispersion measures, combining temporal and static data (person-specific details) and adding predicted symbolic activity data by a previously trained ML model. The resulting architecture increases its performance by approximately 10% while decreasing training input by a factor of 10. It can thus be employed to investigate associations of PAEE with vitality parameters related to healthy ageing.

Ecological momentary interventions in the prevention and treatment of severe mental health disorders: A symposium on four different intervention trials.

Chair(s): Ulrich Reininghaus (Department of Public Mental Health, Central Institute of Mental Health, Medical Faculty Mannheim, Heidelberg University, Mannheim, Baden-Württemberg, Germany), **Inez Myin-Germeys** (Department of Neurosciences, Center for Contextual Psychiatry (CCP), University of Leuven, Leuven, Belgium)

Most mental health disorders emerge at a young age and are preceded by an admixture of symptoms including anxiety, depression, and psychotic experiences, which may signal a heightened risk for developing a severe mental disorder later on. These disorders often share underlying psychological vulnerabilities including low self-esteem, alterations in stress reactivity, and deficits in motivational processes. While many traditional psychotherapies show significant effect sizes, the effects are often small to moderate and do not sustain over time. This may reflect a gap between the therapy room and the real world, characterized by patients learning specific skills and strategies in therapy, but failing to practice them in their day-to-day lives. Furthermore, therapy needs to be more personalized, not only to the needs of a specific patient but also to moments when it is needed most.

This highlights the need for psychosocial interventions that are personalized, timely, effective, and sustainable while improving resilience to underlying

vulnerabilities. Ecological Momentary Interventions (EMIs) provide innovative vistas to tackle these needs based on Experience Sampling Methodology (ESM). Indeed, EMIs may be used as a clinical tool to modify or augment psychotherapy, and deliver personalized and targeted momentary therapeutic principles and techniques to cope better with stressors and symptoms on a smartphone application. As such, EMIs allow patients to practice coping skills in their day-to-day lives, where and when it is most needed, based on principles and sampling schemes of ESM. We will showcase four innovative applications of EMIs in clinical practice and discuss future directions.

Presentations of the Symposium

An ecological momentary compassion-focused intervention for enhancing resilience in help-seeking youths

Isabell Paetzold

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Most mental disorders emerge in youth; they are the leading cause of overall disease burden in adolescents and young adults in high-income countries. Elevated stress reactivity is a widely studied putative mechanism underlying various mental health problems and is thus a promising target for preventing future adverse outcomes and enhancing resilience. EMIcompass, a compassion-focused ecological momentary intervention (EMIcompass), was developed to offer a youth friendly, accessible, tailored, transdiagnostic, real-time intervention for improving resilience in daily life. An uncontrolled phase I pilot study with N=10 help-seeking youth with psychotic, depressive and/or anxiety symptoms, who were offered a short version of the EMIcompass intervention, provided initial support of beneficial effects, feasibility and safety of the intervention. We found decreased stress reactivity (e.g. $b=-0.10$, $p=.005$), momentary negative affect (e.g. $b=-0.44$, $p<.001$) and psychotic experiences (e.g. $b=-0.25$, $p<.001$) as well as increased positive affect (e.g. $b=0.39$, $p=.001$) and reduced symptom levels ($r=0.30-0.65$) at post-intervention and 4-week follow-up. No severe adverse events were observed. A randomised controlled trial is currently ongoing to establish feasibility and efficacy of the EMIcompass intervention in help-seeking youth aged 14-25 with current distress, a broad Clinical High At Risk Mental State (CHARMS) or a first episode of severe mental disorder presenting to mental health services. If the trial demonstrates efficacy, EMIcompass has the potential to advance prevention and early intervention in youth.

A transdiagnostic ecological momentary intervention for improving self-esteem (SELFIE) in youth exposed to childhood adversity.

Mary Rose Postma

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Childhood trauma is seen as a risk factor for developing a range of mental disorders via pathways through self-esteem. The first aim of this talk is to investigate this putative mechanism by presenting findings from a study researching associations between psychotic experiences, self-esteem, and trauma in individuals with first-episode psychosis (FEP, $n=51$), individuals with an at-risk mental state (ARMS, $n=46$), and controls ($n=54$). Findings showed that ARMS individuals and FEP individuals experience lower momentary self-esteem and greater fluctuations in self-esteem than controls. Further, in all three groups, low self-esteem was found to be associated with a greater intensity of psychotic experiences, as well as a trend that fluctuations of momentary self-esteem are positively associated with more intense psychotic experiences. Lastly, the association of self-esteem and psychotic experiences differs by the level of abuse and group. The second aim of this talk is to present a way of targeting such a putative mechanism as self-esteem. A real-time and real-world delivery of a low level ecological momentary intervention (EMI) targeting low self-esteem in traumatized youth in daily life, will be introduced. This EMI is being delivered as part of an ongoing randomized controlled trial named the SELFIE study. Besides investigating its efficacy, a process evaluation is being conducted using the method of realist evaluation. Expert-interviews and a focus-group with stakeholders have led to an initial program theory, that is now being further refined based on individual interviews with participants who have received the SELFIE-intervention. Preliminary results will be presented.

Idiographic analyses of motivation and related processes in participants with schizophrenia following a therapeutic intervention for negative symptoms

Bénédicte Thonon

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Background: Motivational negative symptoms hinder quality of life and daily functioning of individuals with schizophrenia spectrum disorders. A recently developed intervention, Switch, has shown promising effects on negative symptoms and functional outcomes. Switch targets multiple cognitive, emotional and behavioural processes associated with motivation and goal directed behaviours. We aimed to investigate its effects on motivation and associated processes in a naturalistic setting and using a blended-care approach with complementary ecological momentary intervention. Methods: We used a single case approach ($n=3$), with a pre-post and follow-up assessment design, which also included ambulatory assessments (experience sampling method, ESM; and step count). We computed autoregressive lag 1 models to evaluate the effects of the intervention on daily motivation levels and related processes, descriptive pie-charts, and vector autoregressive modelling to reveal the dynamics of the processes over time. Results: The intervention was beneficial for each participant according to traditional evaluations of motivational negative symptoms, apathy, daily functioning and quality of life. The effects on the ESM variables revealed distinct outcomes for each individual. The dynamics between the various processes differed between participants, and fluctuated within participants (when comparing baseline, intervention phase, and follow-up). Conclusions: This study used an innovative approach to look at the effectiveness of an intervention. The intervention seems to lead to meaningful improvements in motivational negative symptoms and functional outcomes. The mechanisms of change need to be further investigated.

Acceptance and Commitment Therapy in Daily Life (ACT-DL) in early psychosis: findings on treatment adherence and acceptability from the INTERACT multi-centre randomized controlled trial.

Evelyn van Aubele

Department of Neurosciences, Center for Contextual Psychiatry (CCP), University of Leuven, Leuven, Belgium

Background: The current study aimed to investigate treatment adherence and acceptability of Acceptance and Commitment Therapy in Daily Life (ACT-DL), a novel Ecological Momentary Intervention (EMI) for people with Ultra-High-Risk state (UHR) and a First-Episode Psychosis (FEP). ACT-DL aims to modify early intervention targets including psychotic symptoms distress, social functioning, and general psychopathology. Methods: In the multi-centre INTERACT randomised controlled trial (RCT), UHR and FEP individuals aged 16-65 were randomised to either treatment as usual (TAU) (control) or to ACT-DL plus TAU (experimental), consisting of 8 face-to-face sessions augmented with an ACT-based smartphone application, delivering ACT exercises and metaphors in daily life. Data on treatment adherence and acceptability of ACT-DL was collected. Predictors included baseline demographic, clinical and functional outcomes. Results: On average, ACT-DL+TAU participants ($n=71$) completed 6 ($SD=3$) out of 8 sessions. On a weekly basis, app adherence data ($n=58$) shows that participants used the app on average 14 times and responded to 6 out of 24 (25%) notifications. Distribution plots of debriefing questionnaire ($n=46$) scores show that while 85-96% of participants reported usefulness of the face-to-face sessions and the app to some extent (scores ≥ 1 , 1=no usefulness), 91% indicated perceived burden of the length and number of notifications (scores ≥ 1 , 1=no burden). Ethnic minority background predicted lower response compliance ($p<.001$), yet higher app acceptability ($p<.05$). Being female ($p<.05$), negative (all $p<.05$), and affective symptom severity ($p<.05$) predicted lower acceptability, while FEP status predicted higher acceptability ($p<.05$). Conclusion: Our results corroborate acceptability of ACT-DL in early psychosis with on average, a relatively high number of session adherence, and, given the intense notification schedule, a relatively good response compliance. We will provide recommendations for further intervention optimization.

Developing and optimising Ecological Momentary Interventions: Patients' preferences and needs

Ana Teixeira

Department of Neurosciences, Center for Contextual Psychiatry (CCP), University of Leuven, Leuven, Belgium

Ecological Momentary Interventions (EMIs) help to bridge the gap between therapy and the "real world" and provide therapy at moments of need. However, few studies have investigated patient's subjective evaluations or involved them in the development and optimization of EMIs. The Acceptance and Commitment Therapy in Daily Life (ACT-DL) was developed to help patients to practice ACT skills in their daily life via smartphone application (PsyMate®) in addition to ACT therapy. The aim of this study is to explore patients' perspective about their use of the ACT-DL in their daily life that will later inform the optimization of this intervention. Semi-structured interviews were conducted with 15 individuals in the early phases of psychosis selected from a randomized controlled trial that assessed the feasibility and efficacy of ACT-DL. The app includes daily questionnaires using experience sampling and ACT exercises. Interviews were audio-recorded, transcribed, and analysed using qualitative content analysis. According to results, participants expressed as advantages of using the app the increased

awareness, receiving reminders of the exercises; and possibility of choosing exercises and when to do it. Disadvantages were the high frequency of beeps to fill in the questionnaires; repetition of questions; and answering questions of symptoms they don't have. Participants considered the app useful to integrate ACT skills into their daily life but expressed the need for more personalized questions and receiving feedback on their use of the app. Findings highlight the importance of involving patients in the development and optimization of EMLs to best suit their personal needs.

K3: Keynote 3

Time: Friday, 02/July/2021: 3:30pm - 4:30pm

Session Chair: **Michaela Riediger**, Friedrich Schiller University Jena, Germany

Session Abstract

A Developmental Perspective on the Emotional Side of Everyday Life: From Adolescence to Old Age

Why do everyday emotional experiences differ between individuals from different age groups? How are everyday emotional processes linked to cognitive, health, and social functioning across the lifespan? And what challenges does longitudinal experience sampling as a means to investigate these questions entail? I will address these issues focusing on the age range from adolescence to old age. Starting point will be the finding that age differences in emotional experiences are mirrored by differences in how individuals from different age groups want to feel. The main focus of this presentation will be on possibly underlying mechanisms. One mechanism concerns how individuals from different age groups appraise affective states, both implicitly and explicitly, which might yield differences in how affective states are experienced. A second mechanism refers to different developmental functions that affective processes might have in different phases of life. A third mechanism derives from age differences in how affective processes are intertwined with other domains of functioning, such as health or cognition. I will illustrate these mechanisms using evidence from a longitudinal experience-sampling project that included ambulatory assessment of cognitive capacity and a bio-monitoring component. I will also highlight the challenges of longitudinal experience sampling designs with age-heterogeneous samples.

P1-D3: Paper Session 1 - Day 3 (Disordered Eating)

Time: Friday, 02/July/2021: 4:45pm - 6:00pm

Presentations

A systematic review of smartphone-based dietary assessment tools

Laura M König^{1,2}, Miranda Van Emmeren², Johanna Nurmi^{2,3}, Katerina Kassavou², Stephen Sutton²

¹University of Bayreuth, Germany; ²University of Cambridge, United Kingdom; ³University of Helsinki, Finland

Smartphones have become popular in assessing eating behaviour in real-life and real-time. This systematic literature review aims to provide a comprehensive overview of smartphone-based dietary assessment tools used in empirical research. The objective of the review is to describe how and what data on eating behaviour is collected.

A protocol was developed following the PRISMA guidelines and preregistered on the Open Science Framework (<https://osf.io/xg8s6/>). Seven databases from behavioural, social and computer science were searched. All observational, experimental or intervention studies and study protocols using a smartphone-based (e.g., app) assessment tool for dietary intake or frequency of eating episodes were included if they reported data collected by adults and were published in English.

A total of 21,722 records were screened and 120 publications comprising 132 studies were included. The majority (57%) used an event-contingent design and another 21.5% of studies used both event- and signal-contingent assessments. Half of the studies (48.4%) used photo-based dietary assessment, 31.4% used a food database, 25.6% asked participants to classify food in categories, 42.1% allowed participants to enter free text descriptions, and 45.5% assessed serving sizes or amounts. Two or more features were used in various combinations in 69.7% of studies.

A great variety of smartphone-based tools exist to assess eating behaviour. Future studies should systematically examine if and to what extent characteristics of the assessment tool impact data accuracy, willingness to participate, research participation effects etc. to provide guidance for choosing the most appropriate tool.

Daily body checking behavior and its relationship with body dissatisfaction, negative affect and dietary restriction in patients with eating disorders

Julia Reichenberger, Ann-Kathrin Arend, Jens Blechert

Paris-Lodron University of Salzburg, Austria

Introduction. The eating disorders (EDs) anorexia (AN) and bulimia nervosa (BN) are characterized by body image disturbances like frequent body checking behaviors (e.g., weighing oneself). Previous research in daily life showed that such behaviors predict higher body dissatisfaction, negative affect, and dietary restriction in healthy individuals but also individuals with AN. However, research examining the role of daily body checking behavior in BN is rather limited.

Method. Patients with AN (n=45) or BN (n=36) completed eight days of ecological momentary assessment (EMA). In the evening, they reported on their daily body checking behavior, body dissatisfaction, actual dietary restriction the same day and intention for the next day, as well as negative affect from 0 (not at all) to 100 (very much/very often). Data were analyzed using multilevel models.

Results. Days marked by more frequent body checking behavior were associated with more body dissatisfaction, negative affect, and intention to restrict food intake the next day, but not actual restriction on that day. Patient groups did not differ significantly in any of these relationships.

Discussion. Body checking behavior may significantly contribute to symptomatic behaviors, thoughts and emotions. However, to make causal claims about the direction, future research should assess these constructs with a more fine-grained resolution. Patient groups did not significantly influence the results, further supporting a transdiagnostic model of EDs. Body checking behaviors constitute an important target for interventions, which could be provided via ecological momentary intervention.

Love me Tinder: The Effects of Female Dating-App Use on Body-Dissatisfaction, Urge to Engage in Disordered Eating, and Negative Mood in Daily Life

Jade Portingale¹, Xinyue Liu¹, Sarah Louise Eddy¹, Shashan Liu¹, Sarah Elizabeth Giles¹, Matthew mattheFuller-Tyszkiewicz², Isabel Krug¹

¹The University of Melbourne, Australia; ²Deakin University

Dating-apps have become a ubiquitous form of contemporary dating that are largely image-focused and thus, may serve as yet another environment in which to subject young females to negative appearance-based evaluation and disordered eating (DE). Despite this, existing research is scant, and currently no ecological momentary assessment (EMA) studies exist on the topic. The present study assessed the effects of dating-app use (state- and trait-level) and the characteristics sought in a potential partner on body dissatisfaction (BD), DE symptoms, and negative mood, and whether the relationship between dating-app use and these outcomes was moderated by appearance-based rejection sensitivity. Using EMA, 248 female participants aged 18-48 years completed a baseline questionnaire assessing demographic and trait variables, and then recorded, via a smartphone application, momentary experiences of dating-app use, BD, DE symptoms (i.e., binge-eating/purging, dietary restraint, exercise), and negative mood six times per day for seven days. Multilevel analyses confirmed that trait dating-app use predicted increases in state binge-eating/purging symptoms (N = 248). Surprisingly, the characteristics sought in a potential partner was not a significant predictor (n = 77). Based on preliminary analyses (n = 9), state dating-app use predicted increases in binge-eating/purging and dietary restraint symptoms over time, and appearance-RS did not moderate the relationship between state dating-app use and dietary restraint. These findings build on previous research by testing between- and within- person models of dating-app use in everyday contexts. Females may benefit from preventative programs that focus on the detrimental consequences of dating-app use on DE symptoms.

An examination of the direct and indirect relationships of self-objectification on disordered eating

Sarah Giles¹, Jessica Rabinowicz², Chantelle Raux², Matthew Fuller-Tyszkiewicz^{3,4}, Isabel Krug¹

¹The University of Melbourne, Melbourne, Australia; ²Institute for Social Neuroscience Psychology, Ivanhoe, Australia; ³Centre for Social and Early Emotional Development, School of Psychology, Deakin University, Melbourne, Australia; ⁴School of Psychology, Deakin University, Geelong, Australia

Objectification theory argues that self-objectification confers risk for disordered eating (DE) both directly, and indirectly through a cascade of negative

psychological consequences which result from self-objectifying (e.g., low mood and self-conscious body monitoring). Robust cross-sectional evidence supports these relationships. However, these cross-sectional studies do not provide evidence for the complex

intraindividual psychological processes outlined in objectification theory which purportedly contribute to DE. Using an ecological momentary assessment design, we investigated the direct within-person effect between state self-objectification and DE. We also investigated the indirect within-person effect of negative mood and body comparisons, on the relationship between state self-objectification and DE. Two-hundred female participants ($M=20.43$ years, $SD=4.60$) downloaded a smartphone app which assessed momentary experiences of self-objectification, mood, body comparisons, and DE six times per day at random intervals for seven days. The results showed that momentary experiences of self-objectification significantly predicted body comparisons and DE behaviours at the next time point. However, self-objectification was not indirectly related to DE through its effect on body comparisons. Interestingly the results showed that momentary experiences of self-objectification did not predict mood. Additionally, the indirect effect of mood on the relationship between state self-objectification and DE was also not significant. These results enhance our understanding of objectification theory and suggest that self-objectification confers risk to DE directly. However, our findings do not support the indirect effect of self-objectification on DE through low mood and body comparisons.

Sexual minority stressors and disordered eating behaviors in daily life: A daily diary study of sexual minority women

Kristin E. Heron^{1,2}, Kelly A. Romano², Abby L. Braithman^{1,2}, Charlotte A. Dawson², Robin J. Lewis^{1,2}

¹Old Dominion University, Norfolk, Virginia, USA; ²Virginia Consortium Ph.D. Program in Clinical Psychology, Norfolk, Virginia, USA

Young sexual minority women (SMW; lesbian, bisexual) in the U.S. are at greater risk for disordered eating than their heterosexual peers. Minority stress theory proposes SMW encounter unique sexual minority stressors (SMS; e.g., discrimination) related to their marginalized status, which in turn contribute to negative physical and mental health outcomes. However, little is known about how daily SMS are associated with disordered eating among SMW. To address this question, we conducted a remote 14-day diary study of 321 U.S.-based SMW ages 19-35. SMS were assessed using an 8-item daily measure (e.g., heard anti-LGBT talk, verbal harassment). Disordered eating was assessed with single items capturing dietary restriction, overeating, loss of control of eating, and emotional eating. Multi-level models with within- and between-person effects were included and random slopes were allowed. Within-person results showed on days when SMW experienced more SMS, they reported more dietary restriction and emotional eating ($ps<.03$), but not overeating or loss of control of eating ($ps>.44$). At the person-level, women who reported more SMS reported more dietary restriction, overeating, loss of control of eating, and emotional eating ($ps<.001$). These results suggest SMS may contribute to disordered eating, particularly dietary restriction and emotional eating, at the day-level. Future research using more frequent daily assessments may elucidate the temporal sequencing of SMS and disordered eating. The present findings can inform the design of disordered eating intervention programs, as understanding the unique daily experiences of SMW is necessary for developing culturally tailored interventions to reduce disordered eating in this at-risk population.

Conference Agenda

Session

P2-D3: Paper Session 2 - Day 3 (Methods 2)

Time: Friday, 02/July/2021: 4:45pm - 6:00pm

Presentations

The Effects of Assessment Intensity on Participant Burden, Compliance, Within-Person Variance, and Within-Person Relationships in Ambulatory Assessment

Kilian Hasselhorn, Charlotte Ottenstein, Tanja Lischetzke

University Koblenz-Landau, Landau, Germany

Considering the very large number of studies that have applied ambulatory assessment (AA) in the last decade across diverse fields of research, knowledge about the effects that these design choices have on participants' perceived burden, data quantity (i.e., compliance with the AA protocol), and data quality (e.g., degree of within-person variability in and relation between time-varying variables) is surprisingly restricted. The aim of the current research was to experimentally manipulate aspects of an AA study's assessment intensity—sampling frequency (Study 1) and questionnaire length (Study 2)—and to investigate their impact on perceived burden, compliance, within-person variability, and within-person relationships between time-varying variables. In Study 1, students ($n = 313$) received either 3 or 9 questionnaires per day for 14 days. In Study 2, students ($n = 282$) received either a 33- or 82-item questionnaire 3 times a day for 14 days. Within-person variability and within-person relationships were investigated with respect to momentary pleasant-unpleasant mood and state extraversion. The results of Study 1 showed that a higher sampling frequency increased perceived burden but did not affect other aspects of data quantity or quality. In Study 2, longer questionnaire length did not affect perceived burden or compliance but yielded a smaller degree of within-person variability in momentary mood (but not in state extraversion) and a smaller within-person relationship between state extraversion and mood. Differences between Studies 1 and 2 with respect to the type of manipulation of assessment intensity are discussed.

The effects of sampling density on variance of affect in ecological momentary assessment protocols

Shirlene D Wang¹, Eldin Dzibur², Bridgette Do¹, Donald Hedeker³, Stephen S. Intille⁴, Genevieve F. Dunton¹

¹University of Southern California, United States of America; ²Livongo Health, United States of America; ³The University of Chicago, United States of America;

⁴Northeastern University, United States of America

Investigations are needed to determine the optimal sampling density in ecological momentary assessment (EMA) studies to maximize the ability to capture within subject variance while minimizing participant burden. This study compared two EMA protocols of different sampling frequencies in terms of participant compliance rates and degree of between- and within subject variability in affect variables. A sample of 20 women ($Age=42.8$, $SD=6.01$) participated in two different EMA sampling protocols: (1) temporally-sparse (~20-question surveys prompted every 120 ± 15 min across 7 days) and (2) temporally-dense (15-question surveys prompted every 30 ± 10 min across 2 days). Current affect (happy, angry, sad, stressed) was self-reported during each EMA survey on loaned smartphones. Mixed effects location-scale models were used to estimate between- (BS) and within-subject (WS) variance parameters of affect items and evaluate the effect of sampling protocol on BS and WS variance. Within-subject compliance to EMA prompts was higher in the temporally dense (89.8%) than in the sparse (73.3%) protocol ($p<.01$). There was significantly higher stress reported in the dense protocol ($p<.01$). Happiness and stress showed significantly greater BS variance in the dense protocol ($ps<.05$). Anger, sadness, and stress showed significantly more WS variance in the sparse protocol ($ps<.05$), indicating the protocol with less frequent prompts showed more variation in self-reported anger, stress, or sadness compared to participants' usual levels. Results indicate that temporally dense EMA may aid in detecting differences between subjects for some affect items but may impede the ability to detect intraindividual variation for other affect items.

Using multilevel latent class analysis to study patterns of behaviors and experiences: An application to daily coping during a COVID-19 lockdown

Tanja Lischetzke, Lea Schemer, Tina In-Albon, Julia Karbach, Tanja Könen, Julia Anna Glombiewski

University of Koblenz-Landau, Germany

The aim of this contribution is to present multilevel latent class analysis (ML-LCA) as an analytic tool that can be applied to ambulatory assessment data of behaviors/experiences to gain insights into momentary patterns (i.e., configurations) of behaviors/experiences at the level of measurement occasions and into individuals' repertoires of patterns across time at the person level. The presented application of ML-LCA refers to daily coping during a COVID-19 pandemic lockdown. The substantive goal was to investigate whether polyregulation (i.e., the concurrent or sequential use of multiple coping strategies) is effective, who is more likely to use polyregulation frequently, and whether a larger strategy repertoire (i.e., a broader range of coping patterns employed across situations) is beneficial for well-being. A non-representative community sample ($n = 322$, 15–82 years old) participated in a 21-day ambulatory assessment with twice-daily surveys. An ML-LCA model with seven daily coping patterns and ten classes of individuals fit the data best. Daily coping patterns differed with respect to the number of coping strategies included (representing low, moderate, or high degree of polyregulation) and the specific combinations of strategies. At the day level, the use of different coping patterns showed very small associations with daily perceived controllability and evening mood. At the person level, individuals who

frequently engaged in a high degree of polyregulation reported more coronavirus-related worrying. The size of individuals' coping repertoire was unrelated to affective well-being and psychopathology. The findings contribute to a polyregulation perspective on daily coping and illustrate the advantages of using ML-LCA.

Predictive Value of Intraindividual Means and Variances from Ecological Momentary Assessment Data: Comparing Standard Computational Formulas to Mixed-Effects Location-Scale Models

Wei-Lin Wang¹, Eldin Dzibur², Jixin Li³, Aditya Ponnada³, Stephen Intille³, Rachel Nordgren⁴, Donald Hedeker⁴, Genevieve Dunton¹

¹University of Southern California, United States of America; ²Teladoc Health, United States of America; ³Northeastern University, United States of America;

⁴University of Chicago, United States of America

Objective:

Traditionally, intraindividual means and variances from Ecological Momentary Assessment (EMA) data have been computed for each person using standard formulas, such as subject-level standard deviations (SD). These strategies ignore the fact that subjects can have unequal numbers of EMA observations and cannot account for the effects of covariates. This study compared the predictive value of intraindividual means and variances computed through standard formulas versus those estimated as random effects (i.e., means, variances) from a Mixed-Effects Location Scale (MELS) model.

Methods:

Research used simulated EMA data sets to compare the bias and coverage of the prediction parameters from the two approaches. In both cases, intraindividual means and variances were entered as predictors of a subject-level outcome in linear regression models. Three scenarios were used: equal observations per subject with no Stage 1 covariates, unequal observations per subject with no Stage 1 covariates, and unequal observations per subject with Stage 1 covariates.

Results:

There was no difference in the bias and coverage of prediction parameters between the standard computation formulas vs. MELS approach for equal observations per subject with no covariates. However, the MELS approach provided lower bias and greater coverage than the standard computational formulas when there were unequal observations per subject with no covariates.

Conclusion:

The MELS approach yielded smaller bias and better coverage, compared to the traditional approach predicting the subject-level outcome in a multiple linear regression model with unequal observations per subject, which is common in EMA data.

Development of online ecological momentary assessment (EMA) algorithms to detect meaningful decreases in heart rate variability (HRV)

Christian Rominger, Martha Schneider, Bernhard Weber, Andreas R. Schwerdtfeger

Univeristy of Graz, Austria

Changes in HRV do not only indicate physiological states of health, but also meaningful changes in affect, cognition, and resilience. Nevertheless, valid algorithms enabling the detection of such psychologically meaningful events in EMAs are strongly underdeveloped. The negative relationship between HRV and physical activity is the starting point of the algorithms predicting HRV, by means of using data from acceleration and ECG sensors. The algorithms' logic is that if the observed HRV is lower than the predicted HRV, based on the regression function of physical activity on HRV, a meaningful HRV-decrease should be detected that triggers a prompt. However, several parameters of the algorithm must be estimated to achieve an individually applicable algorithm functioning in an EMA approach. In this presentation, we will show different simulations of algorithms to detect decreases in HRV in a sample of 80 participants. By means of these simulations, we will show the functioning of different potentially meaningful algorithms in detail and discuss their advantages and disadvantages for field application. Furthermore, this presentation will illustrate how algorithm adjustments affect the characteristic of prompts. In future this work will help to examine HRV-effects on psychosocial function, health, and wellbeing by developing a useful interactive method applicable in EMA.

Conference Agenda

Session

S1-D3: Symposium Session 1 - Day 3

Time: Friday, 02/July/2021: 4:45pm - 6:00pm

Presentations

Feeling good, feeling bad: Biopsychosocial antecedents, correlates, and consequences of everyday affective states

Chair(s): **Theresa Pauly** (Universität Zürich, Switzerland)

Discussant(s): **Jennifer Inauen** (Universität Bern)

Individuals show considerable variability in their affective states, both between and within person. Ambulatory assessment methods offer the unique opportunity to capture affective experiences as they spontaneously occur in people's daily life contexts. In this symposium, we have compiled a set of four papers that showcase current and future endeavors to demonstrate the utility of ambulatory affect measures as an antecedent, correlate, and consequence of everyday biopsychosocial indices. In doing so, we integrate studies of individuals of different ages, ranging from younger to old age. Choi et al. make use of data from four daily-life studies including younger and older adults to investigate age differences in momentary affective correlates of well-being. Lay et al. use geolocation data from middle-aged to older adults to examine whether prosocial behavior might show differential associations with (affective) well-being, depending on the location in which it occurs. Lee et al. randomly assigned participants to 2-week prosocial behavior interventions, to examine the role of daily prosocial behavior for everyday social interactions and affective well-being. Finally, Pauly et al. make use of data from three older adult studies to investigate time-varying associations between discrete affective states and salivary cortisol. The discussant, Jennifer Inauen, will integrate these papers, using her relevant expertise in intensive longitudinal methods to observe and intervene on everyday processes important for health and well-being. She will discuss strengths and weaknesses, and consider implications for future research.

Presentations of the Symposium

Age differences in the daily experiences of happiness and positive affect correlates: Evidence from repeated daily life assessments

Yoonseok Choi¹, Jennifer C. Lay², Minjie Lu³, Helene Fung⁴, Christiane A. Hoppmann¹

¹University of British Columbia, ²University of Exeter, ³Sun Yat-Sen University, ⁴Chinese University of Hong Kong

Previous literature suggests that conceptual bases and experiences of well-being differ across the adult lifespan (Mogilner et al., 2011). Older adults' happiness and sense of meaningfulness are more strongly linked with low-arousal positive states but more weakly linked with high-arousal positive states compared to younger adults (Mogilner et al., 2011; Chu et al., 2020). The current project aimed to replicate and extend previous findings on age differences in the momentary experience of well-being by investigating the positive affective correlates of two well-being indicators (happiness and satisfaction) using repeated daily life assessments. We used four data sets collected at two locations: Vancouver (96 older adults, 51 younger adults) and Hong Kong (56 older adults, 59 younger adults). All data sets contained up to 30 ecological momentary assessments of current affective states. Results build on and replicate previous findings by showing that momentary happiness was more strongly associated with momentary calmness and more weakly associated with momentary excitement among older adults compared to younger adults. Similar effects emerged when using momentary satisfaction instead of momentary happiness in the same analytic models. Follow-up analyses including potential covariates indicate that these associations are qualified by key individual difference characteristics as well as potential age-differences in the distributional properties of everyday affect ratings. This project adds to previous evidence on the age-related contours of happiness using repeated daily life assessments. Future analyses will unpack the roles of cultural heritage, cognitive functioning, and affect variability in shaping wellbeing- positive affect associations among younger and older adults.

Helping where? Geospatial distributions of prosocial behaviour and associations with psychological wellbeing among community-dwelling older adults

Jennifer C. Lay¹, Robyn Ma², Christiane A. Hoppmann²

¹University of Exeter, ²University of British Columbia

Prosocial behaviour has been shown to benefit the wellbeing of the recipient and the provider. The frequency and wellbeing impact of prosocial behaviour may depend on where it occurs (e.g. in familiar vs. unfamiliar locations). Previous research linking geospatial activity patterns to wellbeing has typically focused on social behaviour more broadly or on young adults exclusively. The present study combines time-sampling and 'photovoice' methods to link geospatial distributions of prosocial behaviour to psychological wellbeing outcomes in older adulthood. Fifty community-dwelling adults aged 52-83 years (25 Asian heritage, 22 European heritage, 3 other heritage) captured location-tagged photos of everyday prosocial behaviour over a 10-day period, and provided up to 30 reports of their momentary affective states (e.g. happy, calm). Participants also completed individual-difference measures of six psychological wellbeing facets (Ryff, 1989) and overall subjective wellbeing. Each participant captured 11.4 photos on average (range 4-32). In models controlling for mobility limitations, public transit proximity, prosocial behaviour totals, and sociodemographics, individuals who engaged in more prosocial behaviours in their homes or neighbourhoods reported higher positive affect, whereas those whose prosocial behaviour occurred over larger geographical distances reported lower environmental mastery. Spatial patterns in which prosocial activities were spread in several different directions away from home ("home as hub") were associated with higher environmental mastery, personal growth, and subjective wellbeing. Findings suggest ways that older adults may use home as a base for reaching out prosocially, and novel methods of integrating GPS location data with repeated daily life assessments of subjective experiences.

The effects of performing acts of kindness on daily social contact and emotional well-being

Yeeun Lee, Frances S. Chen

University of British Columbia

Prior findings suggest that prosocial actions have short-term positive emotional effects; however, effects on actors' social well-being are less well-explored. This study tested the effects of performing acts of kindness on daily social engagement and emotional well-being. 407 participants were each randomly assigned to one of three intervention conditions: (i) an acts of kindness intervention (AK) in which they were asked to perform at least one thing nice for another person, (ii) an anonymous acts of kindness (AAK) intervention involving no direct social contact with recipients, or (iii) an active control intervention (i.e., 'taking a break'). Participants completed 3-day daily diary surveys before and after the 2-week intervention assessing their social interaction quantity and daily affect, as well as retrospective global measures of loneliness and affect. Diary analyses showed significant time \times condition effects on daily social engagement and affect. Specifically, AK increased the number of daily interactions compared with both AAK and control interventions. AK also buffered the increase in negative affect and decrease in positive affect found in the other two conditions over time. Such effects were not captured by retrospective global measures. These findings suggest that performing acts of kindness increase social engagement and emotional well-being.

being in daily life. Direct contact the recipients may be one of the active ingredients that drives such effects. The results also suggest that ambulatory assessment can be a more sensitive measure than retrospective global self-reports, for capturing intervention effects.

Daily life associations between affect and cortisol in old age

Theresa Pauly¹, Johanna Drewelies², Karolina Kolodziejczak², Denis Gerstorf², Christiane A. Hoppmann³

¹Universität Zürich, ²Humboldt-Universität zu Berlin, ³University of British Columbia

Stressful events, particularly those including socio-evaluative threat, can activate hypothalamic-pituitary-adrenal axis activity (Dickerson & Kemeny, 2004). Yet, there is sparse and diverging evidence on specific affective states that are accompanied by increases or decreases in cortisol in older adults' daily life, and whether associations might differ by valence and arousal. The current project combines data from three studies (170 older adults from Vancouver, 154 older adults from Berlin, 320 older adults residing in different locations across Germany) to systematically investigate everyday affect-cortisol dynamics. All participants took part in a 7-day daily life assessment phase during which they self-reported their momentary affect on a mobile device and collected concurrent saliva samples 5-7 times each day. Data were analyzed using multi-level modeling, controlling for diurnal cortisol rhythm, age, gender, body mass index, education, person mean affect, affect variability, and study. Preliminary analyses show that cortisol levels were increased in moments when participants reported feeling sadder ($b = 0.007$, $SE = 0.002$, $p < 0.001$), more nervous ($b = 0.012$, $SE = 0.002$, $p < 0.001$), and more overwhelmed ($b = 0.012$, $SE = 0.002$, $p < 0.001$) than usual. Cortisol levels were decreased in moments when participants reported feeling more relaxed ($b = -0.008$, $SE = 0.002$, $p < 0.001$), happier ($b = -0.011$, $SE = 0.002$, $p < 0.001$), and more interested ($b = -0.008$, $SE = 0.002$, $p < 0.001$) than usual. Findings will be discussed in the context of the physiology and aging literatures.

Approaches to analyzing longitudinal data in dyads

Chair(s): **Gertraud Stadler** (Charité, Germany)

Discussant(s): **Dominik Schoebi** (Université de Fribourg)

The authors in this symposium demonstrate four approaches to analyzing longitudinal data in dyads. Scholz and colleagues focus on one person's view in their intensive longitudinal study of social control effects on smoking, affect and reactance during a smoker's quit attempt with the help of a buddy. Buitenhuis and colleagues analyze their dyadic intensive longitudinal data with a dyadic score model to understand the effects of received and provided support and control on smoking and relationship satisfaction. Stadler and colleagues present a dyadic score model for three dyadic intensive longitudinal studies to model the link between companionship and affect, relationship satisfaction, and smoking on the couple level and the daily level. Shrout and colleagues use a latent growth model to understand the trajectories of sexual satisfaction in newly-wed couples. Dominik Schöbi will discuss the strengths and limitations of the four analytic approaches for answering different research questions with dyadic longitudinal data.

Presentations of the Symposium

Foregrounding one person's perspective: Social control from a buddy during a quit attempt

Urte Scholz, Philipp Schwaninger, Corina Berli, Janina Lüscher

University of Zurich

Background: Social control is the attempt to regulate another person's health behavior. Particularly negative control strategies, e.g., nagging, were found to be unrelated to others' health behaviors, but related to more doing the opposite of what the controlling person wanted or to smoking in hiding. This study set out to test the effects of positive and negative control in smokers attempting to quit with the help from a 'buddy' via a smoking cessation app.

Methods: $N = 71$ participants enrolled in a 28-days smoking cessation study (7 days prior to quit date and 20 days after) using the SmokeFreeBuddy-App together with a buddy from their social network. They completed end-of-day diaries on social control from their buddy, smoking, affect, doing the opposite, and hiding smoking.

Findings: On days with higher than usual negative control, participants reported to smoke more and to more do the opposite, particularly after the quit date. People with higher negative control across the 28 days reported feeling worse compared to people with lower negative control. On days with higher than usual positive control, smokers felt better, particularly after the quit date. People with higher positive control across the 28 days reported feeling better than people with lower positive control. No effects on hiding smoking occurred.

Discussion: Negative control from a buddy detrimentally relates to behavioral and affective outcomes, whereas positive control relates to more positive affect. Overall, control does not seem to promote quitting, but positive control might ease the high stress situation of smoking cessation.

Providing and receiving: Daily support and negative control during a quit attempt in single-smoking couples

Anne H. Buitenhuis¹, Marrit A. Tuinman¹, Gertraud Stadler², Hagedoorn Mariet¹

¹University of Groningen, ²Charité, Germany

Background: Research has shown a beneficial influence of partner support on smoking cessation. Previous studies mainly focused on support and neglected negative behaviors. Less is known about differences in support perceptions between partners. This study aims to examine how supportive as well as negative control behaviors relate to smoking and relationship satisfaction in single-smoking couples during a quit attempt.

Methods: Smokers and their non-smoking partners (n = 170 cohabiting couples) participated in an intensive longitudinal study over 21 days with end-of-day diaries. A dyadic score model was used, emphasizing couple levels and differences for the explanatory variables (i.e., support and negative control) and the outcome variables (smoking (for smokers only); relationship satisfaction).

Findings: Smokers whose partner showed more supportive and less negative control behavior had a lower probability of smoking, and both partners had higher relationship satisfaction. On days with more supportive and less negative control behavior than usual, smokers had a lower probability of smoking and both partners had higher relationship satisfaction. For smokers who reported more support than their partner reported providing, the couples' relationship satisfaction was higher and the smokers' relationship satisfaction was higher than their partners'. Differences between received and provided support/control at the between-couple and daily level were unrelated to smoking.

Discussion: Support seems important during a quit attempt as it was related to a lower probability of smoking and higher relationship satisfaction in couples, while negative control behaviors should be avoided as they were associated with higher probability of smoking and lower relationship satisfaction.

Couple means and differences: The example of companionship in close relationships in dyadic intensive longitudinal studies of romantic couples' daily life

Gertraud Stadler¹, Janina Lüscher², Niall Bolger³, Patrick E. Shrout⁴, Nina Knoll⁵, Urte Scholz²

¹Charité, Germany, ²University of Zurich, ³Columbia University, ⁴New York University, ⁵Freie Universität Berlin

Background: Companionship—defined as engagement in enjoyable shared activities—has received limited research attention although available studies link it to better affect and relationship satisfaction.

Methods: This presentation proposes a longitudinal dyadic score model to understand daily and couple-level effects of a dyadic predictor

(companionship) on dyadic outcomes (affect, relationship satisfaction, goal pursuit). In three intensive longitudinal studies (Study 1: 57 community couples; Study 2: 99 smoker-nonsmoker couples; Study 3: 83 dual-smoker couples), both partners reported daily companionship, affect, relationship satisfaction, and (in Study 2 and 3) smoking.

Findings: On days with higher companionship, couples reported better affect and relationship satisfaction. When partners differed in companionship they also differed in affect and relationship satisfaction. But companionship was not always beneficial: While smokers with non-smoking partners smoked less with higher companionship, smokers with smoking partners smoked more on days with higher companionship.

Discussion: These findings show companionship as a consequential relationship construct deserving further study.

Adapting the dyadic score model to latent trajectory analyses of sexual satisfaction during the first three years of marriage

Patrick E. Shrout¹, Yasaman Ghodse-Elahi¹, Lisa A. Neff²

¹New York University, ²University of Texas, Austin

Background: Do newlywed couples with lower relationship satisfaction when they are married have more troubled trajectories of sexual satisfaction in the first years of marriage than couples with initially higher marital satisfaction?

Methods: We address this question by fitting longitudinal reports of 117 married couples over the first three years of marriage with a latent growth model (LGM) that is constructed to emphasize the dyadic rather than individual processes.

Findings: We documented an average dyad-level decline in sexual satisfaction over the first three marital years as well as systematic variation from that average pattern. Level of dyadic marital satisfaction at Time 1 predicted the level of sexual enjoyment over three years, but not variation in the slope. We also found that systematic sexual satisfaction husband-wife differences were predicted by corresponding relationship satisfaction differences, but the strength of this predictive effect lessened over time. The dyad-level effects were diminished or masked when we fit an LGM that emphasized interdependent partners rather than dyadic scores.

Discussion: Depending on the research question, a data analysis model emphasizing interdependent partners or dyadic scores will be more appropriate for analyzing dyads over time.

Intensive repeated measurements with diary and ambulatory assessments in older persons

Chair(s): Marij Zuidersma (University of Groningen, University Medical Center Groningen, Netherlands, The), **Richard Oude Voshaar**

(University of Groningen, University Medical Center Groningen)

Discussant(s): Richard Oude Voshaar (University of Groningen, University Medical Center Groningen)

Older persons with cognitive impairments and dementia are a vulnerable group difficult to study. In older persons with mild cognitive impairments (MCI) who live at home, recall bias and the use of only single assessments of cognitive impairments may bias results of traditional studies. Diary studies with intensive repeated assessments may yield less biased results when studying older persons with MCI. The increased accessibility/feasibility of ambulatory assessments and associated technologies, make (repeated) single subject designs more feasible while analysing individual data on a high level. Particularly in heterogeneous groups such as older persons with MCI, the single-subject study design using intensive repeated diary- and sensor assessments can be useful to make predictions for individual persons. This could help develop person-tailored advice which may improve wellbeing, daily functioning and independence.

Studying nursing home residents with dementia is even more challenging. Self-report or interview data might yield unreliable results due to the substantial cognitive impairments in this group. Therefore, ambulatory assessments using sensors may be particularly suitable for studying daily processes and behaviors in this group.

The first two presentations present the results of a single-subject study in 11 older persons with MCI or mild dementia comprising 693 assessments. The third and fourth presentations present the results of two different studies that used ambulatory sensory data to predict agitated behavior in nursing home residents with dementia. In the end, we will discuss the significance and (im)possibilities of intensive repeated diary- and ambulatory assessments in older persons with cognitive impairments and dementia.

Presentations of the Symposium

Feasibility and usability of daily diary and ambulatory assessments in older persons with MCI and mild dementia

Marij Zuidersma, Sytse Zuidema, Richard Oude Voshaar

University of Groningen, University Medical Center Groningen

Objectives: Ambulatory assessments might be particularly important for older persons with cognitive impairments, to increase mental and cognitive health, and maintain functional independence. We evaluated feasibility and usability of intensive longitudinal diary assessments combined with actigraphy in this group.

Methods: Eleven older persons with cognitive impairments filled out diaries twice a day and wore an actiwatch for 63 days. The diaries included questions about daily behaviors, depressive symptoms, and a computerized cognitive test battery. After one month participants received a feedback report, describing the temporal course of- and associations between daily behaviors, sleep-, affective-, and cognitive problems. Feasibility was determined by 1) missing data due to non-compliance and technical problems, and 2) self-reported burden. Usability was determined by 1) the variability of most important variables, and 2) to what extent study participation and/or the feedback report improved participants' insight in their sleep-, affective-, or cognitive problems.

Results: One participant refused to fill out the cognitive test battery and another participant dropped out earlier. Per participant, 1.6%-18.2% of the possible values were missing, most frequently due to technical problems. The study was not at all or only little burdensome for 7 participants and moderately burdensome for 3 others. Within-person variability was substantial for most variables in most persons. Three participants indicated that the feedback report improved their insight into their sleep-, affective- or cognitive problems.

Conclusions: Intensive longitudinal assessments with ambulatory assessments are feasible and usable in most older persons with cognitive impairments, and may help develop person-tailored self-management strategies.

Daily Associations between Affect and Cognitive Function in Individual Older Adults

Alieke Tieks, Richard Oude Voshaar, Marij Zuidersma

University of Groningen, University Medical Center Groningen

Comorbidity between depression and cognitive impairment increases the disease burden disproportionately, and leads to diagnostic uncertainty. Insight into daily

associations between affect and cognitive function may facilitate the diagnostic process and treatment decisions. When daily associations between affect and cognitive function differ per person, group-based studies will result in average effects that are not applicable to individual patients. Our objective was to get insight into these daily associations within individual older adults. In this single-subject design study seven older adults with depression and cognitive impairment filled in electronic diaries on a daily basis for 62-93 consecutive days including questionnaires on positive- (PA) and negative affect (NA) and cognitive tests evaluating working memory (WM) and visual learning (VL). Time-series analyses using vector autoregressive modelling were conducted for each individual separately. Granger causality tests and cumulative orthogonalized impulse response function analyses were performed in order to determine the direction and cumulative effect size of the associations between affect and cognitive function. In one participant higher NA was associated with better WM the next day. For another participant days with higher NA and lower PA were days with worse WM. For

a third participant better VL was associated with lower NA and higher PA the next day. No associations were found for four participants. These results highlight heterogeneity in the daily associations between affect and cognitive function, even in a small and relatively homogeneous sample. Our results stress the need to search for patient-specific determinants to personalize care instead of using group-based determinants.

Individual Differences in the Temporal Relationship Between Sleep and Agitation: A Single-Subject Study in Nursing Home Residents With Dementia Experiencing Sleep Disturbance and Agitation

Sytse Zuidema¹, Rianne Wijbenga¹, Frank Blaauw², Sarah Janus¹, Coby Tibben³, Annelies Smits⁴, Richard Oude Voshaar¹, Marij Zuidersma¹

¹University of Groningen, University Medical Center Groningen, ²University of Groningen, ³Meriant, Zorggroep Alliaide, Heerenveen, The Netherlands, ⁴Zorggroep Alliaide, Heerenveen, The Netherlands; Sleep-Wake Centre SEIN, Zwolle, The Netherlands

Objectives: Previous studies on the interrelationship between sleep and agitation relied on group-aggregates and so results may not be applicable to individuals. Using actigraphy, we examined the temporal relationship between sleep and agitation in individual nursing home residents with dementia experiencing sleep disturbance and agitation. Furthermore, we explored the experiences of care staff and participants with the actigraphy measurements.

Method: We adopted a single-subject study design. To record activity, the participants wore the MotionWatch 8© (MW8) for 9 consecutive weeks. On sleep and agitation (variables arising from the MW8 data), we performed time series analysis (vector autoregressive modeling) and additional analyses, for each individual separately. To gain insight into the experiences with the actigraphy measurements, care staff answered questions on their and participants' MW8 experiences.

Results: A statistically significant temporal association between sleep and agitation was present in three out of five participants. More agitation was followed by more sleep for participant 1, and by less sleep for participant 4. As for participants 3 and 4, more sleep was followed by more agitation. Two-thirds of the care staff members (16/24) were positive about the use of the MW8 and four out of five participants seemed not bothered by wearing the MW8.

Conclusion: A single-subject approach with time series analysis can be a valuable tool to gain insight into the temporal relationship between sleep and agitation in individual nursing home residents with dementia experiencing sleep disturbance and agitation. This way more tailored treatment advice could be possible.

Wearables For Residents Of Nursing Homes With Dementia To Signal Challenging Behaviour: Values, Attitudes and Needs of People living with Dementia

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Objectives: Challenging Behaviour (CB) occurs in up to 80% of nursing home residents with dementia. Identifying stressors causing CB is difficult (as residents themselves cannot indicate what is experienced as stressful), thereby hampering the psychosocial approach. Nowadays, stress-related biomedical variables, such as (aberrant) physical activity, heart activity and skin conductance, can be measured by means of wearable sensors. Next to in-depth knowledge regarding the relationship between wearable data and CB, it is necessary to consider different values, attitudes and needs of all stakeholders involved in order to successfully develop, apply and implement this technology.

Method: In a Dutch nursing home, two residents with dementia and CB wore the Empatica E4 wristband for three half-days, while their behaviour was scored. The Positive Predictive Value (PPV) and sensitivity of wearable data in predicting CB were calculated, separately for each participant and day. Eight involved nurses and eight informal caregivers were interviewed regarding their experiences.

Results: There was a large range of PPV (34.2%-87.5%) and sensitivity (50%-100%) of wearable data when predicting CB between, but also within individuals (i.e. different days). Stakeholders accepted the wearable as a supportive technology in the care of people with CB. Perceived usefulness, need for information and design were important themes.

Conclusion: Physiological stress-related responses vary greatly, showing the necessity of replicated single case designs. To enhance adoption of wearable sensors in CB in this complex environment, information about the technology and the design of the wearable deserve more explicit attention in clinical practice and future research.

Emotion regulation use in daily life in relation to well-being and psychopathology.

Chair(s): Marlies Houben (KU Leuven)

Optimal emotion regulation is a cornerstone of healthy emotional functioning. Therefore, it is unsurprising that emotion regulation deficits have consistently been linked to psychopathology. Traditionally, emotion regulation has been examined using retrospective self-report questionnaires or experimental lab studies. However, more recently, daily life studies have begun examining emotion regulation in a more ecologically valid way. In this symposium, we investigate emotion regulation strategy use in daily life in relation to well-being and psychopathology. First, Walentynowicz and colleagues developed items to measure momentary self-reported interoception and investigated the relationship between interoception and emotion regulation in daily life. Second, van Roekel and colleagues examined how emerging adults applied positive emotion regulation strategies in daily life, how the use of these strategies was associated with positive and negative affect, and whether depressive symptoms moderated these associations. Third, Hiekkaranta and colleagues examined emotion regulation in response to daily negative and positive events in youth and investigated the role of event intensity and psychopathology. Fourth, Kalokerinos and colleagues examined the use and the effectiveness of specific emotion regulation strategies in daily life in relation to psychopathological features. Finally, Houben and colleagues examined adaptive and maladaptive emotion regulation strategy use in daily life of persons with a borderline personality disorder and the effectiveness of these strategies when they were employed.

Presentations of the Symposium

Relationship between interoception and emotion regulation in daily life.

Marta Walentynowicz¹, Yasemin Erbas², Olivier Luminet³

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Interoception refers to the ability to perceive internal bodily sensations, which is considered crucial for emotion processing. Research suggests that interoception can influence both emotional experience and the regulation of emotional responses. For example, interoception was related to more frequent use of emotion regulation (ER) strategies such as cognitive reappraisal. Until now, interoception and ER were assessed using either performance-based measures, which lack ecological validity, or retrospective self-report questionnaires, which are affected by recall biases. Those limitations can be reduced by employing ecological momentary assessment (EMA). So far, no study used EMA to measure interoception, therefore the goals of the present study are to (a) develop items to measure momentary self-reported interoception and (b) investigate the relationship between interoception and ER in daily life. For 7 days, participants will receive 10 semi-random prompts per day to complete questions about interoception and ER strategy use (e.g., reappraisal, suppression, rumination). Momentary interoception will enquire about the awareness of neutral bodily sensations from

different domains (e.g., heartbeat, respiration, sensations in stomach) in the last 5 minutes. Additionally, participants will complete trait measures of both interoception and ER. Due to the lockdown, data collection will start in October 2020 with expected end in May 2021. Based on previous findings, we hypothesize that higher momentary interoception will be related to more frequent use of cognitive reappraisal. The relationship with other ER strategies will be examined in an exploratory manner.

Positive emotion regulation in daily life: Associations with affect and depressive symptoms.

Eeske van Roekel, Hester R. Trompeter

Tilburg University

Existing studies on the regulation of positive emotions show that the use of upregulation strategies (i.e. savoring strategies) can be beneficial while the use of downregulation strategies (i.e. dampening strategies) can be maladaptive. However, very little is known about the real-life use of these up- and downregulation strategies of positive emotions. The aim of the present study is to examine how emerging adults apply positive emotion regulation (PER) strategies in daily life and how the use of these strategies is associated with positive and negative affect (PA, NA). In addition, we aim to examine whether depressive symptoms moderates these associations. N = 159 emerging adults (Mage = 21.50, 76% female) filled out 5 assessments per day for 14 days. Multilevel analyses were pre-registered and conducted in Mplus 8.0. Preliminary results show that overall, the use of upregulation strategies is associated with increases in PA and with decreases in NA. Individuals with more depressive symptoms tend to use less expression and more dampening and co-dampening. The overall pattern for moderation by depressive symptoms was that individuals with more depressive symptoms increased more in PA and decreased more in NA when they used upregulation strategies. Similarly, individuals with more depressive symptoms increased less in NA when using down-regulation strategies. Our findings show that the use of upregulation strategies is associated with increases in PA and decreases in NA. In contrast with our hypotheses, we found that these changes are stronger in individuals with more depressive symptoms.

Emotion regulation in response to daily negative and positive events in youth: The role of event intensity and psychopathology.

Anu P. Hiekkaranta¹, Olivia J. Kirtley¹, Ginette Lafit¹, Jeroen Decoster², Marieke Wichers³, Inez Myin-Germeys¹

¹KU Leuven, ²Sint-Kamillus, University Psychiatric Center, ³University of Groningen

Few studies have investigated psychopathology and emotion regulation in youth in the context in which personally relevant stimuli and regulation naturally occur: in the fabric of daily life. In the current study, 713 participants aged 15-25 completed a six-day Experience Sampling Method (ESM) study, where each evening, they reported on the intensity of the most negative and most positive event of the day and their emotion regulation responses to both. Psychopathology symptoms were assessed at baseline. We conducted mixed effects regressions and found that higher intensity of negative events was associated with more emotion regulation effort (beta = 0.80, SE = 0.13, p < 0.001), except for acceptance (beta = -0.25, SE = 0.05, p < 0.001) and reappraisal (beta = -0.16, SE = 0.05, p < 0.01), which were negatively associated with intensity. Moreover, higher intensity of positive events was associated with more emotion upregulation responses (beta = 0.19, SE = 0.03, p < 0.001). When intensity of negative events was accounted for, higher psychopathology was associated with more rumination (beta = 0.67, SE = 0.15, p < 0.001) and less sharing (beta = -0.54, SE = 0.23, p < 0.05). Psychopathology was not associated with regulating positive emotions. Finally, we found that in line with recent theoretical accounts, polyregulation was common across positive and negative events. The current study highlights the importance of contextual factors such as event intensity in emotion regulation and provides further insight into the relationship between psychopathology and emotion regulation.

Everyday emotion regulation and psychopathological features.

Elise K. Kalokerinos¹, Marlies Houben², Jardine Mitchell¹, Yasemin Erbas², Peter Koval¹, Peter Kuppens²

¹The University of Melbourne, ²KU Leuven

Psychopathology is typically associated with profound emotion dysregulation in daily life. Despite this, emotion regulation use in relation to psychopathology in daily life is relatively poorly understood. Adopting new perspectives from emotion regulation research, we investigated two key research questions. First, we examined which specific (putatively adaptive or maladaptive) emotion regulation strategies are employed in daily life by people with more borderline personality disorder or depressive features. Second, we investigated the effectiveness of employing these strategies in reducing negative emotion, and whether this is moderated by intensity of psychopathological features. In 3 waves of a longitudinal study (N = 202), young adults participated in one week of experience sampling, in which they repeatedly reported their emotions and emotion regulation use. We found that BPD symptomatology, above and beyond depressive symptoms, was linked to higher self-reported use of both putatively adaptive and maladaptive emotion regulation strategies, suggesting that emotion regulation deficits are not driven solely by choosing maladaptive strategies. Depressive features were uniquely positively related to only rumination and expressive suppression. However, no evidence was found for a weaker effectiveness among those with more psychopathological features, suggesting that deficits may be elsewhere. These findings pinpoint the factors related to emotional dysregulation underlying psychopathology in everyday life, and suggest a rethink is necessary of what may typify emotion regulation difficulties in these groups.

Emotion regulation strategy use in daily life of persons with a borderline personality disorder.

Marlies Houben, Peter Kuppens

KU Leuven

Persons with a borderline personality disorder (BPD) can experience intense emotions and have difficulties regulating these emotions. Still relatively little is known about putatively adaptive and maladaptive emotion regulation strategy (ERS) use in daily life and the effectiveness of these strategies when they are employed by persons with BPD. Forty persons with BPD and 40 healthy participants (HC) participated in an experience sampling protocol. Using a smartphone, they rated their current emotional states and reported the use of different adaptive (distraction and expression), and maladaptive (rumination, suppression, non-suicidal self-injury (NSSI)) ERS 10 times a day for 7 consecutive days. Persons with BPD reported more frequent ERS use than HC for all putatively (mal)adaptive strategies. Next, suppression and distraction had similar effects on consecutive negative affect (NA) in both groups, while rumination resulted in larger increases in NA in the BPD group. Expression was followed by an increase in NA in HC, but showed no significant effect for the BPD group. NSSI resulted in increases in NA in the BPD group. Our findings show that persons with BPD report using more ERS, including putatively adaptive ones. However, employment of these strategies typically does not lead to emotional improvement. In several cases, it results in more detrimental emotional changes than are observed in HC. This suggests that persons with BPD might use a trial-and-error approach in an attempt to regulate emotions. These findings illustrate that maladaptive ERS use is part of the emotional dysregulation underlying BPD.

Temporal networks in clinical psychological science: Recent innovations and clinical applications

Chair(s): Robin N. Groen (University Medical Center Groningen, Netherlands, The)

Discussant(s): Laura F. Bringham (University of Groningen)

Network models, which view psychological disorders as causally interacting webs of symptoms, gained popularity in clinical psychology as a data-analytical approach to examine the dynamic interplay between psychological constructs. While the appeal of this approach lies in investigating dynamic processes, few empirical studies have combined network analysis with intensive time series data. It is therefore undetermined whether this approach can deliver on its goals to (i) elucidate mechanisms involved in onset and maintenance of psychopathology and (ii) identify processes important to treatment efficacy and adherence. Both of which are crucial to ultimately develop

new intervention strategies. To evaluate how far we are in reaching these goals and discuss remaining challenges, the current symposium highlights several empirical examples of network analysis on time-series data and their clinical application.

First, Robin Groen will discuss findings on shared and person-specific stress-reactivity observed in young adults at-risk for psychopathology who completed six months of daily diaries. Second, Alba Contreras presents results of a study examining the mechanisms of paranoia, identifying potential targets for prevention and treatment of paranoia. Next, Dr. Kristof Hoorelbeke will present the effects of an online cognitive training for remitted depressed patients, focusing on how this intervention affects emotion regulation dynamics assessed using an extensive experience sampling procedure. Finally, Brian Schwartz will discuss results of an experience sampling study, investigating potential predictors of dropout in psychotherapy. The symposium will conclude with a discussion led by Dr. Laura Bringham, who is an expert on network methodology and the philosophical debate surrounding it.

Presentations of the Symposium

Shared and individual-specific daily affective responses to perceived stress in a cross-diagnostic at-risk sample: a temporal network investigation.

Robin N. Groen¹, Cara Arizmendi², Catharina A. Hartman¹, Kathleen M. Gates², Marieke J. Schreuder¹, Marieke Wichers¹, Johanna T.W. Wigman¹

¹University of Groningen, University Medical Center Groningen, ²University of North Carolina, Chapel Hill

Introduction: Daily stress-reactivity is a generic risk factor for developing psychopathology, if this process is similar across individuals is unknown. In a cross-

diagnostic context, we aimed to (i) reveal how stress and daily symptoms are interrelated by modeling individual level temporal networks, (ii) detect subgroups with similar dynamics, and (iii) evaluate whether shared stress-reactivity is associated with shared psychopathology and functioning outcomes.

Methods: 122 young adults (43.4% women) at risk for developing a wide range of psychopathology completed a six-month daily diary study. Using a temporal network approach (i.e., group iterative multiple model estimation) we modelled how stress and ten specific symptoms (e.g., feeling down, paranoia, restlessness) were related across time at individual-specific, subgroup, and group levels. Furthermore, we examined whether similarities in stress-reactivity were associated with psychopathology and social dysfunctioning.

Results: Stress was associated with the level of restlessness, worrying, and nervousness during the same day for >65% of individuals. No stable subgroups characterized by shared daily-life stress-reactivity were identified. Instead, we observed a wide variety of stress-reactivity patterns that were largely individual-specific. Similarities in individuals' total stress-reactivity were associated with psychopathology but not social dysfunctioning.

Discussion: This study showed both important overlap between individuals in terms of impact of stress on psychopathology in daily life, and many differences. These differences did not congregate in subgroups with similar stress reactivity. The association of total stress reactivity with psychopathology may suggest that the type of response to stress is less important than the magnitude of the response in developing psychopathology.

A temporal network approach to paranoia: A pilot study.

Alba Contreras¹, Carmen Valiente¹, Alexandre Heeren², Richard Bentall³

¹Complutense University, ²Université Catholique de Louvain, ³University of Sheffield

Introduction: Paranoid beliefs have been linked to schizophrenia but are also common in several mental disorders and in the general population. From the network perspective, paranoia can be conceptualized as a network system of interacting elements. In the present study, we used temporal network analysis to unfold the temporal dynamics between core psychological mechanisms of paranoia, such as self-esteem, sadness, feeling close to others and experiential avoidance.

Methods: Time-series data of 23 participants with high scores in paranoia and/or interpersonal sensitivity were collected via experience sampling methodology (ESM). We applied time-series network analysis (mIVAR) and computed three distinct network models to disentangle within- and between-subject temporal associations between mechanisms of paranoia.

Results: The contemporaneous network model indicated that paranoia and sadness co-occur within the same timeframe, while sadness, in turn, is associated to both low self-esteem and lack of closeness to others. The temporal network model highlighted the importance of feeling close to others in predicting low levels of paranoia in the next timeframe. Finally, the between subject-network largely replicated association found in both contemporaneous and the temporal network models.

Discussion: These complementary network models suggest that paranoia-related mechanisms can be conceptualized as a complex network system varying over time. This new approach to visualizing paranoia offers viable data-driven heuristics in the elucidation of the interactions between pivotal theory-driven mechanisms of paranoia. Moreover, this approach set the scene for the novel translational research directions in the identification of potential targets ripe for prevention and treatment of paranoia.

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Using complex network analysis based on ambulatory assessments to improve dropout prediction in routine care

Brian Schwartz, Wolfgang Lutz

University of Trier

Background: There are large health and economic costs associated with attrition from psychological services. However, predicting dropout is a major challenge in psychotherapy research and recent findings on predictors are rather heterogeneous. Network analyses based on intensive longitudinal data are able to identify the centrality of symptoms that might have predictive power over and above intake variables alone. In a proof-of-concept study, we examined whether centrality measures in complex symptom networks can improve the prediction of dropout.

Methods: Fifty-eight outpatients undergoing psychological treatment were assessed using ambulatory assessments four times a day for two weeks before treatment (3,248 measurements). Multilevel vector autoregressive models were employed to compute dynamic symptom networks. Using machine learning approaches and inferential statistics, the most promising predictors of dropout were selected out of seven intake variables and 61 centrality measures.

Results: Among intake variables, initial impairment and sex predicted dropout explaining 6% of the variance. The final model with two intake and four additional network variables explained 32% of variance in dropout.

Discussion: The findings indicate that patients' dynamic network structures may improve the prediction of dropout. This kind of research can lead to direct applications to personalized predictions of dropout in clinical practice. The findings of this study will be presented against the background of the Trier Treatment Navigator, a recently developed comprehensive feedback and decision support system for psychotherapists. Implementation issues and further developments using individualized items for each patient as well as additional assessments of psychophysiological data via fitness trackers will be discussed.

Socioemotional and Contextual Aspects of Daily Life Stressors: Implications for Adult Development

Chair(s): Gloria Luong (Colorado State University, United States of America)

Discussant(s): David M. Almeida (The Pennsylvania State University)

This symposium includes studies leveraging ecological momentary assessments to elucidate socioemotional and contextual aspects contributing to how people respond to major life stressors and daily life hassles, and the implications for adult development. Ferguson and colleagues investigate how social media use in daily life contributes to differences in positive and negative affect among emerging adults. When emerging adults commented on or liked others' social media posts, their momentary positive affect was reduced, but messaging others was related to greater positive affect. These findings suggest social media may differentially serve as both stressors and sources of support for emerging adults. Building on these social contexts, Raters & Riediger examine younger and older romantic couples' daily experiences of hassles and their disclosures of the event to their partners. Older adults reported fewer hassles and more disclosures, which in turn were related to lower momentary emotional well-being but greater relationship closeness. Older adults may thus use social sharing to promote different socioemotional goals. In contrast, Zavala and colleagues found that older adults (and Blacks, compared to Whites) were more likely to report hassles, and perceptions of subtle and major discrimination were associated with greater likelihood of daily hassles. Luong and colleagues found that older adults prospectively moving into a senior housing facility showed adjustments in daily life (greater momentary emotional well-being), but effects only emerged after several months. Discussant David Almeida will describe the importance of multiple time scales and contexts for understanding responses to daily life stressors, and implications for adult development.

Presentations of the Symposium

Relationship Between Forms of Social Media Use and Emerging Adults' Affect

Giselle Ferguson, Mariah Hawes, Stacey Scott, Daniel Klein

Stony Brook University

Previous work suggests that certain methods of social media (SM) use, such as using it for social comparison, are maladaptive and can have detrimental effects on users' well-being. There may also be forms of SM use that are more adaptive, such as using it for deepening relationships. However, this previous research has often assessed SM usage with general or retrospective measures, thus it is unclear how these effects may play out in daily life. To address this gap, the current study investigated the association between five forms of SM use (posting, viewing others' posts, liking/commenting on others' posts, checking responses to one's own posts, sending direct messages) and positive and negative affect by applying parallel multilevel linear models to data from ecological momentary assessment of a sample of n=153 emerging adults in an ongoing longitudinal study. Participants' positive affect was significantly associated with certain SM uses, such that at times when participants had liked or commented on another person's posts, they experienced significantly less positive affect than at times when they had not done so, and at times when they had directly messaged another person, participants experienced significantly more positive affect than at times when they had not. However, none of the forms of SM use significantly predicted participants' negative affect. In sum, these results suggest specificity - in the types of SM use linked with well-being, in the direction of the effects, and in links with positive but not negative affect.

Guess What Just Happened to Me: Using Dyadic Experience-Sampling to Investigate Functions of Disclosing Recent Everyday Hassles in Younger and Older Couples

Antje Rauters, Michaela Riediger

Friedrich Schiller University Jena, Germany

We investigated affective and interpersonal implications of disclosing everyday hassles in younger and older adults. Disclosing emotional experiences – often termed the social sharing of emotion (SSE) – has been assumed to support emotion-regulation and relationship-regulation goals. Evidence for these notions typically stems from studies investigating SSE either retrospectively or with unfamiliar confederates. However, SSE in daily life typically occurs shortly after the event and with familiar persons. Furthermore, studies have mostly relied on young-adult samples, although it has been argued individuals from different age groups may differ in SSE. To address both concerns, we conducted a dyadic experience-sampling study with 50 younger (20-30 years of age) and 50 older (70-80 years of age) cohabitating heterosexual couples. Using mobile phones, both partners repeatedly (6 times a day, for 15 days) documented whether they had recently experienced a hassle and whether they had told their partner about it. Both partners also repeatedly rated their current affect and how close they momentarily felt to their partner. Older adults reported fewer everyday hassles and were more likely to disclose hassles to their partners. Both age groups reported lower emotional well-being, but higher feelings of relationship closeness when they had disclosed everyday hassles, than when they had not disclosed a hassle. This study suggests that immediate mood-repair may not be the primary function of everyday emotional sharing. Instead, our findings are consistent with the idea that emotional sharing may serve interpersonal functions of regulating relationship closeness in younger and older adults.

Daily Stress Exposure Across Adulthood - Who's Reporting and Does Discrimination Have an Impact on Other Stressors?

Daisy Zavala¹, Elizabeth Muñoz², Martin J. Sliwinski³, Stacey B. Scott¹

¹Stony Brook University, ²University of Texas at Austin, ³Pennsylvania State University

The Minority Stress Model proposes that groups occupying disadvantaged social groups may be exposed to chronic and unique stressors that increase their vulnerability to the effects of stress. This study considered frequency of stressors in daily life as a way to operationalize chronic stressors and attempted to disentangle individual differences related to race from those related to life history of major and subtle forms of discrimination. Participants included 334 racially diverse adults (25-65 years, Mage = 47, 63% Female) from the Bronx, New York, who completed questionnaires on subtle and major discrimination across their lives as well as demographics. Up to 5 times daily for 2 weeks, participants completed ecological momentary assessments (EMA) in which they reported whether a stressor had occurred since the last assessment. Compared to White individuals, Black individuals were 2.10 times more likely to report a recent stressor (OR=2.10, 95% CI= 3.84 -1.12). Older adults were 1.20 times more likely to report a recent stressor (OR=1.20, 95% CI= 1.40-1.03). Individuals who reported greater subtle discrimination were 1.24 times more likely to report a recent stressor (OR= 1.24, 95% CI= 1.46-1.04) and individuals who reported greater major discrimination were 1.32 times more likely to report a recent stressor (OR=1.32, 95% CI= 1.56-1.22). These results demonstrate that occupying disadvantaged groups and being older may place individuals at an increased risk for greater exposure to stressors in daily life.

Affective Experiences and Well-Being Following a Major Life Event: Implications for Models of Resilience in Later Adulthood

Gloria Luong¹, J. Doug Coatsworth², Sy-Miin Chow³

¹Colorado State University, ²University of Tennessee, Knoxville, ³The Pennsylvania State University

Researchers have posited that positive growth in shorter- and longer-term affective experiences and well-being may be possible following adversity and major life events, but much of this literature is based on retrospective self-reports asking participants to reflect back on perceived changes. The current study uses data from the Relocation and Transitional Experiences (RELATE) project, which longitudinally tracked older adults and their partners prospectively to better understand changes in affective experiences and well-being from before and after a move into senior housing (e.g., independent or assisted living facilities), up to about 3.5 months later. Participants completed questionnaires, health and cognitive assessments, and ecological momentary assessments of daily life experiences at 4 different waves in the study: 2 weeks prior to the move, as well as 2 weeks, 1 month, and 3 months after the move. Results indicate that with greater time

since the move, participants were more likely to show greater adjustment to the event in daily life (i.e., decreases in negative affect, increases in positive affect, increases in life satisfaction). These changes did not manifest until about 3.5 months after the move, and were not apparent in earlier waves of the study. Our results indicate that when examining longitudinal changes and adjustment and resilience to major life events, the methodological considerations in timing of assessments is important to consider. Furthermore, our work suggests there may be potential for positive growth following adversity, especially with respect to capacities for change in later adulthood.

Ambulatory Assessment in Clinical Service – Towards a Better Understanding of the Development, Maintenance and Change in Mental Disorders

Chair(s): Andrew Gloster (University of Basel), **Elisa A. Haller** (University of Basel, Switzerland)

The often-maligned lack of knowledge about the naturally maintaining mechanisms of disorders and mechanisms of treatment change has multiple implications. Some of these include that clinicians are less able to help patients who fail to respond to first line treatments; treatment development is retarded; and prevention of complications surrounding mental and environmental strain is made much more difficult. Ambulatory assessment (AA) has been seen as one possible way to overcome some of these obstacles. Within clinical psychology, one distinct advantage is that hypothesized processes of action are targeted in real-time and in patients' natural environments as opposed to single pre-post comparisons in the research setting. This is important given that critical behavior varies across time and circumstances and given that therapeutic change involves unique, dynamic processes. This real-world data gives a view into the daily lives of at-risk individuals and patients with mental disorders while they subjectively experience, feel, behave, and attempt to implement the things they are learning in therapy. In this symposium five speakers will demonstrate how AA is used in clinical service. In the first talk, ideas of applying AA in the prediction and prevention of mental disorders in adolescents will be presented. Three talks will show the unique value of AA in understanding mechanisms of pathology and treatment by focusing on a) worry episodes in generalized anxiety disorder, b) self-efficacy in anxiety disorder and c) prosocial behavior in depression. The final talk will present results on spatiotemporal movement of patients combining AA and GPS-data.

Presentations of the Symposium

Ambulatory Assessment in the prevention of mental disorders in adolescents

Stefanie J. Schmidt, Thomas Berger, Fabian Steiner, Noemi Walder

University of Bern

Mental health of adolescents is a global public health challenge as most mental disorders develop by the age of 24 and tend to have a high likelihood of persistence or recurrence. Therefore, it is critical to develop indicated prevention approaches that enable the prediction of mental disorders and target individuals already experiencing subclinical symptoms. Most indicated prevention approaches have been developed for risk-syndromes of specific mental disorders. However, this contradicts the increasing recognition of emerging psychopathology as a complex system characterized by rapid shifts in subclinical symptoms that cut across diagnostic categories and interact with each other over time. This requires to move current understanding from disorder-specific prediction-models to a transdiagnostic dynamic network approach of symptoms. To this aim, Ambulatory Assessment with intensive longitudinal data collected within an individual is well suited to examine the course, pattern, and critical warning signals of networks of subclinical symptoms. This design also allows to study the transdiagnostic mechanisms underlying the development of several mental disorders that represent worthwhile early intervention targets. This talk will therefore show how Ambulatory Assessment can be used in clinical practice to enhance our predictive accuracy under which conditions and through which processes subclinical symptoms progress into full-blown mental disorders in adolescence. Further, it will be demonstrated how critical transdiagnostic mechanisms of change can be assessed and targeted using Ambulatory Assessment. These results may serve the overall aim to enhance mental health in adolescence.

Anxiety and uncontrollability of worry and strength episodes in patients with generalized anxiety disorder: An event-based ecological momentary assessment study

Andreea Visla¹, Richard Zinbarg², Peter Hilpert³, Christoph Flückiger¹

¹University of Zurich, ²Northwestern University, ³University of Surrey

Background: Research has shown that individuals with generalized anxiety disorder (GAD) experience intense worry episodes that are high in anxiety and uncontrollable. However, there is limited research on how worry episodes influence each other in daily life of individuals with GAD and how strength episodes

might impact on their worry episodes. Methods: Using event-based ecological momentary assessment in 49 individuals (465 observations) with GAD, we examined whether anxiety and controllability of the previous episodes interact with the type of the previous episodes to predict anxiety and controllability in the current episodes. Results: For strength episodes, we found previous controllability by type of prior episode interaction. Specifically, the association between perceived controllability in previous episodes and perceived controllability in current strength episodes was on average higher when previous strength versus previous worry episodes were experienced. The other tested models looking at this interaction effect on perceived controllability in current worry episodes, and anxiety in current worry and strength episodes were not significant. Conclusion: Our preliminary results indicate that the experience of repeated strength episodes might increase the perceived controllability in these episodes much more than would a switch from a worry episode to a strength episode. Implications of these findings for the GAD theoretical models and for the assessment and intervention in individuals with GAD will be discussed.

Lower self-efficacy predicts avoidance in anxiety disorders patients' daily life and early treatment response during transdiagnostic cognitive behavior therapy

Christina Paersch1, Dominique Recher1, Ava Schulz2, Mirka Henninger2, Tobias Kowatsch3, Birgit Kleim1

1University of Zurich, Psychiatry University Hospital Zurich, 2University of Zurich, 3University of St. Gallen

Self-efficacy is a key construct in behavioral science with significant impact on mental health and psychopathology. Self-efficacy's intra- individual effect on symptom changes within individuals, across time, however, as well as the association with symptom change early during psychotherapy have not yet been thoroughly investigated. Here we use Ecological Momentary Assessment (EMA) in 66 patients with anxiety disorders to investigate self-efficacy's influence on (i) avoidance, hope and psychophysiological arousal in daily life as well as on (ii) early treatment changes. Pre-therapy, we prompted patients five times per day (between 10am and 8pm) for 14 days to provide data on their anxiety symptom experiences. They were then randomized to either cognitive behavior therapy (UP) or a wait-list-control group (WAIT). Weekly anxiety and depression symptom severity were assessed. Using multilevel logistic regression, we found that self-efficacy had a direct impact on avoidance and interacted with anxiety to predict hope and psychophysiological arousal. Significant effects of self-efficacy on early treatment change during a transdiagnostic treatment emerged for anxiety. This study provides insights in the importance to examine between-person and within-person dynamics of symptoms in anxiety disorders. Our findings assign a key role to self-efficacy in affecting intra-individual symptom dynamics in daily life and enhancing treatment-relevant processes, such as hope, and may contribute with further research to a more personalized psychotherapy.

Prosocial behavior and its influence on affect and well-being in healthy and clinically distressed individuals: Evidence from a study using experience sampling methodology

Elisa A. Haller1, Marcia T. B. Rinner1, Jeanette Villanueva2, Victoria J. Block1, Andrea H. Meyer1, Andrew Gloster1

1University of Basel, 2University Psychiatric Clinics (UPK), University of Basel

Background: Supporting and helping others are socially and emotionally rewarding human behaviors. However, little is known about contextual factors (i.e., characteristics of prosocial behavior and subgroups) that may impact the beneficial effects of positive social interactions. This study examines prosocial behavior and its relation to affect and well-being as it occurred in the daily life of clinically distressed and healthy individuals. Methods: Data are drawn from two large studies: a transdiagnostic clinical trial on treatment non- responders; and an intervention study on social interactions and well-being in couples. The clinical sample included N = 138 patients, primarily diagnosed with depression and anxiety disorder, during the first week of their treatment. The non-clinical sample included N = 81 couples (162 individuals). Both studies used Event Sampling Methodology (ESM) for seven consecutive days at baseline. Individuals were asked 5 times/day about their current mood and whether they engaged in prosocial behavior since the last prompt, followed by questions about the recipient of and the motive for the helping behavior. Preliminary results show that in healthy individuals, positive effects of prosocial behavior are contingent on the closeness of the recipient and when given by choice. We will report whether clinical and non- clinical populations differ in the extent, the motivation for and their emotional reactivity following prosocial behavior. Conclusion: Results will shed light on prosocial behavior as a behavioral marker of social dysfunction in clinically distressed individuals. Furthermore, understanding naturally occurring interpersonal behaviors that have the potential of elevating mood is of clinical importance.

Movement and Wellbeing: Using Ambulatory Assessment to Examine the Relationship between Movement, Symptoms, and Wellbeing

Andrew Gloster1, Andrea H. Meyer1, Jens Klotsche2, Victoria J. Block1, Jeanette Villanueva3, Elisa A. Haller1

1University of Basel, 2Charité Universitätsmedizin Berlin, 3University Psychiatric Clinics (UPK), University of Basel

Movement is a basic component of health. However, little is known how patients presenting for treatment for mental disorders naturally move about and whether their movement patterns are related to their symptoms and their wellbeing. This study examined the spatiotemporal movement of patients in and outside of a psychiatric hospital and its relation to symptoms and wellbeing. Participants were 106 patients (inpatients (n = 69) and outpatients (n = 37)) treated for a wide range of mental disorders (transdiagnostic sample) who carried a GPS-enabled smartphone for one week at the beginning of treatment. Spatiotemporal clusters (i.e., at the hospital, at home) were established. These clusters were then related to symptomatology, wellbeing, and psychological flexibility. Preliminary results showed that the spatiotemporal patterns of inpatients and outpatients showed some differences (e.g., outpatients' overall area of movement was higher). These patterns were largely unassociated with symptoms (except for agoraphobic symptoms). In contrast, greater movement and variety of movement were more predictive of wellbeing and psychological flexibility, in both inpatients and outpatients. These results demonstrate that measuring spatiotemporal patterns in patients is feasible, suggest that such patterns are predictive of wellbeing, imply that psychological flexibility is an important aspect of health, and that spatiotemporal patterns may be a marker of patient functioning. Ethical issues of collecting GPS data will be discussed.

Conference Agenda

Session

P3-D3: Paper Session 3 - Day 3 (Affect & Mood)

Time: Friday, 02/July/2021: 6:15pm - 7:30pm

Presentations

Loneliness and Older Adults' Daily Experiences of Television Viewing

Yijung K. Kim¹, Yee To Ng², Shiyang Zhang², Meng Huo³, Kira S. Birditt⁴, Karen L. Fingerman²

¹Texas Aging & Longevity Center, The University of Texas at Austin, USA; ²Department of Human Development and Family Sciences, The University of Texas at Austin, USA; ³Department of Human Development and Family Studies, University of California at Davis, USA; ⁴Institute for Social Research, University of Michigan, USA

Television viewing remains the primary daily leisure activity in later life occurring during 6 to 8 hours of older adults' waking hours. Self- reported television viewing over long time periods closely correlates with loneliness, social encounters, and residential status, but little is known about their real-time linkages in the context of older adults' daily lives. This study investigated the effect of television viewing on lonely feelings throughout older adults' days and whether this association varies by social encounters or residential status. Data were drawn from 306 older adults (aged 65+) in the Daily Experiences and Well-being Study, who completed a baseline interview followed by a 5-6 day intensive data collection involving Electronically Activated Recorders (EAR; 30 seconds every 7 minutes) and ecological momentary assessments (EMA; every 3 hours). Multilevel analyses showed that watching more television was associated with feeling lonelier on the same occasion, adjusting for the person's general level of lonely feelings across the study. Living alone, but not being alone on the same occasion, moderated the link between television viewing and feeling lonely. In sum, older adults living alone reported feeling lonelier with more television viewing, but the same association was not present among those living with someone. Discussions include the role television continues to play in older adults' daily lives and the potential pathways by which television viewing may contribute to lonelier feelings of those who live alone.

Facing stressful life events: Do older adults suffer more than younger adults?

Laura Almeling¹, Alexandra M Freund^{1,2}

1University of Zurich, Switzerland; 2University Research Priority Program Dynamics of Healthy Aging

Previous research has shown that negative stressful life events are typically associated with detrimental effects in various aspects. Further, older adults may be more vulnerable to stressors. We present preliminary data from an ongoing multi-burst experience sampling study. The analysis is based on 8201 surveys from 125 participants, consisting of 66 younger (18 – 30 yrs.) and 59 older adults (60 – 85 yrs.) collected on 2028 days. Once per burst, participants reported stressful life events that preoccupied them during the previous month. They also recorded their sleep quality and at each assessment their sense of control and how exhausted or recovered they felt. For a subsample of 103 participants we analysed hair cortisol and cortisone from 208 samples.

In line with previous research but counter to prevalent stereotypes about aging, older adults reported better sleep quality. Overall, older adults also experienced more control in their everyday lives than younger adults. As expected, the experience of a stressful life event was associated with worse sleep quality and a lower sense of control. This relationship was not modulated by age. Further, younger but not older adults experienced a decline in feelings of recovery when facing a stressful life event. Irrespective of age the occurrence of a stressful life event was associated with reduced hair cortisone levels, while hair cortisol was neither affected by age nor the occurrence of a major life event. In sum, there was no evidence for an increased susceptibility to stressful life events for older adults compared to younger adults.

Affect Contagion in Daily Life is Mediated by Perceptions of Partner Affect: A Micro-Longitudinal Study with Older Couples

Elisa Weber¹, Gizem Hueluer²

¹University of Zurich, Switzerland; ²University of South Florida, USA

Intimate relationship partners dynamically covary in their affective states. One mechanism through which intimate relationship partners experience and shape each other's affective states is affect contagion, i.e., the spread of affective states from one person to another. The degree to which social-cognitive processes are involved in affect contagion in daily life remains difficult to disentangle. The majority of older adults live together with a spouse/partner, and intimate relationships are one of the most important social contexts in the daily lives of older adults. Expanding on previous research, we focused on contagion of positive and negative affect between older relationship partners, and examined whether processes of affect contagion were mediated by perceptions of partner affect, i.e., how individuals thought their partners felt at previous moments. We used data from an experience sampling study with 152 older couples (304 participants; 65+ years old) who reported on their positive and negative affect, perceptions of their partner's positive and negative affect, and presence or absence of partners 6 times a day for 14 days (resulting in up to 84 measurement occasions per participant). Dyadic multilevel mediation models were used to evaluate our hypotheses. In line with expectations, we observed strong evidence that processes of positive and negative affect contagion between partners were mediated by perceptions of partner's affective states. Moreover, partner presence was unrelated to processes of affect contagion. Our findings help identify underlying mechanisms of affect contagion and support the notion that perceptions of close others' emotions might shape our own feelings.

Assessing the Effects of Prosociality on Emotional State Using Daily-Life Audio Data

Christina Ristl¹, Alice Baird², Björn Schuller², Jana Nikitin¹

¹University of Vienna, Austria; ²University of Augsburg, Germany

Prosociality (i.e., voluntary thoughts and actions intended to benefit somebody else) is arguably essential for positive social relationships. Less is known about the benefits of prosociality for the prosocial person. The present research investigated the effect of a prosocial focus on the emotional state of a prosocial person. We addressed this question in an intervention study of daily social interactions. All participants (N = 295, 57.6% women, age 19–88 years) started the study with a baseline day with no intervention. Participants then underwent a video-based intervention that trained them to focus on either the well-being of others or the well-being of themselves. Participants applied the corresponding focus in social interactions on the next day. To test the hypotheses, we used device-based audio recordings that were taken every two minutes across the three days. To extract the emotional state of the participant from the recordings we analysed the speech signal in a brute-force manner, applying voice activity detection to reduce the existence of audio without vocalisations. We utilised a pre-trained emotion recognition network to infer the degree of emotion from the dimensions of valence and arousal in the speech. The results inform knowledge on the capacity of audio data to detect emotional states beyond self-reporting. Thus, this study will contribute to establishing the role of automation-based data collection and analysis methods of emotions in daily context.

Association between mood and self-assessment of functionality in patients with an acquired brain injury

Saskia Doreen Forster¹, Siegfried Gauggel¹, Volker Voelzke², Petra Zimmermann³, Caroline Privou³, Verena Mainz¹

¹University Hospital of the RWTH Aachen, Germany; ²VAMED Klinik Hattingen GmbH, Germany; ³MediClin Klinik Reichshof, Germany

Patients with brain injuries often have difficulties with an adequate self-assessment of their functionality. Previous research has shown that these self-assessments can also vary from time to time and mood was discussed as an influencing factor. Therefore, this study examined the association between mood and self-assessment of functionality in 28 patients with different acquired brain injuries using ecological momentary assessments. The relationship between patients' mood and their self-assessment was investigated using multilevel analyses and a significant association was shown. Interestingly time-lagged analyses revealed that only mood significantly predicted patients' self-assessments while self-assessments did not predict patients' mood. This association remained stable after adding age, awareness of illness and severity of impairment as additional predictors. In summary, patients' mood seemed to influence their self-assessment more than the other way around.

Conference Agenda

Session

S2-D3: Symposium Session 2 - Day 3

Time: Friday, 02/July/2021: 6:15pm - 7:30pm

Presentations

From research method to clinical practice: Possible hurdles and how to overcome them.

Chair(s): **Egon Dejonckheere** (KU Leuven)

Discussant(s): **Harriëtte Riese** (Rijksuniversiteit Groningen)

Because EMA data provide a unique insight into people's everyday life, the clinical appeal of this research method is evident. Nevertheless, a clean-cut translation of standard research practices to the therapy room is less obvious for various reasons. In this symposium, we detect different quantitative and qualitative hurdles that currently prevent a direct implementation of EMA methods into clinical practice, and propose strategies to directly improve their diagnostic and therapeutic value. Quantitatively, we provide guidelines to improve the overall data quality in EMA protocols to boost the predictive value of commonly investigated dynamical indicators of psychological well-being, and discuss the importance of optimally modeling temporal information in dynamical system models. Qualitatively, we explain how the sensitivity of idiographic network models can be improved with clinical case information, and investigate how therapists perceive the clinical utility of these method themselves. Integrating these findings, we aim to formulate pointers towards overcoming the scientist-practitioner gap, based on both, methodological and practical considerations.

Presentations of the Symposium

On the signal-to-noise ratio in emotional time series

Egon Dejonckheere

KU Leuven

How emotions unfold in daily life, and how these dynamic patterns relate to person-level characteristics (e.g., psychopathology) is an area of investigation that is gaining increased interest among experience sampling (ESM) researchers. At the same time, however, there is also growing awareness that real-life affect dynamics show limited unique predictive ability compared to more static-like summaries of affect (such as the mean or variability in emotion) when related to person-level outcomes. One explanation may be that the data quality of current ESM studies is simply insufficient to pick up on meaningful dynamical regularities

in emotion time series, concealing the true external validity of affect dynamic metrics. In this talk, we introduce the signal-to-noise ratio (SNR) as a measure of data quality, designed to disentangle the power of people's latent emotional signal from inevitable background noise. Breaking down the SNR into its three different constituents (i.e., inertia, innovation noise and measurement noise), we lay out an overarching framework with various methodological strategies to improve the SNR of affective ESM time series. Providing preliminary empirical evidence, we hope that future ESM studies will implement our suggestions, to unravel when, how, and which affect dynamic measures carry unique information about prominent person-level variables relevant for clinical practice.

The impact of modeling unequal time intervals in ESM time series

Tim Loossens

KU Leuven

The dynamics of affect are considered a process that continuously unfolds across time. It is nonetheless common practice to use models that do not include the specific time intervals between observations to describe this evolution (as is the case for the vector-autoregressive (VAR) and related models), though there exist models that do take the time intervals into account (which are referred to as continuous-time models in contrast to the discrete-time VAR models). There even exists a continuous-time extension of the VAR(1) model, known as the Ornstein-Uhlenbeck (OU) model – these models become equivalent when all time intervals are equal. In practice, however, time intervals are generally not equal. It has been shown that analyzing data with a discrete-time VAR(1) model will lead to biased and inaccurate results if data is generated by a continuous-time OU model and time intervals are unequal. Hence, we would expect that by accounting for the time interval, we can get a better description of the data and thus make better predictions. Yet, when comparing the predictive accuracy of the OU model with that of the VAR(1) model for typical experience sampling data of affect, it turns out that the VAR(1) model significantly outperforms the OU model. If we take into account large abrupt changes on short time intervals, which may be caused by externally driven events, the OU model's predictive accuracy is significantly improved. This provides empirical evidence for the continuous hypothesis, but also indicates that external triggers and events play an important role.

Implementing idiographic methods in the therapy clinic

Madelyn Frumkin

Washington University in St. Louis

Idiographic methods are often touted as promising tools for improving psychological treatment, as they can provide empirical rationale for tailoring therapy to meet the unique needs of the individual. Given that idiographic methods require the collection of intensive longitudinal data – often hundreds of data points – it is critical to determine whether clients and therapists find these methods feasible, acceptable, and useful in clinical settings. We recruited clients seeking therapy at a psychology training clinic to complete ecological momentary assessment (EMA) and provide feedback regarding both these methods and the resulting idiographic models. Clients' therapists were also asked to provide feedback regarding perceived utility of the models, and both clients and therapists made predictions about model structure. Thus far, 23 clients and 23 therapists have participated. Of the 23 clients, 7 (30%) reported that completing EMA five times per day for three weeks was burdensome. Most clients (68%) reported that the idiographic models accurately described their symptoms, and a greater proportion of clients (82%) thought that the models would help their therapist understand and work on their problems. However, less than half of therapists (43%) reported that they would be likely to use the idiographic models in case conceptualization and/or treatment planning, perhaps because less than half of therapists agreed that the models provided novel information about their clients. We will discuss these results as they relate to clients' and therapists' predictions about the idiographic models, and cover opportunities and challenges of implementing idiographic methods in clinical settings.

Idiographic systems as collaborative effort between clinician and patient: A Bayesian approach to estimating idiographic systems from ambulatory assessment data

Julian Burger

University of Amsterdam, University Medical Center Groningen

Advances in ambulatory assessment approaches contributed to new ways of estimating idiographic systems, for instance dynamic networks based on vector-autoregressive relations. Idiographic systems could be important for a broad range of clinical applications, such as selecting personalized interventions, exploring individual symptom dynamics, and establishing systems of early warning signals prior to critical phase transitions. Recently, however, it has been found that using ambulatory assessment data collected under conditions

commonly found in clinical practice (e.g., low power and restricted within-person variability) lead to idiographic systems with low sensitivity. In turn, if idiographic systems lack dynamic relations that are important for clinical case formulation, any subsequent inference, such as the selection of personalized treatment targets, is likely to lack clinical relevance. This presentation proposes a novel approach of including clinically relevant considerations into the estimation of idiographic systems. We introduce PREMISE, the Prior Elicitation Module for Idiographic System Estimation, an interactive web-application that allows clinician and patient to collaboratively construct a prior belief system, which can subsequently be updated using ambulatory assessment data and Bayesian inference. PREMISE has two advantages over purely data-driven system estimation: a) It allows to actively incorporate clinical information and the patient's lived experience, thereby addressing a major barrier in implementing rather statistical procedures in clinical practice, and b) it makes estimation more efficient, by incorporating readily-available clinical information, which helps combatting power issues often found in idiographic system estimation. We showcase PREMISE using a clinical example, and discuss its role in bridging the scientist-practitioner gap.

Understanding health behaviour change in everyday life: Temporal dynamics from different health contexts

Chair(s): Janina Lüscher (University of Zurich, Switzerland), **Jan Keller** (Freie Universität Berlin, Germany)

Discussant(s): Christiane Hoppmann (University of British Columbia, Vancouver, Canada)

Rationale & Aim: Investigating persons' behaviour change as a within-level process (e.g., day by day) is of high importance as behaviour change, behaviour change indicators, and their inter-relations fluctuate over time. To refine the development of behaviour change theories, more evidence on temporal dynamics from studies applying ecological momentary assessment designs is needed. Regarding the development of effective behaviour change interventions, evidence from such studies can help to identify onset and temporal limits of intervention effects.

The overall goal of this symposium is to understand health behaviour change in everyday life by examining these temporal dynamics in different health contexts. Both risk behaviour and health behaviour contexts should be addressed by the set of presentations.

Summary: First, Janina Lüscher shows results from a daily diary study following smokers around a self-set quit date examining day-by-day patterns between responsiveness and smoking behaviour. Second, Jennifer Inauen presents findings from a feasibility study investigating the relationship between unhealthy snacking behaviour and acute stress using continuous heart rate variability assessments via mobile electrocardiography. Third, switching to the context of healthy nutrition, Antonia Domke presents day-by-day changes in adults' fruit and vegetable consumption, self-efficacy, and action control after a brief action planning intervention. Fourth, Jan Keller reports findings on how individuals form a nutrition habit following an action planning intervention by modelling habit formation curves based on 84 daily assessments. Finally, the individual presentations will be followed by a discussion of implications and future directions by Christiane Hoppmann.

Presentations of the Symposium

Does perceived responsiveness predict smoking cessation after a self-set quit attempt in daily life?

Janina Lüscher, Philipp Schwaninger, Corina Berli, Urte Scholz

University of Zurich, Switzerland

Introduction: Social network partners, such as a romantic partner or a buddy can play a crucial role for successful smoking cessation. A factor associated with health indicators and well-being is responsiveness. Responsiveness is defined as the perception that a significant other understands, approves and cares for the self. Only few studies have examined the role of responsiveness in the context of smoking cessation. Moreover, responsiveness was only investigated from a romantic partner and not from a buddy. The present research thus examines perceptions of a self-chosen buddy's responsiveness as a predictor of daily smoking and well-being from a self-set quit date on. **Methods:** 72 adult smokers participating in a dyadic app-based smoking cessation intervention reported on daily responsiveness, number of cigarettes smoked and well-being in end-of-day diaries from a self-set quit date on across 21 consecutive days. **Results:** Multilevel analyses revealed that at the between-person level responsiveness was negatively associated with daily numbers of cigarettes smoked and at the within-person level responsiveness was positively associated with well-being. **Conclusions:** Previous research has shown that responsiveness is an important predictor of smoking cessation. This is the first study examining the role of responsiveness from a self-chosen buddy in the context of smoking cessation in daily life. The present study shows that perceived responsiveness from a self-chosen buddy also predicts less daily smoking and higher well-being and thus demonstrates the

potential of perceived responsiveness for smoking outcomes.

Keywords: responsiveness, smoking cessation, well-being, buddy, ambulatory assessment data, daily life

Investigating the relationship between acute stress and health behavior in daily life using mobile electrocardiography: A feasibility study

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There is growing evidence that both chronic and acute stress are negatively related to health behavior. To arrive at ecologically valid conclusions, these relationships are best studied in daily life, but this is challenging. Past research of stress in daily life has predominantly relied on self-report, and these measures can be biased. Recent developments in mobile assessment of psychophysiological parameters, such as heart rate variability (HRV), provide exciting new possibilities to objectively assess acute stress in daily life. In the present study, we investigate whether HRV assessed by a chest-worn mobile electrocardiography device is a reliable and valid indicator of acute stress, and whether it relates to health behavior in daily life. Fifty-five young adults wore the ecgMove 4 electrocardiography device for four days. They were instructed to tap the sensor immediately to mark stressful events. Additionally, participants reported on their snacking three times a day. It is expected that the ecgMove 4 reliably detects stressful events in daily life, indicated by lower HRV compared to other times of day. Speaking to the predictive validity of the device, HRV is assumed to positively relate to health behavior in daily life, both at the within- and at the between-person level. Provided the reliable and valid detection of stressful events in daily life, mobile electrocardiography has great potential to investigate the stress-health behavior relationship unobtrusively in naturalistic settings.

Effects of a very brief planning intervention on fruit and vegetable consumption: A randomized controlled trial

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Background: Action planning interventions can effectively promote fruit and vegetable (FV) consumption, but not much is known about the day-to-day translation of intervention planning into action. In this randomized controlled trial, immediate intervention effects of a very brief planning intervention on FV consumption during the following 13 days were investigated.

Methods: The ecological momentary assessment phases of the study comprised two 13-days diary periods. After the pre-intervention diary, N = 206 participants (aged 19 to 66 years) were randomly allocated to a waiting-list control condition or a planning condition, where they formed one FV plan. Participants from both conditions completed the post-intervention diary. Self-reported daily FV consumption, FV-specific self-efficacy, and action control were assessed.

Results: Segmented linear mixed models estimating a discrete change (i.e., "jump") between diary phases showed a positive "jump" of FV intake and self-efficacy in the planning condition when compared to the control condition. For action control, such effects were not observed. Changes in study variables throughout the post-intervention phase did not differ between both conditions.

Conclusions: Present findings extend previous evidence on action planning interventions by showing that increases in self-regulatory (i.e., self-efficacy) and behavioral (i.e., FV intake) outcomes are occurring very rapidly and already at the day for which behavioral increases were planned.

Habit formation following routine-based versus time-based cue planning: A randomized controlled trial

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Background: Habit formation has been identified as one of the key determinants of behavior change. To initiate habit formation, self-regulation interventions can support individuals to form a cue-behavior plan and to repeatedly enact the plan in the same context. This randomized controlled trial aimed to model habit formation of an everyday nutrition behavior and examined whether habit formation and plan enactment differ when individuals plan to enact their behavior in response to a routine-based versus time-based cue.

Methods: Following a baseline assessment, N=192 adults (aged 18 to 77 years) were randomly assigned to a routine-based cue or a time-based cue planning intervention, in which they selected an everyday nutrition behavior and linked it to a daily routine or a time cue. Subsequently, participants responded to ecological momentary assessments over 84 days measuring daily plan enactment and the behavior's automaticity (as an indicator of habit formation). Multilevel models with days nested in participants were fitted.

Results: As indicated by asymptotic curves, it took a median of 59 days for participants who successfully formed habits to reach peak automaticity. Group-level analyses revealed that both routine-based and time-based cue planning led to increases in automaticity and plan enactment, but no between-condition differences were found. Repeated plan enactment was a key predictor for automaticity.

Conclusions: Linking one's nutrition behaviour to a daily routine or a specific time was similarly effective for habit formation. Interventions should encourage persons to repeatedly carry out their planned behaviour in response to the planned cue to facilitate habit formation.

Putting intensive longitudinal research into context: Implications for measurement and modeling

Chair(s): Eva Ceulemans (KU Leuven, Belgium), **Janne Kristin Adolf** (KU Leuven, Belgium)

Discussant(s): Eva Ceulemans (KU Leuven, Belgium)

In many psychological fields, a rapid growth in intensive longitudinal research accompanies a paradigm shift from static accounts of inter-individual differences to dynamic perspectives embracing intra-individual variability and change. With time, the enthusiasm over new research opportunities gets complemented by a rising awareness of associated challenges. These also concern incorporating the contextual conditions that shape our everyday lives. This symposium gathers presentations that take up the challenge and attempt to put intensive longitudinal research into context, revealing implications for measurement and modeling.

Horstmann and colleagues examine consistency of personality states in functionally equivalent and non-equivalent situations. They show that personality states are consistent across situations both due to stable influences of the person, and the equivalence of the situation in which states are enacted.

Cloos and colleagues investigate the context sensitivity of typical affect items in an intensive longitudinal study. They manipulate the dimensionality and homogeneity of items that are normally combined via averaging. The context sensitivity of such average scores is then used, among other criteria, to assess their validity.

Ariens and colleagues examine how context can be included in dynamic affect models. A joint simulation and analysis of experimental data, where contextual variables are carefully controlled, reveals that issues related to multicollinearity can easily arise, hampering estimation and interpretation of modeling results.

Finally, focusing on benefits rather than complications for dynamic modeling, Adolf and Ceulemans reveal how contextual change can leverage the estimation accuracy of autoregressive-type models, even if contextual information is imbalanced and incomplete.

Presentations of the Symposium

Distinguishing simple and residual consistency in functionally equivalent and non-equivalent situations: Evidence from experimental and observational longitudinal data

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The current work examines consistencies of personality state scores across functionally equivalent and non-equivalent situations. We argue that simple consistency, defined as the correlation between state scores without taking people's traits into account, needs to be distinguished from residual consistency that does account for traits. The existence of residual consistency reflects systematic inter-individual differences in how people respond to situations, above and beyond what is expected from their traits. We examine the level and individual differences in all of these forms of consistency. In four micro-longitudinal studies (total N = 671), participants first provided trait self-ratings and then state ratings, either in response to two situation vignettes presented at separate testing occasions (Studies 1 and 2) or during experience sampling in daily life (Studies 3 and 4). In all studies, simple consistency was substantial, and the level of residual consistency varied with the level of functional equivalence of the situations. Further, individual differences in both simple and residual consistencies were only weakly correlated, suggesting no underlying general factor but only trait-specific consistencies. We conclude that there are consistent individual differences

in how people respond to equivalent situations, even when their personality trait scores have been taken into account.

Rethinking the use of average scores for assessment across contexts: An examination of methods to measure affect in intensive longitudinal research

Leonie J. R. Cloos, Eva Ceulemans, Peter Kuppens

KU Leuven, Belgium

Due to the lack of standardized affect measures for intensive longitudinal research, the number and content of items selected to construct scales differs across studies. One common practice however is to calculate affect scores, by averaging the items at each occasion. Average scores rely on the assumption that items are equally good indicators of a single construct and are thus homogeneous within measurement occasions. We argue that, in intensive longitudinal research, assumptions of average scores are problematic. Firstly, because items often vary in emotional intensity, relating more or less strongly to the measured construct depending on the intensity of a situation. Secondly, items often reflect distinct emotions that are elicited in specific situations, making affect multidimensional construct at the within-person level. In an experience sampling study we manipulate the heterogeneity and unidimensionality of affect measures and administer emotionally distinct items that vary in their levels of intensity. We evaluate the use of an average score under these conditions and compare it to the alternative scoring methods of maximum scores, component scores, average scores of only high and low intensity items respectively, as well as unipolar and bipolar single items. The validity of the methods are evaluated in terms of their ability to capture variability, their sensitivity to changes in the context, and their location in a nomological net of corresponding constructs. The purpose of this study is to gauge the impact of alterations in measurement and scoring methods, in order to help develop standardized scales to measure affect intra-individually.

The role of context in the interpretation of autoregressive models

Sigert B. Ariens, Janne K. Adolf, Eva Ceulemans

KU Leuven, Belgium

Time series of affect data do not always display stable characteristics. Statistical moments, such as the mean, variance, and autocorrelation, can change over time. Such changes are appealing targets on both theoretical as applied levels, for instance in predicting or understanding the development of affective disorders. Recent methodological developments have attempted to accommodate the demands of analyzing non-stationary psychological data, of which a promising framework is fixed moderated vector autoregression. In this framework, researchers are able to tie changes in dynamics to observed covariate changes. In this way, the role theoretically appealing contextual variables have in describing non-stationarities can be made specific. For instance, focusing on affect dynamics, changes in intercepts are assumed to reflect level changes in the process, and changes in autoregressive parameters are hypothesized to be related to changes in emotional inertia. Contextual variables play the role of moderators in these models, and the extent that contextual variables influence the dynamics of the affective process can be estimated freely. However, it is unclear how easily such changes can be detected in empirical data. Moreover, if contextual variables demonstrate strong, theoretically relevant relationships with an affective processes of interest, we also expect strong correlations between the contextual variable and the lagged affective scores. The resulting multicollinearity thus poses a significant problem for estimation, and in extension straightforward interpretation of parameter estimates. This study aims to elucidate both the statistical and interpretational hurdles confronting researchers wishing to integrate contextual information in autoregressive models used to analyze intensive longitudinal data.

Improved estimation of autoregressive-type models through contextual input

Janne K. Adolf, Eva Ceulemans

KU Leuven, Belgium

The aim of the dynamic paradigm of affect research is to characterize daily life-affective processes by means of intense longitudinal data and dynamic modeling, typically autoregressive-type modeling. The contextual conditions accompanying and potentially influencing affective processes thereby form an important part of the picture. Recent theoretical and methodological work has therefore started to incorporate context into the dynamic affect paradigm (e.g., by theorizing about contextual effects, or by proposing autoregressive-type dynamic models with context-moderated parameters). The main purpose thereby is to learn about contextual effects on affective processes. There can however be an additional benefit of including context into studies and models, namely improved estimation accuracy of the autoregressive-type models themselves. Such leverage effects can be observed even in cases where contextual information is imbalanced and incomplete, because contextual changes happen rarely and are not measured directly. In this talk we take a look at this phenomenon, and discuss implications for how we should analyze our data from observational studies, and how we might manipulate context in experimental studies.

Executive Functions and the Regulation of Emotion and Behavior: Assessment of Cognition in Everyday Life

Chair(s): Florian Schmiedek (DIPF | Leibniz Institute for Research and Information in Education)

Discussant(s): Oliver Wilhelm (Ulm University)

Executive functions (EF) – like updating of working memory (WM) contents and inhibition – have been ascribed important roles not only for cognitive performance in various domains but also for the regulation of behavior and emotion in everyday life. When research addresses the role of EF for regulatory processes in real life contexts, the typical laboratory study assessing EF at one occasion faces limitations, however. First, when substantial interest is in regulatory processes (and individual differences therein) that take place within persons over time, research design and data analysis also need to move to the within-person level. Second, processes that take place in everyday environments should also be investigated in these contexts. Recent developments regarding intensive longitudinal study designs (e.g., measurement burst studies), data analysis (e.g., multilevel and dynamic structural equation modeling), and technology (e.g., smartphone-based data collection) allow capturing within-person processes “in the wild” and modeling their multivariate dynamics. In this symposium, it will be demonstrated how existing EF paradigms, like memory updating (Schmiedek et al.) and the stop-signal paradigm of inhibition (Wieland et al.) can be turned into versions deployable in ambulatory assessment (AA) studies and how such tasks can be used in studies on the coupling of WM and ADHD symptoms in school children (Buhr et al.) and on emotion regulation in adults (Brose & Blanke). The symposium will be closed with a discussion by Oliver Wilhelm, an expert on WM and EF in cognitive, differential, and educational psychology.

Presentations of the Symposium

The Memory Updating Paradigm in the Lab and in the Wild

Florian Schmiedek¹, Andrea Schmidt¹, Andreas B. Neubauer¹, Judith Dirk¹, Michaela Riediger²

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Several of the contributions in the symposium use variants of the same WM paradigm – memory updating (MU). MU implements the defining WM affordance of “storage and processing” by requiring the processing (updating) of the elements to be held in memory (other than the notorious complex span paradigms, which combine a storage task with an unrelated processing task). MU tasks have been used successfully in general cognitive psychology and proven to have very good psychometric properties as indicator tasks of a general WM factor. For the use in AA studies with different age groups, the MU paradigm has the benefits of (a) allowing for the automated generation of arbitrary numbers of trials with good control over task difficulty (by manipulating memory load level and/or presentation time) and (b) being applicable with younger and older adults as well as with children at elementary school age. When used to investigate within-person processes, psychometric characteristics cannot be inferred from standard between-person information alone, but have to be evaluated using appropriate methods (e.g., within-person reliability measures based on two-level confirmatory factor analyses). With data from a lifespan sample (N = 364) covering the age range of 14 to 89 years and two samples of children assessed at the end of elementary school (Grade 4, N = 90) and right after the transition to Gymnasium (Grade 5, N = 108), we demonstrate how the MU paradigm can be used to assess WM performance in AA studies with brief assessments.

Daily Fluctuations of ADHD Symptoms and Working Memory Performance in an Ambulant Assessment Study of German School Children

Lilly Buhr, Merle Reuter, Ulrike Schwarz, Caterina Gawrilow

University of Tübingen

Children with ADHD suffer from symptoms of inattention, hyperactivity, and impulsivity. According to neuropsychological ADHD theories, the presence of ADHD symptoms might correlate with difficulties concerning executive functions as for instance the working memory (WM). Studies testing the theory with one-time laboratory assessments came to inconsistent conclusions. Since recent evidence hints towards significant daily fluctuations of ADHD symptoms as well as WM,

we aimed at exploring the variability of ADHD symptoms and WM and expected to find a coupling of daily ADHD symptoms and WMC at the within-person level. In an ambulatory assessment study, 55 school children (6 with an ADHD diagnosis) completed a memory updating task three times per day for 18 consecutive days. Additionally, parents reported general as well as daily ADHD symptoms. The portion of between-person variance over total variance (intraclass correlation, ICC) for daily WM accuracy ranged from .46 to .59, while the ICC for daily ADHD symptoms was .52. Preliminary multilevel analyses revealed no coupling of daily ADHD symptoms and daily WM, which may be explained by the relatively low occurrence of inattention and hyperactivity in the sample. Inspections of within-person trajectories of WM in children with diagnosed ADHD lead to the assumption that between-person differences might influence the coupling of within-person fluctuations. Further analyses will be applied to better understand the relation between ADHD symptoms and WM between and within children. Investigating the daily fluctuations of

ADHD symptoms and WM might support theories of the role of executive functions in the disorder.

Working Memory is Associated With Less Perceived Stress, Less Rumination, But Not With More Positive Reappraisal Within Days and Across Individuals

Annette Brose, Elisabeth S. Blanke

Humboldt-Universität zu Berlin

Working memory (WM) is a resource across different domains of functioning. Among others, it is suggested to contribute to emotion regulation, specifically regarding strategies that require cognitive resources. For example, positive reappraisal is supposed to draw on cognitive resources and should thus profit from high levels of WM. Also, high levels of WM should be associated with lower levels of rumination because it should prevent cognitive interference. At a more abstract level, high levels of WM may result in lower levels of perceived stress because it may provide the feeling of being able to manage stressful situations. This study tested the proposed associations using ambulatory assessment methodology. 179 middle-aged participants (38-61 years) completed about 69 measurements across three weeks (a maximum of 6 measurements on about 13 days spread across weeks). At each occasion, they worked on a numerical memory updating task, an indicator of WM. They also rated concurrent perceived stress as well as rumination and positive reappraisal in response to negative experiences. On average, individuals with higher levels of WM performance were indeed those with lower levels of perceived stress and rumination across the three weeks. Moreover, occasions with higher levels of WM were occasions with lower levels of perceived stress and rumination. Unexpectedly, individuals with higher performance did exhibit lower levels of positive reappraisal, and WM and positive reappraisal were unrelated at the within-person level. These results partly support the notion of WM being a resource in emotion regulation and extend prior findings to the within-person level.

The Stop-Signal Paradigm: Lessons Learned from an Analysis of Ambulatory and Lab-based Measurements of Inhibitory Control

Lena M. Wieland, Elena D. Koch, Ulrich W. Ebner-Priemer

Karlsruhe Institute of Technology, KIT

Inhibitory control (IC), the ability to suppress the execution of behavioral impulses, is essential to self-control and to the execution of goal-directed behavior in changing environments. Theory and research suggest that IC is subject to fluctuations in response to internal or environmental events and that temporary declines in IC can predict dysfunctional behavior in real-life. However, most studies assessed participants' IC based on their average stop-signal response time (SSRT) in the stop-signal task (SST) under laboratory conditions. Little is known on how to design repeated applications of the SST in real-life to obtain reliable indicators of IC (and its within-person variability). We examined the applicability of the SST using the tracking procedure within N = 58 students (Mage = 21.9) across three days with four daily measurements, including three consecutive blocks with 64 trials each. Descriptive inspection of the data revealed that the tracking procedure systematically biased SSRTs in the first block of each measurement. An MCFA approach was used to assess the reliability of IC indicators at the between- and within-person level. Results revealed considerable within-person variability in IC indicators. At the within-person level, internal consistency was satisfactory across measurements within days ($\omega = .634$, $p < .001$). The reliability of indicators for between-person differences in IC derived from ambulatory measurements ($\omega = .977$, $p < .001$) exceeded the reliability of baseline laboratory measurements ($\omega = .725$, $p < .001$). We also examine the influence of momentary self-reported attention, concentration, and mood and discuss practical implications for future research.

Unveiling ESM-data - opportunities of digital monitoring and feedback for stand-alone or blended care mental health interventions

Chair(s): Inez Myin-Germeys (Center for Contextual Psychiatry, Department of Neurosciences, KU Leuven), **Ulrich Reininghaus** (Department of Public Mental Health, Central Institute of Mental Health, Medical Faculty Mannheim, Heidelberg University) **Discussant(s): Ulrich Reininghaus** (Department of Public Mental Health, Central Institute of Mental Health, Medical Faculty Mannheim, Heidelberg University)

Experience sampling methodology (ESM) delivered using mobile health (mHealth) technologies are promising to gain a better understanding of service users' experiences in their daily lives. ESM can be used for self-monitoring symptoms and for providing personalized feedback and, thereby, may contribute to insight and empowerment of individuals with mental health problems. These methods have shown great potential and may serve as common ground between patients and clinicians to establish person-tailored therapeutic goals. In this symposium, we will present findings on 1) the development, 2) implementation and 3) efficacy of digital monitoring and feedback in different contexts of mental health care.

Simone Verhagen will present insights on a case where individual monitoring and feedback over the course of two years guided a patient's treatment and promoted recovery from depression.

Lena de Thurah will present results from focus group studies examining which aspects of mental illness people with lived experience of psychosis and clinicians working with clients with mental health problems find clinically relevant to monitor.

Julia Schulte-Strathaus will present findings on a newly developed mHealth tool which aims to personalize crisis-resolution and home treatment through digital monitoring, feedback, and adaptive interventions.

Leonie Ader will present preliminary results on the feasibility and momentary effects of a novel ecological momentary intervention (EMI) using monitoring, feedback, and positive refocusing in patients with chronic musculoskeletal pain.

Presentations of the Symposium

Monitoring my lived experience – an individual road to recovery

Simone J.W. Verhagen¹, Jaimie Lenssen²

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Depression, or mental illnesses in general, are often accompanied by the feeling of being lost. Treatment options are extensive and it can be challenging to find out where to start or what to continue. A helpful tool for individual recovery is the Experience Sampling Method (ESM). To illustrate this, I will present an individual case example of a woman in her twenties who used ESM during her recovery from depression. Together with an ESM expert, an individual questionnaire was co-developed and online feedback was viewed on a weekly basis. The protocol consisted of ten daily semi-random beeps, programmed between 8:30AM and 10:30PM, and a morning and evening questionnaire assessing respectively sleep quality and daily appraisals. Next to mood, cognition, context (activities, location, persons present), and appraisal of that context, assessments also sampled medication use, meditation exercises and time spent outside. Attention was paid to a positive framing of negative concepts such as hopelessness to avoid reactivity. The naturalistic single case dataset includes over 2000 completed ESM beep questionnaires that were collected almost continuously over the course of two years. Monitoring proved a valuable asset on the road to recovery. It helped to appraise the personal situation objectively, in the first stages by keeping track of what was going on and later by providing concrete clues for change. The data guided treatment choices and at the end showed a story with ups and downs: a lived reality full of vulnerability and resilience.

What should clinical experience sampling method tools monitor? The perspective of clients and clinicians in mental health care

Lena de Thurah¹, Rob Sips¹, Jeroen Weermeijer¹, Ana Teixeira¹, Glenn Kiekens¹, Zuzana Kasanova², Inez Myin-Germeys¹ ¹Center for Contextual Psychiatry, Department of Neurosciences, KU Leuven, ²Leuven Research and Development, Spin-off & Innovation Unit, KU Leuven

While the experience sampling method (ESM) has already proven its merits as a research tool for studying psychopathology in situ, many questions remain unanswered regarding how ESM can be used in the clinical management of mental illness. A crucial step in developing ESM tools to support patient-centered mental health care is to understand which aspects of mental illness clients and clinicians find clinically relevant to capture using ESM. To examine this, we

conducted a total of 6 focus groups with (1) people with lived experience of psychosis and (2) clinicians working in mental health care. Using inductive thematic analysis, we identified overarching themes that participants found clinically relevant to monitor using ESM. For clients, this included; changes in one's thought patterns, intensity of emotion, and sensitivity to stress and stimuli. Clinicians believed that ESM could benefit their work with clients by providing descriptive accounts of clients' emotions and symptom dynamics, giving insight into clients' daily lives, allowing for early psychopathology screening, and evaluating the effectiveness of therapy and treatments. This study suggests that clients and clinicians clearly see many application potentials for ESM in mental health care. Building upon these findings, future research should focus on iterative piloting of ESM tools and incorporation of user feedback to ensure the development of effective ESM tools for mental health practice.

DiSERVE@home - Innovative digital forms of service delivery for personalized crisis resolution and home treatment for people with severe mental health problems

Julia Schulte-Strathaus¹, Christian Rauschenberg¹, Dusan Hirjak², Thomas Ganslandt³, Anita Schick¹, Andreas Meyer- Lindenberg², Ulrich Reininghaus¹

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Ward-equivalent treatment (StÄB), a form of crisis resolution and home treatment in Germany, has been introduced in 2018 as a new model of mental health service delivery for people with an indication for inpatient care. The rapid progress in the field of information and communication technology offers entirely new opportunities for innovative digital services in, and personalizing the delivery of, crisis resolution and home treatment for people with severe mental health problems. This presentation will provide initial findings from DiSERVE@home, a translational research project that aims to develop and evaluate digital forms of service delivery for personalizing crisis resolution and home treatment. In a first stage, interviews with service users and health professionals will be carried out to identify and discuss promising digital forms of service delivery, including (1) online chat and video call for better communication, continuity of care, and flexibility; (2) monitoring of symptoms and behaviour in real-time through ESM; (3) use of multimodal ESM data to generate and offer personalized feedback on subjective experience and behavioural patterns as well as (4) adaptive ecological momentary interventions (EMIs) tailored to the person, moment, and context in daily life. Following principles of co-design, these findings will be used to develop and evaluate a novel mHealth tool used in the context of StÄB by carefully investigating its quality from the user perspective, safety, feasibility, initial process and outcome quality as well as barriers and facilitators of implementation.

Development and evaluation of a novel ecological momentary intervention using monitoring, feedback, and positive refocusing of attention in patients with chronic musculoskeletal pain

Leonie Ader¹, David Baumeister², Martin Löffler³, Jürgen Hesser⁴, Jonas Tesarz², Herta Flor³, Ulrich Reininghaus¹

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Musculoskeletal pain diseases affect between 13.5% and 47% of the general population constituting one of the most growing causes of disease burden globally, as they may become chronic. Pain diaries have long been a common tool in non-pharmacological pain-treatment in order to monitor and provide feedback on patients' symptoms in daily life. More recently, techniques for positive refocusing of attention have come to use, promoting pain-free episodes and positive outcomes rather than focusing on managing the pain. Embedded in a randomized controlled trial that compares three personalized treatment approaches for chronic musculoskeletal pain (CMSP), this study aims to optimize and evaluate the effects of a novel ecological momentary intervention (EMI) using a micro-randomized design in n=35 CMSP-patients over the course of 12 weeks. The EMI combines three micro-interventions targeted at positive refocusing of attention with experience sampling methodology (ESM) for digitalized monitoring of momentary outcomes, i.e. absence of pain, positive affect and subjective activity. Personalized daily and weekly feedback will be provided comparing two presentation modes (verbal vs. visual feedback) and a control condition (no feedback) at each time point. I will present preliminary results on the feasibility and evaluation of the different intervention-components, i.e. monitoring, feedback, and micro-interventions. This study can potentially contribute to our understanding of the implementation and momentary effects of monitoring and feedback in CMSP in order to enhance the efficacy of EMIs targeted at positive refocusing of attention, with the ultimate goal of reducing disease burden caused by CMSP.

Daily-life stress, recovery and resilience in the development and treatment of mental illness

Chair(s): Rayyan Tutunji (Radboud University, Netherlands), **Joana De Calheiros Vellozo** (KU Leuven, Belgium), **Anna Kuranova** (University Medical Center Groningen, Netherlands), **Elisabeth van der Stouwe** (University Medical Center Groningen, Netherlands) **Discussant(s): Thomas Vaessen** (KU Leuven, Belgium)

Increased reactivity to daily stress is a known vulnerability marker of (risk for) psychopathology. As a next step towards stress-focused early momentary interventions, research is now focusing on automatic stress detection through wearable sensors. However, there remain many unanswered questions. Additionally, only little is known about the recovery from, as well as resilience to these daily stressors and their usefulness as targets in early prediction and intervention for the development of mental illness.

Developments in wearable technology have allowed physiology to be collected in combination with ESM. Tutunji and colleagues have thus explored the success and reliability of machine learning models in predicting periods of greater daily stress.

Like reactivity, aberrant recovery to daily stressors may also inform on psychopathology. Hence, De Calheiros Vellozo and colleagues assessed the patterns of recovery to minor daily stressors in three different groups: individuals with subclinical symptoms of depression, individuals with a diagnosis of major depressive disorder (MDD), and healthy controls.

Recovery to daily stress is not only relevant in the moment, but may also help predict the future development of psychopathology. Kuranova and colleagues investigated the recovery to daily stress and psychopathology a year later. Moreover, they also explored the functioning of the reward system, as well the dynamic interplay between positive and negative affect as two other potential mechanisms of resilience.

Finally, van der Stouwe and colleagues investigated whether affect and paranoia reactivity and recovery are amendable to change by a virtual reality cognitive behavioral therapy (VR-CBT) treatment.

Presentations of the Symposium

Predicting Ecologically Relevant Stress States from Ambulatory Measures

Rayyan Tutunji¹, Nikos Kogias¹, Bob Kapteijns², Martin Krentz¹, Florian Krause¹, Eliana Vassena¹, Erno Hermans¹

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Predicting how individuals react to stressors in their daily lives is an important step towards understanding resilience mechanisms. This has been investigated using ecological momentary assessments (EMA) which requires active involvement from participants. Studying stress with EMA also presents challenges, in that EMA surveys require engagement, which is not always possible and may be an intervention in and of itself. In this study, we use EMA in combination ecological physiological assessments (EPA) using wearables to assess the impact a real-life stress on both self-report EMA and implicit physiological responses. We test university students during an exam week (i.e. stress week) and compare that to a non-exam week (i.e. control week). We observed significant increases in EMA stress measures and negative affect, coupled with decreases in positive affect ($p < 0.001$), indicating the validity of our stressor. Further, we observed an unexpected overall decrease in skin conductance measures from EPA during the stress week. We exploit a novel machine learning (ML) approach – i.e. Individualized random forest with leave-one-beep-out (LOBO) validation – to investigate whether week type could reliably be classified from EMA mood items and EPA data. EMA models and EPA models (classification error rates 33.22% and 35.53% respectively) both offered significantly better than chance level errors as determined by bootstrap error rates (49%, $p < 0.001$). This shows that EPA can potentially be used in place of EMA for implicit monitoring purposes. This has important implications for long-term monitoring of chronic stress, for example as a predictor of stress-related disorder progression or relapse.

Predicting recovery from daily stress in depression

Joana De Calheiros Vellozo¹, Thomas Vaessen¹, Wolfgang Viechtbauer², Stephan Claes¹, Inez Myin-Germeys¹

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Individuals diagnosed with depression show an increased sensitivity to minor daily stressors reflected in stronger affective responses compared to healthy individuals. Recovery from these daily stressors remains however largely unexplored. Evidence suggests that individuals with depression struggle to disengage from negative stimuli resulting in sustained negative affect that may translate into longer recovery periods from daily stressors. We used survival analyses to predict the time to recovery following the first stressor of the day in a sample of individuals with subclinical symptoms of depression, individuals with a diagnosis of major depressive disorder (MDD), and healthy controls. We furthermore controlled for the effect of stressor intensity and cumulative stress on recovery. Results show that survival analyses can successfully be applied in the context of ESM to predict recovery to daily stressors. Moreover, findings show that individuals with MDD take significantly longer to recover from daily stressors than healthy individuals and those with subclinical symptoms. In fact, there was no significant difference in recovery time between healthy controls and individuals with subclinical symptoms of depression. We conclude that interventions that specifically target recovery from daily stress may be successful in treating and possibly even preventing the further development of depression.

Studying resilience in daily life: examples of three experience sampling studies

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Introduction: Psychological resilience refers to the ability to maintain mental health or recover quickly after stressful events. One way of understanding resilience dynamically is as a process of bouncing back from adversity. The use of experience sampling data collected in daily life may provide insights into this exact process. We have studied three possible aspects of daily experiences related to resilience: functioning of the reward system (study 1); dynamic interplay between positive and negative affect states (study 2); and the speed of affect recovery after small daily adversities (study 3). These daily experience patterns may be identified and used to predict future development of symptoms in the context of adversity.

Methods: In study 1, we used data from 43 participants with mild depressive symptoms to construct individual reward system networks that, in turn, were used to predict six-month symptoms trajectories. In study 2 and, 3 we used data from 159 adolescents at increased risk for psychopathology who were divided into groups with stable and increasing one-year course of symptoms. We compared these groups on baseline affect networks (study 1) and speed of affect recovery (study 3).

Results: In study 1, baseline individual network characteristics predicted the level of symptoms six months later. In study 2, group networks differed visually but not statistically. In study 3, the group with a stable level of symptoms had a faster speed of affect recovery than the increasing group.

Conclusions: Dynamic patterns in daily experiences seem associated with some aspects of psychological resilience.

Daily-life stress reactivity and recovery following virtual-reality-based cognitive behavioural therapy in patients with a psychotic disorder

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Introduction
Several ESM studies have demonstrated that individuals with psychosis, but also individuals at risk and first-degree relatives, show an increased reactivity to daily stressful events compared to individuals without psychosis. These studies suggest that reactivity (and possibly recovery) from stress is an endophenotype, which is relatively stable over time within individuals. On the other hand, reactivity and recovery can be viewed as a proxy for psychological resilience, which is likely to be amendable by treatment. This study was the first to investigate whether reactivity and recovery from daily-life stressors are amendable by a treatment, namely virtual reality cognitive behaviour therapy (VR-CBT).

Methods

A total of 116 patients with a psychotic disorder was randomized to either 16-session VR-CBT or treatment as usual. At baseline, post treatment and at 6-month follow-up, participants completed a diary ten times a day for a period of six to ten days. Multilevel analyses were used to model the time-lagged effect of daily stressful events on negative and positive affect and paranoia symptoms, to examine the levels of reactivity and recovery for 5 consecutive time points. To assess differences in affect and symptom reactivity and recovery between the VR-CBT group and the TAU group across the baseline assessment, post assessment and follow-up assessment, three-way interactions were included in the models.

Results/Discussion

Definite results will be presented and discussed in the presentation at the symposium.

Capturing and predicting suicidal ideation and severe psychopathology outcomes across daily life contexts in clinical populations

Chair(s): Birgit Kleim (University of Zurich, Switzerland)

The WHO recognizes suicide prevention as a public health priority. Many suicide and severe psychopathology predictors and risk factors have been identified, but traditional clinical methods do not yet allow for the accurate prediction of such symptoms and suicide behaviors. This symposium presents innovative approaches to tackle this challenge. We will start with two updates on capturing and understanding suicidal ideation fluctuations in inpatients recently discharged from acute psychiatric care covering youths (Czyz, UMichigán) and adults

(Homan, UZurich), as well as just-in time interventions. We will then present data on suicidality profiles of in-patients in psychiatry based on electrophysiological Patterns, Passive Sensing and Smartphone Data (Hörman, UZurich). the next presentation will present the application of deep learning algorithms to video recordings for the quantification of facial, vocal, and movement markers associated with mood, emotion, and motor functioning in in-patients at risk for suicide (Ries, UZurich). Finally, we will focus on digital biomarkers mimicking real life behaviors for severe psychopathology and machine- learning-based prediction of depression outcomes in emergency department patients (Schultebrucks, Columbia University. Together, the papers demonstrate that it is possible and acceptable to collect longitudinal, fine-grained, contextualized data (ie, EMA) from clinical patients at risk. In the future, such efforts will greatly advance clinical tools for suicide prevention, inform intervention science and could be integrated into existing emergency procedures.

Presentations of the Symposium

Predicting suicidal ideations after hospital discharge: an ecological momentary assessment study

Stephanie Homan¹, Anja Ries¹, Laura Sels², Tobias Kowatsch³, Urte Scholz¹, Birgit Kleim¹

¹University of Zurich, ²Ghent University, ³University of St. Gallen

Background. Suicidal ideation is the strongest predictor for suicide attempts, and yet reliable prediction models for suicide risk are still lacking. Digital technologies might offer a unique solution. With ecological momentary assessments (EMA), mobile applications provide the unparalleled opportunity to collect real-world, real-time data on suicidal ideation and its predictors. In a high-risk population for suicide, we used EMA delivered with mobile apps during the most vulnerable phase: the 28 days after hospital discharge. We examined the predictive value of the modifiable risk factors feeling depressed and hopeless as well as thwarted belongingness and perceived burdensomeness which are implied by the Interpersonal Theory of Suicide. **Methods.** We included psychiatric patients across diagnoses with suicidal ideations from the inpatient units of the University Hospital of Psychiatry Zurich, Switzerland. Patients used our in-house developed app that delivered 5-times daily EMA for 28 days after hospital discharge. EMA data was analyzed with a random intercept and slope model. **Results.** We included 37 patients (females: N=23, age: M=37.1, SD=11.8 years) who were clinically depressed (Beck Depression Inventory: M=27.6, SD=14.1) and reported suicidal ideations (365 of 980 EMA, 37.2%). Feeling depressed ($\beta=0.19$; 95%CI, 0.1, 2.8; $P<.001$) and hopeless ($\beta=0.34$; 95%CI, 0.22, 4.56; $P<.001$) significantly predicted suicidal ideation, while thwarted belongingness and perceived burdensomeness did not ($P>.05$). **Discussion.** We showed that EMA allow to capture suicidal ideations, even in a high-risk population, as well as predictors which provides a valuable next step in the prevention of suicide and the treatment of suicidal ideation and suicidal behavior.

Using intensive longitudinal data to identify short-term markers of suicide-related outcomes in adolescents

Ewa Czyz, Inbal Nahum-Shani

University of Michigan

Advancements in mobile technology offer new possibilities for assessing suicidal ideation and behavior in real- or near-real-time, with potential to identify suicide warning signs and critical periods for delivery of timely interventions, such as just-in-time adaptive interventions (JITIs). However, it is not clear whether and how intensive longitudinal data can be used to identify meaningful predictors of near-term suicide risk and thus critical periods for interventions. We utilized two samples of adolescents (ages 13-17) hospitalized for suicide risk who were followed daily for a month after discharge. We applied a multiple-step process

involving a series of Receiver Operating Characteristic Curve (ROC) analyses to investigate which features— derived from theoretically-informed constructs assessed each day— are useful in identifying a suicidal crisis two weeks after discharge (Study 1) or next-day suicidal ideation (Study 2). In study 1 (N=32; 360 observations), models derived from single risk factors aggregated over the first two weeks post-discharge had modest predictive accuracy in identifying a suicidal crisis two weeks later (Area Under the ROC Curve [AUC] 0.46-0.80) while nearly all models derived from combinations of risk factors produced higher accuracy (AUCs 0.80-0.91). In Study 2, (N=78; 1621 observations), we are investigating the extent to which within-person features—derived from time-varying constructs— are useful in identifying next-day suicidal ideation; these analyses will be completed prior to the conference. This work will contribute to our understanding about how intensive longitudinal data can be used to produce decision rules for predicting near-term suicide risk among adolescents and inform timely interventions.

Profiles of Suicidality for in-patients in psychiatry: Electrophysiological Patterns, Passive Sensing and Smartphone Data Christoph Hörmann, Annia Rüesch, Tania Villar, Anna Bankwitz, Sebastian Olbrich

University of Zurich

Background: Suicide is one of the leading causes of death in the population between 15 and 45 years not only in Switzerland, but in many countries worldwide. Despite different research approaches and substantial governmental efforts, so far, preventive measures did not result in a significant decrease of the number of suicides over the last years. A deeper understanding of “suicidal profiles” using modern technology-based approaches might enable clinicians to enhance preventive efforts.

Method: To gain insight into the specific neurobiological and smartphone-based profiles of patients that suffer from suicidal ideations and have attempted suicide within the past six months (N=120), psychiatric in-patients that met these criteria have been assessed. The procedure included an electroencephalogram (EEG) during rest to examine the electrophysiological brain signature as well as smartphone-based passive sensing over the course of one week to track daily activity including movements, ambient-noise, smartphone usage etc.** Additionally, we sought to receive movement and timeline data from the week prior to the suicide attempt. These specific profiles conducted from EEG and passive sensing were compared to data from a healthy population (N= 60) in order to extract features that discriminate between suicidal persons and healthy controls. Further, we plan to reassess the suicidality and (attempted) suicides after one year to search for predictive features in the baseline data.

Results and Conclusions: It is planned to present the results from the first analysis for differentiation between suicidal patients and healthy controls. A discussion on the usage of these profiles for preventive measures will be included, especially highlighting implications for clinical and outpatient settings.

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Title: Digital biomarkers identified in direct clinical observation during free speech for diagnostic assessment of depression

Katharina Schultebrasucks¹, Vijay Yadav², Arie Y. Shalev³, George Bonanno¹, Isaac Galatzer-Levy²

¹Columbia University, ²AI Cure, ³NYU

The diagnosis of psychiatric diseases is burdensome, time-consuming, and cost-intensive. The direct measurement and quantification of visual and auditory signs offers a promising alternative through the application of machine learning (ML) based on the use of accessible and passively collected data sources. We investigated whether computer vision, semantic and acoustic analysis can be used to accurately assess Major Depressive Disorder (MDD).

We used an advanced and rigorous ML approach for computer vision and voice analysis. We extracted facial, voice, speech, and

movement characteristics from an unstructured clinical interview in 81 patients, one month after they were admitted to an emergency department of a Level-1 Trauma Unit following a life-threatening traumatic event. These features were used as inputs to classify MDD.

Video- and audio-based markers were able to accurately discriminate depression status (AUC=0.86, weighted average precision=0.83, recall=0.82, and f1-score=0.82) and symptom severity (R²=0.62).

Our results show that digital biomarkers identified in direct clinical observation during free speech can be used to classify MDD status and depression severity using ML methods. Digital biomarkers could improve the scalability and sensitivity of clinical assessments using low burden, passive patient evaluations. Given the advantages of a flexible approach based on free speech rather than a formal clinical assessment, digital biomarkers emerge as a potentially objective, economical, and ecologically valid alternative to assess MDD risk. Since digital biomarkers are unaffected by subjective biases, lightweight and low burdening, the proposed approach is of great promise to be scaled-up for recurrent use in routine practice integrated into everyday life and across daily life contexts.

Conference Agenda

Session

F1: Flash Talks 1

Time: Friday, 02/July/2021: 7:45pm - 8:30pm

Presentations

Habits and self-efficacy moderate the effects of intentions and planning on physical activity

Sally Di Maio¹, Jan Keller¹, Diana Hilda Hohl¹, Ralf Schwarzer^{1,2}, Nina Knoll¹

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Objectives.

Behavioural intentions and action planning can facilitate the adoption

and maintenance of physical activity under certain conditions. The present study examined levels of self-efficacy and habit strength as possible conditions that may modify this relationship.

Design.

As a secondary analysis of an intensive longitudinal randomized trial to improve physical activity, n = 225 recipients of a planning intervention were followed up at five measurement

points over one year. Methods.

Two-level models were fit. Within-person levels, that is, fluctuations of

intention and action planning around person means, were modelled to predict self-reported moderate-to-vigorous physical activity. Moreover, between-person, that is,

average person, levels of self-efficacy and habit strength were specified as putative moderators of this relationship.

Results.

The within-person intention–activity relationship was moderated by between-person levels of habit strength, yielding a compensatory effect: higher-than-usual intention predicted activity only when average activity habit levels were low. The

within-person planning–activity relationship was moderated by between-person levels of self-efficacy, yielding a synergistic effect: higher-than-usual planning combined with high average self-efficacy resulted in highest physical activity levels.

Conclusion.

Higher-than-usual intention may only be required in the presence of low activity habits. Moreover, self-efficacious individuals may invest more efforts to enact their plans.

Fostering self-regulation (SR) in higher education with Podcasts – an intervention study using Interactive Ambulatory Assessment (IAA)

Caroline Götz, Simone-Nadine Löffler

Karlsruher Institut für Technologie, House of Competence, Germany

Especially in higher education and during the corona pandemic SR skills are more and more necessary. We use IAA to investigate and foster SR during student learning sessions. The students set learning goals in the morning and report on their progress working on them during the day using IAA self-reports.

With a two group design (N>60) we investigate the differences between SR in learning processes of the control group (CG) with no feedback and the intervention group (IG) with daily feedback based on their daily IAA reports. The groups are randomly assigned and conduct a baseline phase of 10 days. The daily feedback for the IG lasting from day 11 to day 20 is presented in form of podcast episodes about e.g. self-motivation, how to deal with time pressure and anxiety, how to activate prior knowledge and promote competences. The CG gets feedback at the end of the IAA in form of a counselling session.

We use Multilevel analyses to investigate the effects of the intervention on SR. Since the data collection will be completed until March 2021, we look forward to present and discuss the results at the conference.

Associations of glucose levels and affect – The Carrot Study

Thies Moolenaar¹, Thomas Kubiak², Oliver Tüscher¹

¹Leibniz Institute for Resilience Research, Germany; ²Johannes-Gutenberg University Mainz, Institute of Psychology, Health Psychology, Germany

Blood glucose fluctuations (hyper-/hypoglycemia) in people with diabetes may influence the momentary affect and may have an effect on mental health. To date, studies which investigate the relationship between affect and blood glucose in individuals without diabetes have been scarce. The ongoing CARROT study ("Correlates and moderators of resilience: the role of eating behaviors and diet") examines the interaction between the glucose and the momentary affect with an Ambulatory Assessment protocol of 10 consecutive days that includes EMA and continuous glucose monitoring (Dexcom G6 sensor). Preliminary findings (n = 10) will be presented and further avenues of analyses explored. Initial within-subject models using vector autoregression (VAR) indicate that glucose levels predict select affect variables (satisfaction, relaxed, annoyed). In turn, affect is associated with subsequent glucose levels in case of anxious and sad affect.

Comparison of standardized effect sizes on the between- and within-person level

Mario Wenzel, Zarah Rowland, Thomas Kubiak

Johannes Gutenberg University Mainz, Germany

Current guidelines and benchmark studies for interpreting standardized effect sizes do not differentiate between whether differences are

examined on the between-person or on the within-person level. Research is missing that examines systematic differences regarding the level of analysis. In a first step towards this endeavor, we examined the between- and within-person associations in an ambulatory assessment dataset (N = 182; 12 measurement occasions per day for 7 days) that includes measures of emotion, emotion regulation, event characteristics, and mindfulness. Between-person associations were calculated by correlating the variables aggregated on the person-level, whereas within-person associations were calculated by correlating the within-person standardized items at each measurement occasion. We found a mean correlation of $r = .40$ (Fisher's $Z = 0.42$) for between-person associations and $r = .16$ (Fisher's $Z = 0.17$) for within-person associations. Thus, between-person associations were approximately 2.5 times larger than within-person associations. In the next steps, we want to conduct a meta-analysis to summarize between- and within-person effect sizes from more datasets and research fields in order to eventually develop new guidelines for the assessment of effect sizes of relationships within and between individuals.

Conference Agenda

Session

F2: Flash Talks 2

Time: Friday, 02/July/2021: 7:45pm - 8:30pm

Presentations

Co-calibrating Short Term, Mixed-Methods Based Momentary Assessments for Physical and Psychological Outcomes with Long Term Quality of Life Outcomes in Older Adults: An Evaluation of the coQoL Method

Vlad Manea¹, Matias Igor², Katarzyna Wac^{1,2}

¹University of Copenhagen, Denmark; ²University of Geneva, Switzerland

Inactivity, lack of sleep, and poor nutrition predispose individuals to health risks. Momentary Patient-Reported Outcomes (PROs) assess short-term physical behaviors and psychological states for a given recall period (ranging from weeks to seconds) but suffer from reporting biases. Conversely, wearables are an increasingly accurate source of long-term behavioral Technology-Reported Outcomes (TechROs). However, the extent to which short-term PROs and TechROs provide convergent information is unknown. We propose the coQoL co- calibration method for short-term QoL and long-term TechRO and report its feasibility, reliability, and human factors influencing these. We present the first results for the coQoL method based on a dataset collected with 42 seniors for three years. Our results can inform designs of longitudinal assessments and, whenever appropriate, personalized interventions.

Capturing real-time dynamic symptom-distress interactions in childhood cancer survivorship care: a pilot study of "scanxiety"

Lauren C. Heathcote¹, Sarah J. Cunningham¹, Marta Walentynowicz², Elizabeth Murnane³, Pamela Simon¹, Sheri L. Spunt¹, Gary Dahl¹, Bill Chiu¹, Laura E. Simons¹, Claudia Mueller¹

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Background: Over 80% of children treated for cancer will successfully transition into survivorship care. While regular cancer recurrence surveillance is an important part of survivorship care, diagnostic imaging can create significant distress, reducing quality of life. Qualitative research suggests that these periods of "scanxiety" are characterized by heightened awareness of and worry about physical symptoms (eg., pain, fatigue) as signs of cancer recurrence, driving elevated distress. Yet, whether symptom awareness and worry causes distress or distress causes greater symptom awareness remains untested.

Methods: Youth (15-25 years old) who previously completed treatment for childhood cancer are completing 3x-daily smartphone-based assessments of symptom awareness, symptom worry, and cancer-related distress at semi-randomized time-points for 5 days before and 5 days after diagnostic imaging; youth are also completing an exit interview to assess acceptability of study procedures.

Hypotheses & Implications: We predict that childhood cancer survivors will find it acceptable to complete smartphone assessments surrounding diagnostic imaging, and that these assessments will capture fluctuations in symptom awareness and worry, and cancer-related distress, that covary over time. If confirmed, these findings will support a larger confirmatory study to assess causal symptom-distress interactions that will support or refute the targeting of symptom-related worry to mitigate scanxiety.

Working from Home During the Coronavirus Lockdown: The Effects of Segmentation and Integration of Work and Private Life on Well-Being

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¹University of Zurich; ²Swiss National Centre of Competence in Research LIVES – Overcoming vulnerability: Life course perspectives;

3University Research Priority Program "Dynamics of Healthy Aging," University of Zurich

Due to the lockdown related to the new coronavirus pandemic, many people faced the challenge of having to work from home, and re- negotiate the boundaries between work and private life. Whereas the media touted a message of the importance of segmentation, the empirical evidence for its advantages is less clear. We made use of the enforced work from home during the lockdown in Switzerland in May 2020 to conduct an online experiment to investigate if clear-cut and blurred boundaries differ regarding a set of subjective indicators of productivity and well-being. Boundaries were manipulated by asking participants (N = 79) to implement recommendations that created either clear-cut or blurred boundaries between work and private life over the course of four workdays. In this daily diary study, participants reported on their home office day in end-of-day assessments. Results of Bayesian analyses provided evidence that segmentation and integration did not differ regarding nearly all indicators. Segmentation preference did not moderate the effects. However, there was some evidence that participants with childcare demands profited more from segmentation. The findings of this experiment complement prior correlational research on boundary management, remote work, and the psychological consequences of the coronavirus pandemic.

Context matters? Using EMA to Investigate Situation-Specific Emotion Regulation across Adulthood

Tabea Springstein, Tammy English

Washington University in St. Louis, United States of America

Individuals regulate their emotions across diverse situations in daily life. Previous work suggests that the use and function of emotion regulation (ER) strategies are context-dependent. However, this work has focused primarily on younger samples and has not assessed consistency of ER within contexts. As people age, they may become more skilled in flexibly adjusting their ER based on environmental factors. Accordingly, ER may be more situation-specific among older adults. The present study explores associations between situational context and ER, including how these links may vary across adulthood. A sample of 300 adults (25-85 years old) was randomly prompted 5x/7 days to report on their momentary ER and several aspects of their situation (location, activity, social context, appraisals). Using mixed-effects location scale modeling we assess whether mean levels and consistency of ER strategy use are related to features of the participant's situation. Additionally, we assess whether age moderates how ER strategies are used in accordance with the situational context. This work extends prior findings on ER flexibility across the lifespan by examining how strategy use covaries with a wide range of contextual factors. It also demonstrates how EMA can be used to gain insight into context-dependent processes as they occur.