To foster research in everyday life, the Society for Ambulatory Assessment (SAA) was launched in 2008. Regular exchange of scientific progress and innovation at the annual conferences is one of SAA's core activities. Below we present the program and book of abstracts for the SAA Conference 2023 in Amsterdam, running from June 5 to June 8.

Program and book of abstracts for the SAA Conference 2023

Published by the SAA local organizing committee of the department of Biological Psychology, Vrije Universiteit Amsterdam, the Netherlands on May 15, 2023.

Program overview

Monday June 5	Location: PAKHUIS DE ZWIJGER (near central Train Station)						
Time	**Entrance**	**Foyer/Expo**	**Grote Zaal (cp. 300)**	**IJ-zaal (cp. 140)**	**Workspace (cp. 70)**	**Studio (cp. 110)**	**Meeting room**
08.00 - 18.00	registration &						
09.00 - 09.15	information		Opening & Welcome				Sponsor stand (m-path, Movisens, Mindware, VU-AMS)
09.15 - 10.15			Keynote lecture				
10.15 -10.30		coffee/ tea break					
10.30-12.00			symposium 1	symposium 2	symposium 3	symposium 4	
12.00-13.00		lunch					
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14.30-16.00			paper session 1	paper session 2	paper session 3	paper session 4	
16.00-16.15		coffee /tea break					
16.15-17.15			symposium 9	symposium 10	symposium 11	symposium 12	
17.15-18.15		poster presentations					poster presentations
Tuesday June 6							
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08.00 - 18.00	registration &						
08.00-19.00	information						
09.00 - 09.15			Opening & Welcome				Sponsor stand (m-path, Movisens, Mindware, VU-AMS)
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10.15 -10.30		coffee/ tea break					
10.30-12.00			symposium 13	symposium 14	symposium 15	symposium 16	
12.00-13.00		lunch					
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08.00 - 18.00	registration &						
08.00-19.00	information						
09.00 - 09.15			Opening & Welcome				Sponsor stand (m-path, Movisens, Mindware, VU-AMS)
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Monday June 5, 2023

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9:00 Conference opening

Words of welcome, household announcements and introduction of the keynote speaker by dr Eco de Geus, chair of the SAA local organizing committee

Time: 09:00 - 09:15

Location: Grote Zaal

9:15 Keynote Lecture Matthias Mehl

Quotidian Psychology: How the Little Things in Life Matter for Our Lives

Matthias R. Mehl, University of Arizona

In psychology – as well as in the social sciences more broadly – major life events have historically been in the theoretical spotlight of what is considered to impact human health and wellbeing. Marriage, childbirth, divorce, or death of a loved one; moving and starting a new job, receiving a promotion, or getting unemployed; being diagnosed with a life-changing or life-threatening illness or personally or vicariously experiencing a trauma – these are the critical life events that have received the vast majority of scientific attention in the field. The late ecological psychologist, Kenneth Craik, insightfully said that “lives are lived day by day, one day at a time, from day to day, day after day, day in day out … lives as we experience and observe them are inherently quotidian.” In this talk, I adopt such a “quotidian” theoretical perspective. Drawing broadly on ambulatory assessment research, including the naturalistic observation research I have been part of for the last 25 years, I will illustrate how the “little things in life”, “the 98% experiences and behaviors” that make up most of our lives are much more than “supporting actors” on the psychological science stage and can matter profoundly for human health and wellbeing.

Time: 09:15 - 10:15
Location: Grote Zaal (Main Theatre)

10:15 Coffee break / Sponsor exhibition

Time: 10:15 - 10:30:
Location: Sponsor stand / Foyer

10:30 Symposium 1: Feedback and prediction of mental health: focusing on the individual

Chair: Anna Langener

Ambulatory assessment can provide rich data from the daily life of an individual. Currently, researchers begin to use this data to provide personalized feedback to participants and build prediction models, ultimately aiming to improve mental health and well-being. In this symposium, we present recent developments in using ambulatory assessment as a feedback and prognostic tool. The first two speakers illustrate the use of personalized feedback applied in clinical practice (Stadel, Bringmann). The third speaker elaborates on current challenges in prediction models (i.e., decision trees and random forests) and discusses available solutions to these challenges (Henninger). The last two speakers are focusing on the feasibility of predicting health outcomes using machine learning models and on identifying the most important variables that are able to predict those outcomes (Langener, Hehlmann). Overall, this symposium highlights the potential and challenges of using (individualized) feedback and predictions to study and improve the mental health of an individual.

Time: 10:30 - 12:00
Location: Grote Zaal (Main Theatre)

Personal Networks and Daily Social Interactions - Feedback About Patients' Social Context

Marie **Stadel**, Anna M. Langener, Timon Elmer, Gert Stulp, Marijtje A. J. van Duijn, Laura F. Bringmann

The social context of a psychotherapy patient can improve and aggravate mental health and therefore contains potential intervention targets for successful treatment. Important social dynamics unfold in everyday life: social interactions, such as having a fight or meeting for dinner with friends, affect the mood and symptoms of a patient. Additionally, these social interactions aggregate into different social relationships which form the personal social (support) network of the patient. Therefore, there are two intertwined dynamic levels which are both relevant for psychotherapeutic interventions, but rarely examined in conjunction: Daily social interactions and social (support) relationships.
During this talk, I will illustrate the idiographic assessment of both social context levels by utilizing a combination of experience sampling methodology (ESM) and repeated personal social network (PSN) data collection. I show a personalized feedback prototype that focuses specifically on a patient's daily social context and present results from a qualitative evaluation of this prototype.

Combining qualitative and quantitative feedback for patients with threat beliefs

Laura **Bringmann**, Maarten Piot, Merijn Mestdagh, Stijn Verdonck, Eva Tolmeijer

Threat beliefs are common and transdiagnostic experiences with a heterogeneous profile. They are highly prevalent in many disorders, including personality disorders, post-traumatic stress disorder and psychosis. The Oxford Feeling Safe programme involves a translational approach in which six empirical maintenance factors of threat beliefs (insomnia, negative self-beliefs, worry, anomalous experiences, reasoning biases, and safety behaviours) are identified and targeted with short cognitive behaviour therapy (CBT) modules. Within the Feeling Safe-NL project, we have developed a new self-monitoring and data-visualization tool specifically tailored for the programme, using the m-Path platform. Patients receive a brief daily questionnaire during the six months of therapy. The data arising from the questionnaires is visualized in an innovative way, which is reviewed by patients and therapists in an online dashboard during weekly sessions. There are currently 41 patients taking part in the Feeling Safe-NL trial, of which 20 are using self-monitoring and visual feedback in the therapy. This visualization is innovative in that it combines quantitative and qualitative information, for the first time also using self-learning items that are visualized in a word cloud. Besides leading to a combination of qualitative and quantitative feedback, the self-learning items also result in personalized feedback. In this presentation, we illustrate the usability and feasibility of this new feedback tool, and show how it can provide more insight on threat beliefs.

The level matters: Level-1 and Level-2 predictor variables in machine learning extensions for multilevel data

Mirka **Henninger**, Carolin Strobl

Machine learning methods, in particular decision trees and random forests, allow researchers to explore complex non-linear and interaction effects in empirical data. Therefore, they might provide valuable tools for exploring complex, interindividual trajectories of psychological characteristics over time. In recent years, first attempts have been made to extend machine learning methods for their application to multilevel data, such as data in ambulatory assessment studies. While most of these extensions focus on integrating random effects structures into machine learning methods, so far they have not considered the role of predictor variables. In this talk, we will focus on the distinction between predictor variables that are time-varying (level-1) or describe individuals (level-2). Using simulation studies, we will show that current decision tree and random forest algorithms erroneously select Level-2 predictor variables with no true effect when they are applied to multilevel data. Besides pointing out when researchers face a risk of false-positive research findings,

we will demonstrate and discuss currently available solutions to this challenge using an example from psychological research. We will close the talk by pointing towards future developments and potential method extensions.

Predicting mood based on the social environment measured through the experience sampling method, digital phenotyping, and social networks

Anna M. **Langener**, Laura F. Bringmann, Martien J. Kas, & Gert Stulp

Social interactions are essential for mental health. Therefore, researchers increasingly attempt to capture an individual's social environment to predict and explain changes in well-being. Digital phenotyping is an often used technology to assess a person's social behavior through passive sensing and without self-report. Additionally, the experience sampling method (ESM) can capture the subjective perception of specific interactions multiple times per day. Lastly, egocentric networks are often used to measure specific relationship characteristics. Although those different methods capture different aspects of the social environment that are related to well-being, they have rarely been combined in previous research. Combining those methods may be necessary to increase the predictive accuracy of well-being and thus its utility for clinical applications. In this study, we aim to investigate how accurately we can predict mood based on the social environment as measured through digital phenotyping, ESM, and ego-centric networks. We examine how much each of those three methods adds to the prediction, which allows us to identify the most important measurements for predicting health outcomes. We use data from a student sample collected over a 28-day period. We train individualized machine learning models and calculate feature importance scores. Overall, we investigate how feasible it is to predict mood, which might be useful for developing just-in-time interventions. Furthermore, identifying which parts of the social environment are most relevant, can help to deliver personalized interventions and to reduce the participant burden.

Two is better than one. Using two separate EMA samples for outcome prediction in psychological therapy

Miriam I. **Hehlmann**, Brian Schwartz, Danilo Moggia, Wolfgang Lutz

Background: To date, most prediction studies in psychotherapy research have used cross-sectional data to predict treatment outcome. The present project used Ecological Momentary Assessment (EMA) of two separate samples and Continuous Time Dynamic Modeling (CTDM) to investigate the self-reported affect and rumination parameters and their ability to predict treatment outcome.
Methods: Patients treated with CBT took part in a two-week EMA period. In the first sample (n = 58), EMA took place before the onset of treatment. For the second sample (n = 108), EMA was carried out at the beginning of treatment. Patients filled out self-reports regarding affect and rumination four times a day. Hierarchical Bayesian CTDM was conducted for each sample to identify temporal effects within (auto-regressive) and between (cross-regressive) parameters, which were entered

into a LASSO model to be examined as predictors of treatment outcome. Finally, it was analyzed whether the prediction model based on CTDM of the first sample generalizes to the second.
Results: Results indicated that CTDM parameters, e.g., cross-effects were significant predictors, and able to explain outcome variance beyond cross-sectional data in both samples. Moreover, the prediction model of sample one was able to explain variance in treatment outcome in the second sample.
Discussion: The results demonstrate that CTDM is valuable for the mapping of individual differences and the prediction of treatment outcome. This information can be used to provide therapists with feedback to personalize treatments, for example in the context of a feedback system.

10:30 Symposium 2: Understanding and improving everyday mental health in children, adolescents and emerging adults

Chair: Andreas Neubauer

The five contributions of this symposium examine factors that play very prominent roles for mental health from late childhood to emerging adulthood. The presented research further shows how ambulatory assessment methods are uniquely suited to target within-person dynamics of mental health in everyday life in these age periods.
In the first contribution, Irmer and Schmiedek focus on the role of social media use in late childhood. Their data suggest negative associations between social media use and self-worth and highlight the central role of social comparisons accounting for these dynamics.
The next two contributions target the associations of goal pursuit with well-being: van Halem et al. report differential associations of engagement with hedonic vs. eudaimonic goals with momentary well-being in adolescents. Sosin and Neubauer present data showing that the reasons why emerging adults pursue goals in their everyday lives are associated with affective well-being.
Exemplary intervention approaches aiming at improving affective well-being in children and adolescents are presented in the final two contributions. Wieland et al. introduce an intervention combining a breathing exercise and a physical activity intervention in the school context, which aims to improve school children's subjective well-being and momentary working memory performance. Keijsers et al. present data collected using the Grow It! App, a cognitive behavioral therapy inspired app-based intervention aiming at improving adolescents' mental health.
Together, these talks illuminate the unique potential of ambulatory assessment methods for understanding the central ingredients for mental health in critical developmental periods.

Time: 10:30 - 12:00
Location: IJ Zaal

The daily reminder that others are better off: Investigating the role of upward comparisons in the link between children's everyday social media use and well-being

Andrea **Irmer**, Florian Schmiedek

Social media has become an indispensable part of our daily life. Individuals are entering the social media world at younger and younger ages, leading parents, policymakers, and researchers to wonder how social media use relates to subjective well-being in youths. However, empirical findings on this matter have been inconsistent, ranging from negative associations to null findings to positive associations, and mainly refer to the between-person level. The present study aimed at investigating the link between smartphone social media use and different facets of subjective well-being in children's daily lives and at the within-person level. Two-hundred youths (103 girls) aged 10 to 14 years (Mage=11.71, SDage=1.02) participated in a 14-day online diary study. Every day, they reported their use of Instagram, TikTok, and YouTube (e.g., "How much did you use Instagram today?"), their upward social comparisons (e.g., "I had the feeling today that others have a better life than I have."), as well as their subjective well-being (i.e., positive affect, negative affect, positive self-worth, and negative self-worth). Multilevel structural equation models showed that social media use was associated with lower positive and higher negative self-worth on a daily basis, but not with positive or negative affect. Upward social comparisons, however, were linked to diminished subjective well-being on all four dimensions. Furthermore, our findings were consistent with (partial) mediation of the effect of social media use on positive and negative self-worth through upward social comparisons. Findings are discussed in light of previous research and implications.

Are the Affective Experiences of People Before and During their Hedonic and Eudaimonic Goal Engagements Dependent on Individual Differences in Well-Being?

Sjoerd van **Halem**, Jaap J.A. Denissen, Hester R. Trompetter, & Eeske van Roekel

In the present study, we expanded upon previous studies by examining the affective conditions with which people engage in their hedonic and eudaimonic goals, as well as the extent to which these affective conditions were moderated by individual differences in well-being. Our sample consisted of 185 participants (MAGE = 25.63, 75% female), who in addition to an online survey, received five experience sampling surveys per day for a period of 14 days. In these surveys, participants reported about the extent to which they engaged in their current activity with hedonic and eudaimonic goals, and additionally reported about their current affective state. We found that participants' hedonic goal engagement was more often accompanied by experiences of high positive and low negative affect. Additionally, participants experienced more negative affect in the moment preceding hedonic goals. Taken together, these findings could imply that hedonic goals serve to maximize pleasure—or diminish feelings of displeasure or pain. In contrast, engaging in eudaimonic goals was related to both higher positive and higher negative affect. We speculate that

although engaging in eudaimonic goals can be a pleasurable experience, it also requires determination and hard work that can (at least temporarily) involve negative affect. Contrary to our expectations, participants' affective experiences, both during and before engaging in hedonic and eudaimonic goals, were independent from their levels of wellbeing. This indicates that people with high and low well-being had relatively equal affective experiences during and before their engagement of hedonic or eudaimonic goals.

Why we do what we do matters: A three-level analysis targeting the links among autonomous goal regulation, need fulfillment, and well-being in daily life

Anne **Sosin**, Andreas B. Neubauer

Personal goals determine individuals' behavior and provide structure to their daily lives. The reasons why individuals work towards their personal goals vary not only between persons, but also within persons and across different personal goals. According to Self-Determination Theory (SDT), autonomous goal regulation is associated with higher well-being because autonomous goal regulation leads to the fulfillment of the three basic psychological need for autonomy, competence, and relatedness. The present work tested this prediction in a three-week ambulatory assessment study.
In this study, participants (N = 207, age = 16 – 30 years) first completed a baseline questionnaire in which they indicated three personal goals for which they planned to actively work in the following three weeks. In the subsequent three-week ambulatory-assessment part, participants reported three times per day whether they had worked for any of their goals since the last assessment and reported (a) their autonomous goal regulation since the last beep, (b) their need fulfillment since the last beep, and (c) their momentary affective well-being.
Analyses using three-level models (repeated measurements nested within individual goals nested within individuals) showed that autonomous goal regulation was associated with higher positive affect and lower negative affect. Indirect effects via need fulfillment were found on all three levels.
These findings are in line with predictions by SDT and prior empirical research, and suggest that pursuing goals for more autonomous (vs. controlled) reasons yields positive consequences for individuals which are derived from the fulfillment of basic psychological needs.

Better do Jumping Jacks or Take a Deep Breath? Immediate Effects of Exercise and Relaxation on Well-Being and Working Memory Performance in School Children

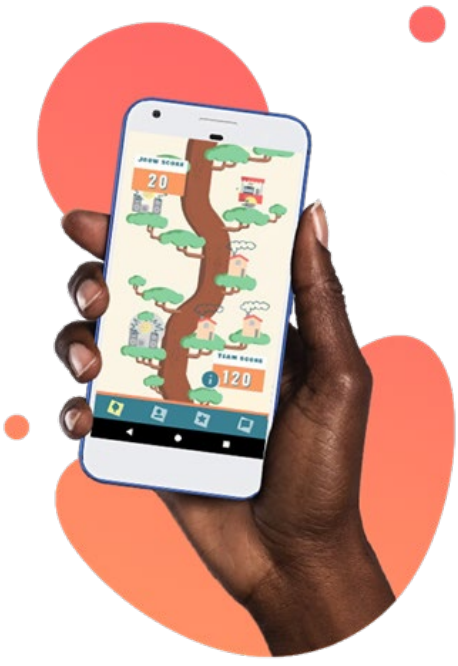
Lena M. **Wieland**, Andreas Neubauer, Florian Schmiedek

A 20-day ambulatory assessment study was designed to examine the immediate effects of (1) a physical activity break and (2) a slow-paced diaphragmatic breathing exercise on school children's subjective well-being and working memory

performance in everyday life. The investigation will address both individual determinants and situational influences that are expected to affect the efficacy of the interventions. A minimum of N = 100 secondary school students aged 10 to 14 years will have participated by the time of the symposium. Two three-minute exercises were offered to students on 10 days each in a semi-randomized order: The video-assisted physical activity break during school, at the end of a lesson, and the video-assisted breathing exercise via smartphones in the evening. Students were asked to report on their subjective experiences and well-being via smartphone four times a day (in the morning, at school, in the afternoon, and in the evening). Working memory performance was measured three times daily (except in the morning) via smartphones using a numerical and a spatial updating task. Accelerometers were used to record students' day-to-day physical activity. Beforehand, students and their parents were asked to complete an online questionnaire to obtain information about students' overall life satisfaction, attitudes toward school, sports and physical activity routines, and sleep patterns, among other things. Preliminary results on the short-term within-person effects of both interventions on well-being and working memory performance will be presented, including a discussion of their relevance to the development of tailored just-in-time interventions.

mHealth tools with Experience Sampling may promote adolescent well-being

Loes **Keijsers**, Evelien Dietvorst, Jeroen Legerstee, Annabel Vreeker, Manon Hillegers



Mental health problems, such as depressive feelings, may increase during adolescence. The Grow It! app is a multiplayer mHealth intervention to prevent these. It contains cognitive behavioral therapy (CBT)-inspired challenges as well as self-monitoring of emotions through Experience Sampling Methods (ESM).
Three preregistered studies were conducted among of 12–25-year old Dutch adolescents who played the app for 3 to 6 weeks (sample 1: N = 476, Mage = 16.24, 76.1% female; sample 2: N = 814, Mage = 18.45, 82.8% female; Sample 3: N = 320, age = 15.88, 69% female). ESM were used to measure daily positive and negative affect and coping (sample 1: 42 days, 210 assessments per person; sample 2 and 3: 21 days, 105 assessments).
Study 1 demonstrates significant within-person improvements in affective well-being after playing the app as well as a decrease in depressive feelings.
Study 2 unravels the within-person mechanisms through which coping and daily well-being may explain such improvements, using ESM data. Latent class analysis further identified that the majority of participants with low to moderate-risk on developing

mental health problems were likely to benefit from the Grow It! app. By comparing two versions of the app,
Study 3 showed that real-time feedback improved user motivation and engagement. Conclusion. Gamified CBT with self-monitoring of emotions may improve adolescents' affective and cognitive well-being, especially adolescents receive real-time insights into their emotional well-being.

10:30 Symposium 3: (Tackling) Assumption Violations in Experience Sampling Data

Chair: Ginette Lafit

Holding the promise to reveal daily life psychological processes and their dynamics, the Experience Sampling Method (ESM) has become vastly popular in recent psychological research. The quality of findings can however be impaired if assumptions that underly the measurement or the analysis of ESM data are violated. This can in turn influence conclusions and threaten the robustness and replicability of ESM-based work. In this symposium, we take a closer look at measurement and analysis assumptions and discuss approaches to detect and/or tackle their violation. First, Jordan Revol introduces a step-by-step framework, a repository of R functions, and reporting guidelines to support the preprocessing of ESM data and the investigation of data characteristics. Second, Joran Geeraerts presents novel techniques to detect careless responding which allow to identify responses characterized by overly fast reaction times, rhythmic tapping, consistency in responses, and outlying responses. Third, Ginette Lafit investigates the effects of different operationalizations of affective measures and data preprocessing choices on statistical power and sample size recommendations. Fourth, Egon Dejonckheere evaluates the efficacy of an alternative measurement method that employs visualizations of previous intensity levels of ESM items to improve the estimation of dynamic measures. Fifth, Janne Adolf shows how unmeasured daily events in ESM data can improve the estimation of autoregressive-type dynamics, especially if robust modeling techniques are used. Finally, Merijn Mestdagh presents three tools to aid researchers in designing ESM studies by making protocols more dynamic including sampling bursts and novel ways of designing ESM questionnaires.

Time: 10:30 - 12:00
Location: Expo

Preprocessing ESM data: framework, R functions and reporting guidelines

Jordan **Revol**, Ginette Lafit, Martine Verhees, Laura Sels, Eva Ceulemans

ESM studies have become a very popular tool to gain insight into the dynamics of intra- and interpersonal processes. Whereas the statistical modeling of ESM data

has been widely studied, the preprocessing step that precedes such modeling has received relatively limited attention. Yet it is crucial when sharing data and to guarantee transparency and reproducibility of obtained results. The preprocessing step can be particularly challenging, because of the large variety of study designs and sampling schemes and the potentially huge interindividual differences in how participants react to and handle the repeated sampling. Adequate preprocessing not only helps to resolve data issues but also provides valuable information about the quality of the data. To support researchers in properly preprocessing ESM data, we have developed a step-by-step framework, an online repository of R functions and guidelines on how to report the steps when preprocessing ESM data. Particular attention was given to checking adherence to study design (e.g., were the momentary questionnaires delivered according to the sampling scheme), examining participants' response behaviors (e.g., compliance, careless responding) and visualizing the data.

Investigating Careless Responding Detection Techniques in Experience Sampling Methods

Joran **Geeraerts**, Peter Kuppens

Experience sampling methods involve repeatedly gathering self-report data from participants in daily life. Careless responding is a source known to partly invalidate such self-report data. Literature on techniques to detect this type of responding is well established in classic survey research, but scarce related to experience sampling data. We adapted existing careless responding detection techniques from survey studies and developed novel techniques for the experience sampling context. This resulted in 11 novel detection techniques, indicating overly fast reaction times, rhythmic tapping, too little and too much consistency in responses, and outlier responses. In three studies, we evaluated the interrelations between these techniques, how they were predictive of actual (instructed or self-reported) careless responding itself, and how accurate combining them can be for identifying careless responses in the context of experience sampling research. Results showed that counting psychometric antonyms and synonym violations was correlated to outlier indicators, as well as correlated with each other, showing that too little consistency is rare and could indicate careless responding. Moreover, using mixed-effect logistic regression models, we showed that the proposed techniques were able to accurately classify instructed careless responses, with average time per item as the most powerful indicator. Furthermore, low correlations between our detection techniques and scores on a self-reported attention item show that the latter might not be an effective indication of careless responding. In my symposium talk, I will present these techniques and findings, including recommendations for using these techniques in experience sampling research.

The effect of different operationalizations of affect and preprocessing choices on power-based sample size recommendations in intensive longitudinal research

Ginette **Lafit**, Jordan Revol, Leonie J. R. Cloos, Peter Kuppens, Eva Ceulemans

Intensive longitudinal (IL) designs have become indispensable to the investigation of how affect fluctuates in daily life. The popularity of IL research has, however, also highlighted the multitude of decisions that have to be made concerning study design. Among these design decisions are the number of persons and the number of measurement occasions included. These sample size decisions are commonly based on statistical power considerations. In IL research, power analyses are usually conducted by specifying the population values of all model parameters. This is a daunting task, given the large number of model parameters. Therefore, these values are usually set based on data from previous studies. The use of previous studies for determining the parameter values for a priori power analysis is problematic. For instance, in affect dynamic research it is common practice to combine an ad hoc selection of specific emotion items to construct affect scores, but what items are used and how they are combined differs across studies, which may lead to different values for the model parameters and effect sizes. Similarly, preprocessing choices that lead to exclusion of measurement occasions within participants due to delayed responses, or the exclusion of participants based on low compliance change the data used to determine the values of the model parameters for computing statistical power. Therefore, in this presentation we showcase the effect of different operationalizations of affect and preprocessing choices on power-based sample size recommendations using data from a recent study that includes distinct types of items to measure affect.

For better or for worse? Visualizing previous intensity levels improves emotion (dynamic) measurement in experience sampling

Egon **Dejonckheere**, Ine Penne, Leontien Briels, Merijn Mestdagh

It is a long known reality that humans have difficulty to accurately rate the absolute intensity of internal experiences, yet the predominant way experience sampling (ESM) researchers assess participants' momentary emotion levels is by means of an absolute measurement scale. In a daily-life experiment (n = 178), we evaluate the efficacy of two alternative measurement methods that solicit a simpler, relative emotional evaluation: (1) the visualization of a relative anchor point on the absolute rating scale that depicts people's previous emotion rating, and (2) the phrasing of relative emotion items that ask for a comparison with earlier emotion levels by means of a relative rating scale. Using six quality criteria relevant for ESM, we conclude that the use of a visual 'Last' anchor significantly improves emotion measurement in daily life: (a) Theoretically, this method has the best perceived user experience, which suggests that it better aligns with people's emotional rating experience. Methodologically, this type of measurement generates ESM time series that (b) carry a stronger emotional signal, (c) exhibit less measurement error, produce person-level emotion dynamic measures that are (d) more stable, and generally show stronger (e) unique and (f) incremental relations with external criteria like neuroticism and borderline personality. In sum, we see great value in the addition of a relative 'Last' anchor to the absolute measurement scales of future ESM studies on emotions, as it structures the ambiguous rating space and introduces

more standardization within and between individuals. In contrast, using relatively phrased emotion items is not recommended.

Improved estimation of autoregressive models through contextual impulses and robust modeling

Janne K. **Adolf**, Eva Ceulemans

The aim of the dynamic paradigm of affect research is to characterize daily life affective processes by means of intense longitudinal data and dynamic, typically autoregressive-type models. The contextual conditions accompanying and potentially influencing affective processes obviously form an important part of the picture. Especially distinct contextual events – ranging from salient daily events to major life events – are regularly assessed and their effects modelled. Such an explicit approach to studying context can however reach its limits, if relevant events are hard to define, measure or model. In that case one finds oneself in a situation where contextual events play out as hidden contaminators possibly obscuring the affective process of interest. Interestingly, such contamination can also have beneficial effects in that it can trigger autoregressive dynamics and leverage their estimation. In this paper we take a closer look at this phenomenon. We also demonstrate that robust autoregressive models deal especially well with contextual contamination as they not only capitalize on positive leverage effects but also mitigate the negative obscuring effects contextual events might have.

A new era of dynamical measurement

Merijn **Mestdagh**

In order to reach robust conclusions about people's real-life emotional or symptom fluctuations, and to truly advance our understanding of the temporal regularities that underlie our experiences, a first prerequisite is the reliable assessment of people's momentary emotions and symptoms. Unfortunately, data gathered with the experience sampling method is often clouded by measurement noise. In this presentation we discuss how we can boost the signal to noise ratio of an experience sampling research protocol by making the protocol more dynamic. Specifically we introduce three tweaks (developed in the m-Path experience sampling platform). First we discuss how experience sampling bursts can be programmed to measure the moments that matter in a higher frequency. Second, we discuss how to make measurements relative instead of absolute. Finally, we discuss how to change the content of questions conditional on an R script, allowing for advanced logic in questionnaires.

10:30 Symposium 4: New Approaches to Analysing Psychological Time Series

Chair: Oisín Ryan

Time series analysis is surging in popularity in psychological research, with the availability of high-frequency ecologically valid measurements promising researchers the ability to tap into psychological dynamics in previously unprecedented ways. In clinical psychology in particular, the hope is that this data can be used to gain insights into transdiagnostic dynamics underlying the treatment of psychopathology.
To fully leverage time series for psychological research, new methodologies and ways of analysing this data need to be developed. In this symposium we present a number of new ideas on how to think about and analyse psychological time series, with a focus on applications in clinical psychology. Specifically, the five talks of the symposium will touch on: a new method for computing lagged correlations in the presence of unequally spaced measurements; a new perspective on analysing emotion measurements based on modality; an exploration of how time-varying models can be used to gain insight into the changing dynamics of symptoms; an investigation of how general change profiles in personalised time-series relate to treatment outcomes; and a new method for detecting reliable changes in symptom levels of varying durations.

Time: 10:30 - 12:00
Location: Studio

Extracting dynamic features from irregularly spaced time series

Oisín **Ryan**, Kejin Wu, Nicholas C. Jacobson

Autocorrelation and cross-correlation functions provide the basis for understanding the dynamics underlying time-series data. They encode how variables relate to themselves and each other at different time-intervals or lags, providing both critical descriptive information as well as a means of assessing whether time-series models appropriately capture the information in ones data. However, the estimation of auto- and cross-correlations typically relies on the assumption that data are equally spaced in time, and this assumption is often violated in practice: In psychology, self-report measures collected through experience sampling designs often result in high irregularly spaced measurements, either by design or due to missing measurement waves. We develop and present a statistical tool, available as the R package expct, which allows for the estimation of auto and cross-correlations from irregularly spaced time series. Based on generalized additive models, we assess the performance of this method in comparison to both traditional approaches and the confirmatory fitting of continuous-time models, the latter of which is vulnerable to problems of model misspecification and unobserved confounding, which the presented method circumvents.

Multimodality and Skewness in Emotion Time Series

Jonas **Haslbeck**, Oisín Ryan, & Fabian Dablander

The ability to measure emotional states in daily life using mobile devices has led to a surge of exciting new research on the temporal evolution of emotions. However, much of the potential of these data still remains untapped. In this paper, we re-analyze emotion measurements from seven openly available Experience Sampling Methodology (ESM) studies with a total of 835 individuals to systematically investigate the modality (unimodal, bimodal, more than two modes) and skewness of within-person emotion measurements. We show that both multimodality and skewness are highly prevalent. In addition, we quantify the heterogeneity across items, individuals, and measurement designs. Our analysis reveals that multimodality is more likely in studies using an analogue slider scale than in studies using a Likert scale; negatively valenced items are consistently more skewed than positive valenced items; and longer time series show a higher degree of modality in positive and a higher skew in negative items. We end by discussing the implications of our results for theorizing, measurement, and time series modeling.

Depressive Symptoms as a Heterogeneous and Constantly Evolving Dynamical System: Idiographic Depressive Symptom Networks of Rapid Symptom Changes among Persons with Major Depressive Disorder

Nicholas, C., **Jacobson**, Matthew, D., Nemesure, Amanda, C., Collins, George, D., Price, Tess, Z., Griffin, Arvind, Pillai, Michael, V., Heinz, Damien, Lekkas, Andrew, T., Campbell

Major depressive disorder (MDD) is a leading cause of global disease burden. MDD is characterized by rapid symptom changes that occur within days and is highly heterogeneous, varying considerably across people in both function and form. Recent efforts have examined this heterogeneity by studying MDD as a system where symptoms influence one another over time. Nevertheless, most studies have made a strong assumption: that the symptom dynamics themselves are static and do not dynamically change over time. As a part of the Tracking Depression Study, participants (N=105) completed ratings of MDD depressive symptoms three times a day for 90 days. We conducted time-varying vector autoregressive models to investigate the idiographic symptom networks of the entire sample of participants collected to date and illustrate the finding with a case series of five persons with MDD. The results indicate that there is high heterogeneity across persons, such that the individual network composition is unique from person to person. For most persons, individual MDD symptom networks changed dramatically across the 90 days with 86% of individuals experienced at least one change in their most influential symptom across the 90 days. Most individuals had at least one symptom that acted as both the most and least influential symptom at any given point over the 90-day tracking period. Our findings offer further insight into short-term symptom dynamics, suggesting that the composition and driving factors of MDD are not only heterogeneous across persons but also within-persons across time.

Shifts in time: identifying reliable symptom changes of different duration in within-person time series

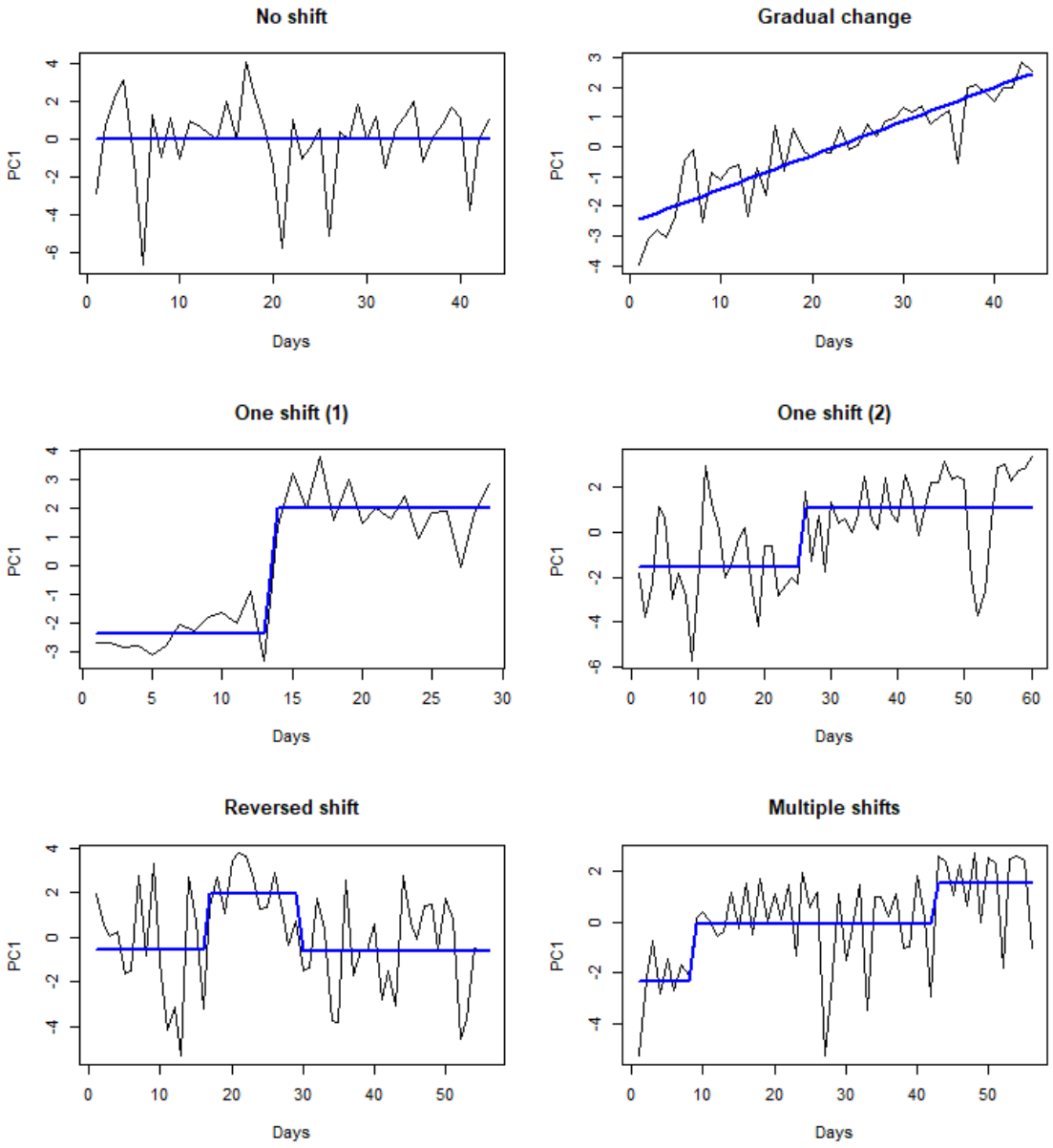
Marieke A. **Helmich**

Routinely measuring (former) patients' psychological complaints and collecting time series of repeated assessments within individuals has become common practice in the context of therapy and relapse prevention. Identifying relevant symptom shifts as they enfold can be of interest to psychopathology researchers and clinicians alike, but it is important to know whether the variability in a person's measurements on a symptom questionnaire are more likely to be due to the instrument's precision (standard error of measurement), or due to an actual important change. While various methods exist to determine whether a relevant change in symptoms has occurred at the within-person level, these typically 1) make no particular assumption about the time it took for the symptoms to change, e.g., pre-post treatment changes, 2) require quite a few data points to model change, e.g., simple linear regression or change point analysis, and 3) do not provide solutions for relatively fast changes that extend over multiple time points. In the presented study, an adaptation of the well-established Reliable Change Index (RCI) is proposed that allows for the detection of symptom changes of varying durations in individual patients' time series: the Duration-adjusted RCI (DaRCI).
To illustrate the utility of this method, we simulated depressive symptom time series with varying degrees of discontinuity and overall mean change in scores. The results of these simulations will be presented, along with case illustrations in empirical data, which reveal that the DaRCI is effective at identifying changes over multiple weeks.

The best of both worlds? General principles of psychopathology in personalized assessment

Merlijn **Olthof**

A complex systems approach to psychopathology proposes that general principles lie in the dynamic patterns of psychopathology, which are not restricted to specific psychological processes like symptoms or affect. Hence, it must be possible to find general change profiles in time series data of fully personalized questionnaires. In the current study, we examined general change profiles in personalized self-ratings and related these to treatment outcome. We analyzed data of 404 patients with mood and/or anxiety disorders who completed daily self-ratings on personalized questionnaires during psychotherapy. For each patient, a principal component analysis was applied to the multivariate time series in order to retrieve a person-specific time series. Then, using classification and regression methods, we examined these time series for the presence of general change profiles. The change profile classification yielded the following distribution of patients (See Figure): no-shift (n = 55; 14%), gradual-change (n = 52; 13%), one-shift (n = 233; 58%), reversed-shift (n = 39; 10%) and multiple-shifts (n = 25; 6%). The multiple-shifts group had better treatment outcome than the no-shift group on all outcome measures. The one-shift and gradual-change group had better treatment outcome than the no-shift group on respectively two and three outcome measures. Overall, this study illustrates that person-specific (idiographic) and general (nomothetic) aspects of psychopathology can be integrated in a complex systems approach to psychopathology, which may combine 'the best of both worlds'.



12:00 Lunch break / Sponsor exhibition

Time: 12:00 - 13:00
Location: Sponsor stand / Foyer

13:00 Symposium 5: Using experiencing sampling data to forecast, prevent and treat mental health problems in real-time: from complex systems to just-in-time adaptive interventions

Chair: Eva Ceulemans

Within-person changes in emotion dynamics, such as rising variances and autocorrelations, were recently put forward as person-specific warning signs for upcoming mental disorders. Yet, empirical support for this idea remained limited. The first part of this symposium will therefore broaden the scope regarding the type of warning signs that may forewarn psychological transitions. First, Kyra Evers will present how recurrence quantification analysis (RQA) compares to more conventional warning signs for anticipating a range of simulated psychological transitions. Second, Evelien Schat will present how monitoring mean levels through statistical process control (SPC) may aid the early detection of mental health problems. In particular, it will be addressed whether the “normative” range of mean levels can be derived from group-level experience sampling data. Marieke Schreuder also addressed this in an empirical study that aimed to distinguish youth with vs. without persistent mental health problems by means of SPC. Evidently, the ultimate goal of monitoring warning signs – whether detected through RQA or SPC – is to prevent or treat mental health in real-time. Therefore, the second part of this symposium features two presentations that illustrate the promises and boundaries of just-in-time adaptive interventions (JITAIs). Arnout Smit will discuss theoretical frameworks for JITAIs in order to outline present and future of JITAIs in mental health research. Finally, Eeske van Roekel will present a study on the feasibility of JITAIs in first-year university students. Altogether, this symposium features some of the latest findings with respect to anticipating, preventing and treating mental health problems in real-time.

Time: 13:00 - 14:30
Location: Grote Zaal (Main Theatre)

Anticipating Regime Changes: A Comparison Between Conventional Early Warning Signals and Recurrence Quantification Analysis in the Generalised Lotka-Volterra Model

Kyra **Evers**, Lourens Waldorp, Denny Borsboom, Eiko Fried, Fred Hasselman

Early warning signals (EWS) are used across a range of fields in systems as diverse as climates, financial markets, and neuronal ensembles, and have recently shown promise as signals for anticipating mental health transitions. The statistical signals that are expected to indicate an upcoming transition are often derived from dynamical systems theory, such as increased variance during the phenomenon of

critical slowing down. In the move from theory to real-world data, new challenges arise, such as high dimensionality, non-linearity, noise, and non-stationarity. A relatively unexplored method in the EWS literature which is able to handle these challenges is Recurrence Quantification Analysis (RQA), which identifies recurrent patterns in line structures of the timeseries' distance matrix. We introduce and showcase RQA in a well-studied dynamical system, the Generalised Lotka-Volterra model, and compare it to conventional EWS such as skewness and variance. We test the performance of EWS on a Hopf bifurcation, chaotic regime transitions, and null models, and briefly demonstrate how RQA may be applied to psychological data. Our simulation study approximates Ecological Momentary Assessment (EMA) data collection, where data may be analysed in real-time without access to the full timeseries to detect a transition. As a simulation of purported parameter changes in real-world systems, our study tests RQA's ability to detect a transition in the underlying parameters before a qualitative shift in the system occurs. As such, RQA may be a promising tool for the detection of transitions in data collected using new sampling technologies harbouring unknown transition types.

Can warning signals for mental health problems in at-risk young adults be informed by momentary emotions reported by the general population? A novel application of the principles of statistical process control

Marieke J. **Schreuder**, Peter Kuppens, Evelien Schat, Peter de Jonge, Catharina A. Hartman, Eva Ceulemans

Statistical process control (SPC) was recently introduced as a method for detecting person-specific warning signals for mental ill-health. Such warning signals occur when a person's repeatedly assessed emotions exceed a control limit. This control limit should in principle be based on the same person's emotions in a healthy period. As such data are often unavailable, we performed a preregistered study to investigate whether general population data can be used instead. We used data from the HowNutsAreTheDutch study, in which adults from the general population (N=746) rated their emotions three times a day for three months. Based on these data, we computed control limits according to the exponentially weighted moving average and Shewhart SPC procedures. Next, we investigated how often young adults with vs. without persistent mental health problems from the TRAILS TRANS-ID study (N=100) – who rated their emotions daily for six months – reported scores beyond these general population-based control limits. Warning signals occurred more often in young adults with persistent mental health problems compared to healthy young adults. The predictive performance of SPC varied across emotions and SPC procedures, but did not consistently improve when control limits were conditioned on individuals' age, sex, and depressive symptoms. Thus, warning signs in individual's emotions can be monitored using relatively generic norms, derived from the general population. In this talk, I will highlight the pros and cons of using generic norms to inform warning signs, and further discuss the scientific and clinical implications of this novel SPC application.

Deriving EWMA control limits in case of few in-control observations: A comparison of a person-specific and a multilevel modeling approach

Evelien **Schat**, Francis Tuerlinckx, Bart De Ketelaere, Eva Ceulemans

Retrospective analyses of experience sampling (ESM) data have shown that changes in mean levels may serve as early warning signals of an imminent depression. Detecting such early warning signs prospectively would pave the way for timely intervention and prevention. The exponentially weighted moving average (EWMA) procedure seems a promising method to scan ESM data for the presence of mean changes in real-time. First, this procedure captures the natural variation present in a set of in-control data, used to establish control limits. Afterwards, incoming data are compared to the in-control distribution, to detect and test whether and when the incoming data go out-of-control (i.e., when the data go beyond the control limits). One of the biggest challenges of applying the EWMA procedure to ESM data, is the amount of in-control data that is needed for optimal performance, which amounts to at least 50 days. Clearly, it is not trivial to obtain such a large amount of in-control data of a single person. We therefore investigate whether we can use available data from standard one or two-week ESM studies to establish adequate control limits. Specifically, we fit multilevel models to these data and use the obtained model parameters as well as a limited amount of in-control data from the individual under study to estimate EWMA control limits. Based on simulations, we provide recommendations on when this multilevel modeling approach will outperform the standard person-specific approach.

Just-In-Time Adaptive Interventions in Mental Health: a scoping review

Arnout C. **Smit**, Claire R. van Genugten, Melissa Thong, Wouter van Ballegooijen, Donna Spruijt-Metz, Mirjam A. G. Sprangers, Heleen M. Riper

This study aims to gain insight into the current state-of-the-art on the use of Just-In-Time Adaptive Interventions (JITAIs) for promoting mental health. JITAIs are a relatively new tool for health promotion that use mobile technology to monitor an individual's behavior, mental state and context in order to provide appropriate support at the right time, place and only when needed. The dynamic and context-dependent nature of mental health makes JITAIs a potentially relevant tool for mental health promotion, as the effectiveness of (micro) interventions and patient engagement may strongly depend on their state and context. The current scoping review has two related objectives. First, we identify and describe the conceptual frameworks of JITAIs currently used in other fields and exemplify these frameworks with narrative descriptions. Second, we provide an overview of existing JITAI studies in mental health and examine how these studies fit into these conceptual frameworks. We examine reported challenges and limitations when applying JITAIs in the field of mental health, identify potential gaps of knowledge and provide recommendations for future research in this field.

incReasIng poSitive Emotions (RISE project): A pilot study on a just-in-time adaptive intervention in daily life

Eeske van **Roekel**, Dominique Maciejewski

Improving positive emotion regulation can play a critical role in preventing the development of mental health problems and increasing well-being (Carl et al., 2013). An effective way to improve positive emotions (PE) is through positive psychology interventions (Quoidbach et al., 2015; Sin & Lyubomirsky, 2009). Yet, as individuals experience PE differently, a one-size-fits all approach may not be effective. Previous Experience Sampling Method (ESM) studies have shown that providing one-time personalized feedback based on ESM increases PE (Kramer et al., 2014; Van Roekel et al., 2017). However, there is large heterogeneity in effectiveness between individuals. An important next step is to further personalize interventions to maximize effects for each individual, by identifying the optimal timing and content of the intervention, also referred to as "just-in-time adaptive interventions" (JITAI) (Nahum-Shani et al., 2015; Wang & Miller, 2020). Individuals may benefit from receiving interventions aimed at maintaining PE (i.e., savoring) and increasing PE. The aim of the present study is to examine the feasibility of providing micro-interventions during moments of low versus high levels of positive emotions, and whether this is effective in increasing positive emotions and well-being, in a sample of first-year university students. Participants will first participate in a 14-day baseline period, after which they are randomly assigned to the intervention group (N = 50) who continues with the ESM and receives the JITAI, or an active control group (N= 50) who only continues with the ESM. Data are currently collected, first results will be presented during the conference.

13:00 Symposium 6: Innovative approaches in daily life research: Novel methods, study designs, and methodological specificities

Chairs: Philip S. Santangelo & Johanna Hepp

This symposium features a collection of studies that use novel and innovative Ambulatory Assessment (AA) methods and designs. Lennart Seizer will present findings from a study examining the bidirectional association between emotional states and immune system activity. To this end, the authors repeatedly asked participants to rate their emotional states and collect their entire urine over a period of two months. Tobias Kockler will then present the design for a large-scale study addressing affective dysregulation in three clinical groups. In their one-year long study, the authors will combine continuous unobtrusive assessments via smartphone-derived parameters with traditional e-diary assessments at varying emotional intensities. In addition to daily evening assessments, the study will also include five micro bursts with a high sampling frequency. Next, Annika Reinhold will present a study on the transferability of clinical neurofeedback interventions to real-

life using a newly developed ecological momentary intervention. Lastly, Philip Santangelo will discuss the questions of acceptance of and reactivity to AA, given that researchers have more and more technical gimmicks at their hands. He will presents a newly developed post-monitoring questionnaire researchers can use to assess AA acceptance and reactivity. Overall, the symposium highlights AA methods, designs, and methodological specificities that go beyond classical e-diary assessments and that can be applied to a wide range of contextual research questions.

Time: 13:00 - 14:30
Location: IJ Zaal

Emotional states predict cellular immune system activity: A multivariate time-series analysis approach

Lennart **Seizer**, Dietmar Fuchs, Harald R Bliem, Christian Schubert

The relationship between emotional states and immune system activity is characterized by bidirectional influences that have been described by bio-behavioral and psycho-neuro-immunological research. The goal of this study was to investigate how these unfold over time under real-life conditions. For this, three healthy women collected their entire urine over a period of two months in 12-h intervals (8am–8pm, 8pm–8am), resulting in a total of 112 to 126 consecutive measurements per subject. In addition, the subjects completed a questionnaire on emotional states (EWL-60-S) each morning and evening. To determine levels of cellular immune activity, neopterin per creatinine concentrations were measured in the urine samples via high-pressure liquid chromatography. The dynamic relationships between the time series of the six emotional states (mental energy levels, general lethargy, extraversion, well-being, irritation, anxiousness/depressiveness) and urinary neopterin levels were estimated in vector-autoregressive models and evaluated using granger-causality tests, forecast error variance decomposition and impulse-response functions. Emotional states were found to explain up to 33.24% of the variance in neopterin per creatinine levels, whereby most of the effects happened within a period of two days. Across all subjects, rises in anxiousness/depressiveness and extraversion were found to lead to increases in neopterin levels, while mental activity led to decreases in neopterin. These results highlight the reactive nature of the immune system and the importance of psychosocial influences.

Dynamics of Affect Modulation in Neurodevelopmental Disorders: Introduction of the multicenter DynAMoND study

Tobias D. **Kockler**, Andreas Reif, Antoni Ramos-Quiroga, Giovanni de Girolamo, Jan Haavik, Nader Perroud, Ulrich W. Ebner-Priemer

Borderline personality disorder (BPD), bipolar disorder (BD), and attention deficit/hyperactivity disorder (ADHD) are highly comorbid disorders characterized by

affective dysregulation. While three affective dysregulation components (homebase, variability, return to baseline) were presented in the DynAffect model in a BPD sample, empirical data distinguishing between these components in different clinical groups are lacking. Whether the short-term affective states attributed to BPD and ADHD and the more episodic mood fluctuations occurring in BD are distinct phenomena or rather ends of a spectrum is unclear. This ambulatory assessment study aims to differentiate the affective dysregulation of BPD, ADHD, and BD by combining digital phenotyping, a measurement burst e-diary design with different sampling frequencies, and accelerometry. We will recruit 480 participants (120 with BPD, 120 with ADHD, 120 with BD, and 120 healthy controls) at five different European study centers. Participants' digital phenotypes, i.e., parameters derived from their private smartphones reflecting communicativeness (phone calls, social app usage) or activity/diurnal rhythm (via GPS tracking), will be assessed continuously over a one-year monitoring period, complemented by daily evening assessments of mood and sleep. In addition, five five-day measurement bursts will be distributed throughout the year, with e-diaries prompted ten times a day to assess mood, self-esteem, impulsivity, stress reactivity, social interactions, and dysfunctional behaviors. Additionally, participants will be equipped with activity sensors during the high-frequency bursts. Analysis of shared and unique aspects of affective dysregulation components across disorders will extend the DynAffect model, complement diagnostic tools, and potentially allow for early detection of negative disease courses.

A mobile ecological momentary intervention to transfer rtfMRI-neurofeedback strategies to daily life: Proof-of-concept study

Annika Stefanie **Reinhold**, Ulrich Reininghaus, Christian Paret, Jessica Hartmann, Christian Schmahl

Neurofeedback deploying real-time functional magnetic resonance imaging (rtfMRI-NF) allows for high anatomical precision in self-regulating brain activity and has been suggested as an early intervention across mental illness involving emotional dysregulation. However, rtfMRI-NF has been criticised for a lack of transferability to real-life. To support this transfer, we aim to 1) develop a novel mobile app (neurofEMI) that embeds rtfMRI-NF strategies within an ecological momentary intervention (EMI), and 2) examine the acceptability, safety, reach, and initial signals of efficacy of neurofEMI.
This is a two-phased proof-of-concept study with young people (14-25 years) at a Clinical High At-Risk Mental State. First, we will co-create neurofEMI together with participants (N = 16), building on an established EMI platform and rtfMRI-NF amygdala downregulation protocol. Second, participants (N = 83) will undergo 3 rtfMRI-NF training sessions and use neurofEMI for 6 weeks in a micro-randomised trial. NeurofEMI will prompt participants to self-report affect and stress 6x / day and, based on the outcome, randomly assign them to a personalised intervention that instructs the application of self-regulation strategies acquired via rtfMRI-NF. Primary (emotional reactivity) and secondary (emotion regulation, context-related metadata) outcome measures will be assessed after each momentary intervention. User participation and satisfaction will be measured qualitatively and quantitatively

throughout and at the end of the trial.
Developing and proving the concept of neurofEMI could help to overcome the issues of impracticality and generalisability of rtfMRI-NF and improve intervention options for early psychological distress or mental health conditions involving emotional dysregulation.

What was it like for you? Developing and validating the Ambulatory Assessment Post Monitoring Questionnaire

Philip S. **Santangelo**, Matthias F. Limberger, Tobias D. Kockler, Ulrich W. Ebner-Priemer

The use of Ambulatory assessment (AA) methods constantly offers new methodological possibilities and technical gadgets to enhance our insights in the processes that we are interested in. However, researchers always have to balance the intrusiveness of the method to avoid reactivity and ensure participants' compliance. The question researchers are facing is how to assess acceptance and representativity of the AA.
In order to provide a validated measurement instrument with good psychometric properties, we developed a 25-item questionnaire, the Post Monitoring Questionnaire (AA-PMQ), that should be administered directly following an AA epoch. The items are supposed to assess reactivity to the assessments, acceptance of the assessment (i.e, the sampling scheme as well as the devices), and representativity of the assessment period. We used this newly developed questionnaire in a German and Canadian sample of patients with borderline personality disorder. To validate our questionnaire, we asked participants to report about extraordinary events during their day in a daily evening assessment. Moreover, we are rolling out a large-scale study in five European countries in which we use the AA-PMQ. Thus, German, English, French, Italian, Spanish, and Norwegian translations of the questionnaire exist. We will present the results of the confirmatory factor analyses and the resulting psychometric properties of the AA-PSQ. Moreover, we will present the results of the validity analyses, since in AA the use of retrospective questionnaire measures is usually criticized and now we develop a questionnaire measure to assess the acceptance and representativity of our AA.

13:00 Symposium 7: Embracing the complexity of daily life - Methodological advances to capture dynamics in time-series data

Chair: Dominique F. Maciejewski

Ambulatory Assessment (AA) methods offer exciting opportunities to capture emotions and behaviours in daily life and the resulting rich time-series allow for unique insights into dynamics. However, commonly used methods to analyse such time-series data (e.g., multilevel models) are often limited in capturing complex

dynamics, because they assume linear relations and stationarity. The present symposium brings together five talks that introduce innovative ways to capture complex dynamics in time-series data and showcase their application for a variety of concepts, including emotions, emotion regulation, personality, and physical activity data.
The first talk (Hulsmans) will showcase how idiographic network models can be used to understand the dynamic nature of personality, highlighting the limitations of assuming static temporal relations within individuals. The second talk (Maciejewski) will introduce applying an index from ecology to capture dynamic switching between different variables in time-series data and will present its utility for the concept of emotion regulation variability. The third talk (Cui) presents a new R package (fitlandr) that can conduct nonparametric estimations for the dynamical function and stability landscape of psychological systems, which will be showcased using both simulated and empirical datasets. The fourth talk (Baretta) will present a novel method to quantify physical activity resilience (i.e., the ability to recover from stressors) from time-series data. The fifth talk (Hasselman) will present a new statistical method, multiplex recurrence networks, which can be used to study the dynamics of N=1 multivariate time series consisting of many different variables.

Time: 13:00 - 14:30
Location: Expo

Personality networks: are we truly embracing the idiographic, dynamic and complex nature of personality states?

Daan H. G. **Hulsmans**, Freek Oude Maatman, Roy Otten, Evelien A. P. Poelen, Anna Lichtwarck-Aschoff

The network theory acknowledges that personality is complex and dynamic, exemplifying this with complex systems principles such as sudden nonlinear transitions between stable states (Borsboom, 2017; Cramer et al., 2012). Timeseries data enable idiographic personality network estimations which summarise one individual's dynamics within a period of time. We estimated idiographic networks using graphical vector autoregressive models, exploring how (dis)similar structures are between individuals and within individuals over time. Our analyses included 9,360 datapoints from 26 inpatients (Mage=23) with a mild intellectual disability who self-rated six personality-profile related items once per day for 60 days. Explorations of autocorrelation functions for each participant revealed significant interactions across both short (e.g., lag-1) and longer timelags (e.g., lag-6 or lag-14), suggesting that persons have both short- and long-term memory – a characteristic of complex systems. Our analytical strategy is therefore to only estimate contemporaneous networks and refrain from estimating temporal networks that prioritizing typical lag-1 timescale. Results are available on https://hulsmans.shinyapps.io/IdiographicNetworkModels. We found high heterogeneity between persons. Furthermore, repeated network estimations within a sliding window showcase temporal inconsistencies at the n=1 level. This stresses that one idiographic network is still a static representation that summarizes average

linear interplays during one timeframe. Static networks reflecting 60 days thus do not represent any smaller epoch within the 60-day period, even for one individual. This can aptly be considered a result of approaching nonlinear phenomena with linear models, rather than a consequence of noise or lacking power. Together, this substantiates the need for analyses that truly embrace complexity.

Capturing emotion regulation as a dynamic process - Introducing Bray-Curtis dissimilarity

Tak Tsun Lo, Maaike Verhagen, Caspar J. Van Lissa, Yasemin Erbaş, Katie Hoemann, Dominique F. **Maciejewski**

Emotion regulation (ER) variability refers to how individuals vary their use of emotion regulation strategies across time. How ER variability covaries with changing contexts at a moment-to-moment level is fundamental to well-being. The theoretical foundation of ER variability recognizes two constituent processes in ER variability: strategy switching (e.g., moving from distraction to social sharing) and endorsement change (e.g., decreasing the intensity of both distraction and social sharing from one moment to the next). These two processes can only be unveiled when within-strategy and between-strategy variability are considered together. However, recently popular indices in estimating ER variability separately calculate the standard deviation (SD) between strategies per time-moment or the SD within a strategy across time. Therefore, these SD-based indiceshave low validity in estimating strategy switching and endorsement change. We demonstrate how Bray-Curtis dissimilarity is more sensitive in detecting ER variability through simulation studies; we apply it to three different intensive longitudinal datasets (total N = 365) and show higher Bray-Curtis dissimilarity predicted lower negative affect at both moment level and person level more consistently than SD-based indices. Bray-Curtis dissimilarity, a methodology that matches theoretical concepts, may improve understanding of the causes and consequences of within-person ER variability. We recommend the use of Bray-Curtis dissimilarity for further understanding ER variability and discuss its potential in studying the variability in other multivariate dynamic processes.

Towards a method to recover nonlinear dynamics and multistability from intensive longitudinal data

Jingmeng **Cui**, Fred Hasselman, Anna Lichtwarck-Aschoff

The availability of smart devices has made it possible to collect intensive longitudinal data (ILD) from individuals, providing a unique opportunity to understand the complex dynamics of psychological systems. However, existing time-series methods often have limitations, such as assuming linear interactions or having restricted forms, leading to difficulties in capturing the complex nature of these systems. To address this issue, we introduce fitlandr, a method with implementation as an R package that integrates nonparametric estimation of drift-diffusion function and stability landscape. The drift-diffusion function is estimated using the Multivariate Kernel Estimator (MVKE, Bandi & Moloche, 2018), and the stability

landscape is estimated through Monte-Carlo estimation of the steady-state distribution. (Cui et al., 2021, 2022). Using a simulated emotional system, we demonstrate that fitlandr can effectively recover bistable dynamics from data, even in the presence of moderate noise, and that it primarily relies on dynamic information from the system instead of distributional information. We then applied the method to two empirical single-participant ESM datasets and compared the results with the simulation datasets. Whereas both datasets showed bimodal distributions, fitlandr only revealed bistability in one of them, indicating that bimodality in ILD does not necessarily imply the existence of bistability in the underlying system. These results demonstrate the potential of fitlandr as a tool for uncovering the rich, nonlinear dynamics of psychological systems from ILD.

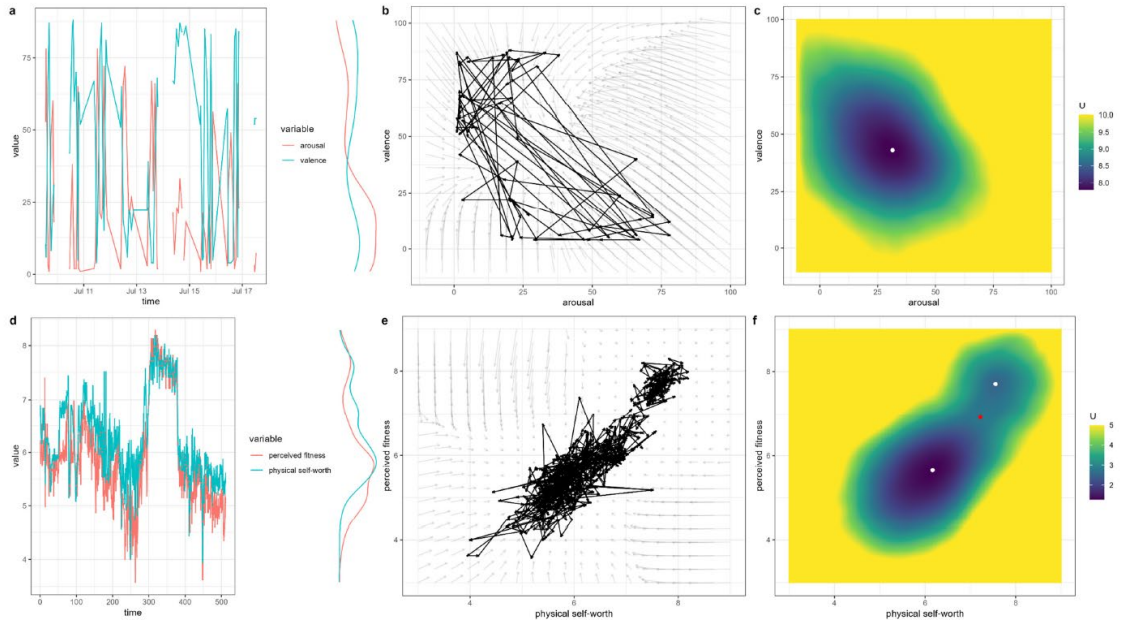


Figure 1. The empirical time series, their vector field estimation results, and their landscape construction results.

Resilience characterised and quantified from physical activity data: a methodological approach based on time series analysis

Dario **Baretta**, Sarah Koch, Inés Cobo, Gemma Castaño-Vinyals, Rafael de Cid, Anna Carreras, Joren Buekers, Judith Garcia-Aymerich, Jennifer Inauen, Guillaume Chevance

Consistent physical activity (PA) is key for health and well-being, but it is vulnerable to stressors. The process of recovering from such stressors and bouncing back to the previous state of PA can be referred to as resilience. Quantifying resilience is fundamental to assess and manage the impact of stressors on consistent PA. In this talk, we present a method to quantify the resilience process from PA data. We leverage the prior operationalization of resilience, as used in various psychological domains, as area under the curve (AUC) and expand it to suit the characteristics of PA time series. As a use case to illustrate the methodology, we quantify resilience in step count time series (N = 366) for eight participants following the first COVID-19 lockdown as a stressor. Steps were assessed daily using wrist-worn devices. For each person's time series, we fit multiple growth models (GAMs) and identify the

best one using the Root Mean Squared Error (RMSE). Then, we use the predicted values from the selected model to identify the point in time when the participant recovered from the stressor and quantify the resulting AUC as a measure of resilience for step count. Further resilience features can be extracted to capture the different aspects of the process (e.g., recovery rate, relative resilience). This methodological approach is paired with a R tutorial that offers a ready-to-go toolbox that can be used by researchers to investigate the determinants of PA resilience or to identify the intervention strategies that promote faster resilience.

Personalized Process Monitoring in Practice: Geometric Resilience Loss Indicators From Multiplex Cumulative Recurrence Networks

Fred **Hasselman**

I will discuss how to use multiplex recurrence networks to describe the dynamics of N=1 multivariate time series consisting of many different variables, often self-reports of human experience. The aim of these descriptive analyses is that they should, in principle, be usable in a clinical setting in which process monitoring is used and data accumulates on a daily basis. Many of the existing data-analytic techniques, for example, to discover early warning signals of imminent transitions in symptom severity, require many participants and/or many data points, making them less suitable to be used in clinical practice. Moreover, the data can consist of personalised questionnaires, qualitative data, or can be a mix of physiological and psychological variables. In such settings, decisions on potential intervention activities can be based on an analysis of the dynamics of the recent past and a quantification of the multivariate structure of the time series quantified by measures on multiplex recurrence networks. I will discuss the promises and challenges of the recurrence network approach compared to statistical models such as symptom networks based on Vector Autoregression (VAR).

13:00 Symposium 8: Parenting Dynamics in Adolescence: Results from Daily Diary and Experience Sampling Studies

Chair: Amaranta D. de Haan

The six presentations in this symposium bring together state-of-the-art research on within-family correlates of everyday parenting in adolescence. The presentations are based on daily diary studies and experience sampling studies of Dutch and Belgian adolescents and their parents. The presentations focus on explaining parenting behavior (de Haan, Keijsers) and adolescent well-being (Bülow), and on clarifying the direction of effects between parents and adolescents (Boele, Li). One presentation addresses the issue of parent-adolescent dynamics from a methodological perspective (Verhees). Keijsers shows that adolescent disclosure and parental solicitation are both associated with more parental knowledge. De Haan demonstrates that parent-child conflict, parental negative affect, and adolescent negative affect are each related to higher psychological control. Bülow establishes that need-supportive parenting is positively associated with adolescent well-being in all families, but the strength of associations varies considerably across families. Boele shows that the direction of parenting-affect associations (parent-driven, adolescent-driven, reciprocal) differs between families, and even within families, for different combinations of parenting and adolescent affect. Li will show how the parent-adolescent relationship and adolescent well-being are interrelated across days and years. Verhees will present on the feasibility of experience sampling studies versus daily diary studies to assess parent-adolescent dynamics using multi-informant approach.
The presentations in this symposium provide a comprehensive understanding of how parents and adolescents affect each other within days, across weeks, and over years, and are indicative of substantive between-family differences in these within-family dynamics. Scientific and practical implications of the findings will be discussed.

Time: 13:00 - 14:30
Location: Studio

What's up? Sampling Adolescent's Everyday Communication with Parents

Loes **Keijsers**, Savannah Boele, Anne Bülow, Joyce Weeland, Annabel Vreeker

Introduction. Keeping track of adolescents' everyday leisure activities and functioning is necessary for parents to be sensitive to the child's needs and to interfere when needed. However, little is known of how parents and adolescent talk about their leisure time and feelings in everyday lives.
Research Questions.

RQ1. Are there differences in the extent to which parents and children communicate about leisure time versus feelings?
RQ2. How do adolescent disclosure, parental solicitation (i.e., asking questions) and parental knowledge affect each other in everyday lives?
RQ3. Do these dynamics vary from one family to the next (i.e., effect heterogeneity)
Method. In this preregistered Experience Sampling study 99 adolescents between age 12 and 18 (average 15.8) were followed for 14 days. 5 to 6 semi-random times per day adolescents received a notification on their smartphone to report how they felt (PANAS-c), with whom they were, and what they were doing. We also measured to which extent communication with their parents had taken place (e.g., did you disclose your whereabouts/feelings to your parents?), using a novel 8-item parenting instrument.
Results. In their everyday lives, adolescents disclosed more about leisure time activities, whereabouts, and friendships than about their feelings (RQ1). Dynamic Structural Equation Modeling in Mplus illustrated similar underlying processes for how parents stay informed (RQ2) as well as meaningful heterogeneity between families (RQ3) - Table 1.
Impact. Understanding how parents and children communicate about leisure and feelings, and how these processes differ between families may help to tailor future parenting interventions.

Table 1. Within-person effects and variance around these effects as obtained with DSEM models (H3).

	Leisure time			Feelings			Domain differences
Within-person effect	Est	95%CI	Effect size	Est	95%CI	Effect size	Paired t-tests
Disclosure→ Knowledge (H2.1a)	0.453	0.382 0.525	**0.444**	0.767	0.675 0.862	**0.594**	
Solicitation→ Knowledge (H2.1b)	0.370	0.288 0.450	**0.321**	0.683	0.571 0.790	**0.485**	
Solicitation→ Disclosure (H2.1c)	0.718	0.658 0.775	**0.620**	0.756	0.693 0.819	**0.679**	
Variance around effects							
Disclosure→ Knowledge (H2.1a)	0.102		**0.368**	0.158		**0.278**	
Solicitation→ Knowledge (H2.1b)	0.118		**0.528**	0.196		**0.316**	
Solicitation→ Disclosure (H2.1c)	0.055		**0.276**	0.060		**0.365**	

Notes. Effects in bold confirm our hypotheses according to preregistered inference criteria. Est is unstandardized effect (average for sample). 95% CI = 95% credibility interval. Effect size = average of within-person standardized effects, using STDYX person-specific standardization for within-person effects and variance/effect ratio for variances.

Everyday Psychological Control in Adolescence: A Dynamic Process Model

Amaranta (A. D.) de **Haan**, Anne (A. L.) Bülow, Savannah (S.) Boele, Loes (L. G. M. T.) Keijsers

Given that parents have substantial and long-lasting effects on their children, it is imperative to understand why parents parent the way they do. We applied current theoretical views of parenting as a dynamic construct to the seminal Process Model of parenting. Using Multilevel Autoregressive Lag-1 (ML-AR(1)) analyses in Mplus, we examined within-person and between-person associations between parent-reported psychological control, parent-reported parent-child conflict, parent-reported parental negative affect, and adolescent-reported adolescent negative affect. The sample included 159 ethnic majority Dutch two-parent families (parent: Mage = 45 years, 79% female; adolescent: Mage = 13 yeas, 62% female). Parents were mostly higher educated (62% university/higher professional education; 25% post-secondary vocational education; 10% secondary education).
Within-person associations indicate that higher-than-usual parent-child conflict (β=.40, p<.001), parental negative affect (β=.11, p<.001), and child negative affect (β=.06, p<.05) were each associated with higher-than-usual everyday parental psychological control. Further, these within-person associations differed significantly between families. Between-person associations indicate that higher average levels of parent-child conflict (β=.76, p<.001) and parental negative affect (β=.56, p<.001) were associated with higher average levels of parental psychological control. Adolescent negative affect was not associated with between-person differences in psychological control (β=.10, ns).
Results from this study show that individual parent factors, individual child factors, and dyadic parent-child dynamics shape everyday psychological control at the within-person level and provide groundwork for a Dynamic Process Model.

Universal Ingredients to Parenting Teens: Parental Warmth and Autonomy Support Promote Adolescent Well-being in Most Families

Anne **Bülow**, Andreas B. Neubauer, Bart Soenens, Savannah Boele, Jaap J. A. Denissen & Loes Keijsers

Even though each adolescent is unique, some ingredients for development may still be universal. According to Self-Determination Theory, every adolescent's well-being should benefit when parents provide warmth and autonomy. To rigorously test this idea that each family has similar mechanisms, we followed 159 Dutch parent-adolescent dyads (parent: Mage = 45.34, 79% mothers; adolescent: Mage = 13.31, 62% female) for more than three months, and collected 100 consecutive daily reports of parental warmth, autonomy support, positive and negative affect. Positive effects of parental warmth and autonomy support upon well-being were found in 91-98% of the families. Preregistered analysis of 14,546 daily reports confirmed that effects of parenting differed in strength (i.e., some adolescents benefited more than others), but were universal in their direction (i.e., in fewer than 1% of families effects were in an unexpected direction). Albeit stronger with child-reported parenting, similar patterns were found with parent-reports. Adolescents who benefited most from need-supportive parenting in daily life were characterized by higher overall sensitivity to environmental influences. Whereas recent work suggests that each

child and each family have unique developmental mechanisms, this study suggests that need-supportive parenting promotes adolescent well-being in most families.

Direction and Nature of Day-to-Day Parenting Processes in Adolescence is Heterogeneous

Savannah **Boele**, Anne Bülow, Adriene Beltz, Amaranta de Haan, Jaap. J. A. Denissen, Loes Keijsers

As every family is unique, parenting most likely functions uniquely in each family. We tested whether the direction of influence (reciprocal, parent-driven, or adolescent-driven effect) is indeed heterogeneous and to what extent the nature of reciprocal effects (inhibitory or reinforcing cycle) also varies across families. To understand the characteristics of parenting processes of each family, we applied an idiographic approach. The sample included 159 Dutch adolescents (Mage=13.31, 62% female) who completed a 100-day diary study. The idiographic findings indeed revealed that the direction of influence in day-to-day associations between dimensions of parenting and adolescent affect varied across families: Reciprocal effects were found in 11% to 54% of the families, parent-driven effects in 8% to 43%, adolescent-driven effects in 10% to 27%, and null effects in 16% to 60%. Yet, even within the same family, the direction of influence depended on the parenting and affect dimension. In case of reciprocal effects, reinforcing cycles were more common than inhibitory cycles, though both positive and negative reinforcing cycles were identified in different families. Exploratory analyses indicated that adolescents scoring higher on sensory processing sensitivity and neuroticism experienced stronger influences of parenting. Thus, characteristics of everyday parenting processes seem to depend on the family and even on the exact process under investigation. These insights have the potential to better tailor parenting advice to the family's characteristics, and to identify what works for families in which general principles do not apply.

Dynamic Associations between Daily Mother-Adolescent Relationship Quality and Adolescent Affect and Psychopathology Symptoms: An Experience Sampling Study

Qili Q. **Lan**, Monika M. H. Donker, Susan S. Branje

High-quality mother-adolescent relationships contribute to adolescent adjustment. How these overall patterns are shaped by dynamic micro-level day-by-day relationship processes, however, remains unclear. Investigating daily relationship dynamics (e.g., variability across days) might help to better understand the process leading to adolescent (mal)adjustment. Thus, this experience sampling study aimed at examining the dynamic associations between daily mother-adolescent relationship quality and adolescent adjustment. Mother-adolescent dyads (Dutch, N = 488) self-reported their relationship quality (i.e., support and negative interaction) and affect (i.e., positive and negative) for 5 consecutive days, 3 times per year across age 13-17 years (i.e., 75 assessments in total). Each year, adolescents also reported their psychopathology symptoms (anxiety and depression). A dynamic

structural equation model (DSEM) will be conducted to test (1) whether and how daily mother-adolescent relationship quality predicts adolescent positive and negative affect on the same and the next day at the within-dyad level. From DSEM, relationship quality dynamics (average level, variability, and stability across days) can be derived. Using path analysis, we will test (2) whether and how relationship quality dynamics predict adolescent average affect and psychopathology across years at the between-dyad level. We hypothesize that: (1) Day by day, increases in relationship quality will predict increases in positive affect and decreases in negative affect of adolescents; (2) Across years, less optimal relationship quality dynamics (lower average level, higher variability, and lower stability) will predict higher negative affect, lower positive affect, and greater psychopathology symptoms in adolescents. Implications for mother-adolescent daily relationships and interactions will be discussed.

Examining Stress and Support in Adolescents' Daily Lives: Feasibility and Usability of Triadic Paradigms

Martine **Verhees**, Nadja Bodner, Eva Ceulemans

How adolescents and their caregivers cope with the adolescent's stressors is relevant for child well-being. Therefore, it is important to chart what happens in adolescents' daily life, both from adolescents' and their caregivers' perspectives. Such studies are, however, not without their challenges. In the current pilot study we explored the feasibility of two different paradigms for assessing daily life stress and subsequent support experiences in early adolescence from the perspective of early adolescents (12-13y) and two of their caregivers (mother and father). Ten triads participated in an experience sampling study (ESM): adolescents and parents answered questions multiple times per day for 10 days, and 10 different triads participated in a daily diary study: participants answered questions one time per day for 14 days. Following the ESM/diary part of the study, children and their parents reviewed their experiences with the study concerning, among others, perceived burden. Feasibility and usability of the triadic ESM and diary paradigms will be discussed in terms of compliance, burden, number and type of reported stressors and subsequent support, as well as convergence in reports between family members. Preliminary results concerning feasibility suggest that individual compliance was sufficient (i.e., >50%) for almost all participants, albeit somewhat higher in the diary compared to the ESM study. However, triadic compliance (all family members answered questions at the same timepoint) was below 50% for four of the families participating in the ESM study. Participants in the diary study also perceived less burden compared to ESM participants.

14:30 Paper session 1: Combining physiological and self-reported ambulatory data

Chair: Denise van der Mee

Time: 14:30 - 16:00
Location: Grote Zaal (Main Theatre)

Investigating the relationship between daily states and hearing in everyday life with ecological momentary assessment

Giulia **Angonese**, Anna Maria Knapinska, Samira Saak, Birger Kollmeier, Andrea Hildebrandt

Increasing evidence suggests that hearing performance fluctuates from day-to-day and is associated to individual states like motivation, stress and affect. Ecological Momentary Assessment (EMA) techniques allow researchers to investigate such relationships in everyday life. We will present two EMA studies conducted with young and healthy participants. In the first study, N1=20 participants (12 f; M=27, SD=6 years of age) completed a two-weeks online longitudinal assessment on their personal mobile phones (sw: formr). The daily measurements occurred at random times within three time-periods (morning - lunchtime - evening) and they included the assessment of hearing performance and self-reports of perceived stress and affect. The second study aims at elaborating on previous findings by using objective measures of daily states (planned N2=20). Physiological arousal is detected through wearable sensors (MovisensXS) capturing continuous data on Heart-Rate Variability (HRV). HRV is an established indicator of autonomic regulation of emotional responses. Interactive experience sampling is used to assess daily hearing performance and self-reports of stress and affect during relevant emotional states, captured by supra-threshold variations in HRV. Next to event-sampling measurements, daily assessments at random time-points are included to sample neutral states, resembling the design of the first study. Systematic fluctuations of daily hearing performance depending on relevant emotional states are described, taking into account subjective reports and objective psychophysiological measures. Emotional valence specific coupling of hearing performance and affect will be discussed.

Stress physiology during awake time and sleep in adults with and without hearing impairment

Nicole **Huizinga**, Laura Keur-Huizinga, Wieke van Dijk, Sjors van de Ven, Adriana Zekveld, Sophia Kramer, Eco de Geus

Hearing impairment affects 466 million people worldwide and is projected to increase to 700 million by 2050. Increased listening effort, fatigue and stress are linked to hearing loss, which can impact work performance and quality of life. One mechanism that can account for the negative consequences of hearing loss is change in autonomic nervous system (ANS) regulation. Given the increased mental effort and subjective stress caused by listening, we predicted lower vagal tone and

higher sympathetic control during awake periods in hearing impaired (HI) compared to normal hearing (NH) participants.
Method: 78 participants (27 NH and 51 HI), aged 40-70 (mean age NH: 57; HI: 62), wore a validated stress monitor measuring ECG and ICG (www.vuams.nl) for two 24-hour periods. From these signals, we derived respiratory sinus arrhythmia (RSA), pre-ejection period (PEP) and root mean square of successive differences (RMSSD). After excluding fragments with physical activity based on accelerometry, averages for HR, PEP, RSA and RMSSD were computed. We used linear mixed models, controlled for age and sex, to compare HR and ANS activity (RSA, PEP, and RMSSD) between NH and HI participants during awake and sleep periods. Additionally, participants were prompted questions every 2 hours about listening effort and fatigue using the Ethica app.
Results: No group differences were found for HR, RMSSD and RSA. A modest interaction effect showed larger PEP reactivity from awake to sleep in HI compared to NH participants (p=.047). Averages of physiological parameters are shown in Fig. 1. Follow-up analyses will incorporate EMA during awake time, and contrast moments with low versus high listening effort and fatigue.

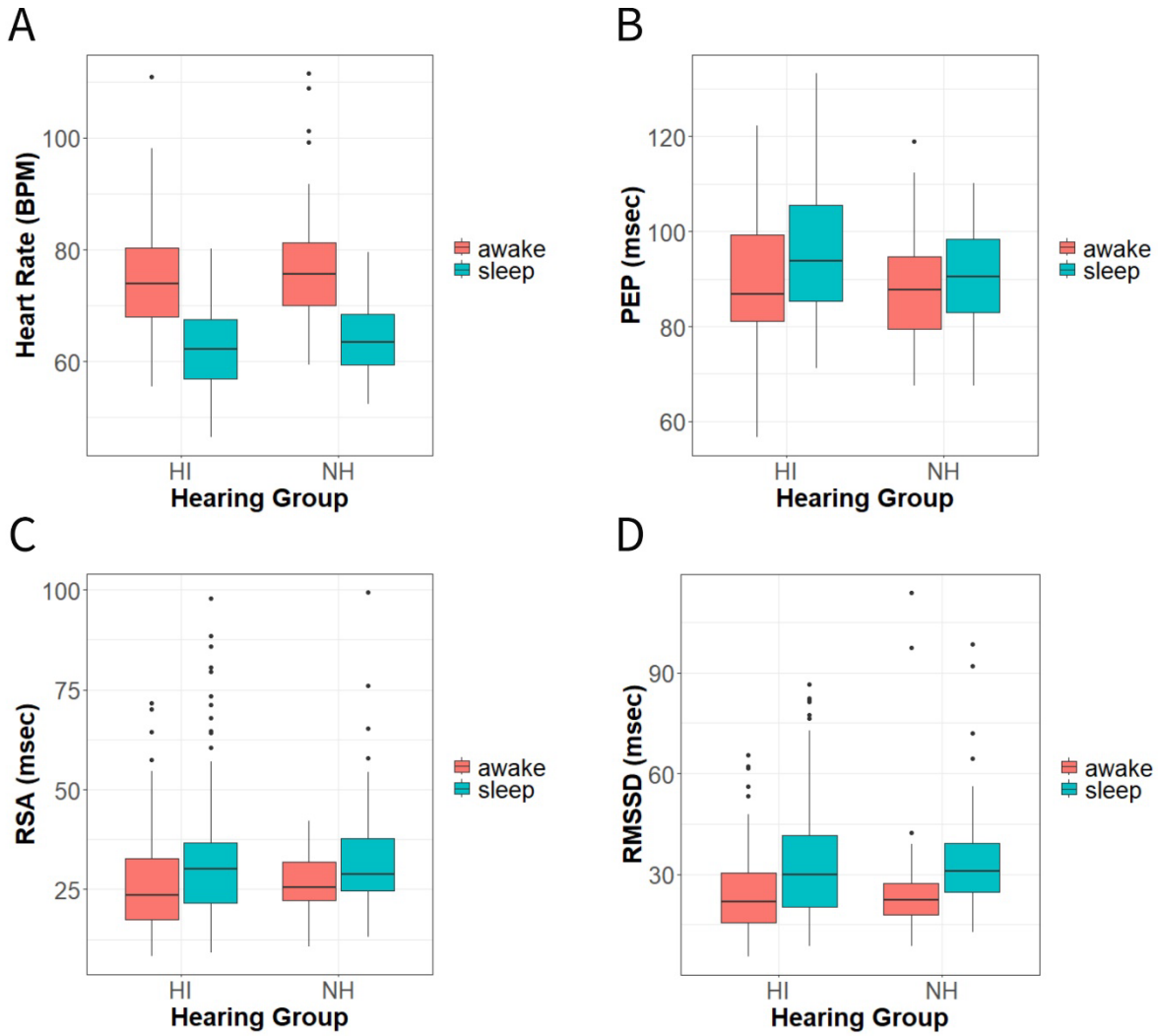


Fig. 1. Average values of A) heart rate (HR), B) pre-ejection period (PEP), C) respiratory sinus arrythmia (RSA) and D) root mean square of successive differences (RMSSD) during awake and sleep periods in normal hearing (NH) and hearing impaired (HI) participants.

Measuring long-lasting stress in real life: predictors of perceived stress and cortisol awakening response trajectories

Marina **Giglberger**, Hannah L. Peter, Gina-Isabelle Henze, Elisabeth Kraus, Christoph Bärtl, Julian Konzok, Sandra Zänkert, Ludwig Kreuzpointner, Peter Kirsch, Brigitte M. Kudielka, Stefan Wüst

The LawSTRESS project is a controlled prospective-longitudinal study on psychological, endocrine, central nervous and genetic predictors of responses to long-lasting academic stress in a homogenous cohort.
Law students from Bavarian universities (n = 452) have been studied over 13 months. Students assigned to the stress group (SG) prepared for their first state examination; students in the control group (CG) were in the mid-phase of their study program. Ambulatory assessments comprising frequent measurements of perceived stress and the cortisol awakening response (CAR) were administered at six sampling points starting 12 months prior exam. In a subsample of 124 participants, the fMRI

paradigm ScanSTRESS was applied additionally.
As predicted, a significant increase in perceived stress and a blunted CAR over time could be detected only in the SG. Remarkably, this long-term CAR effect was neither associated with the increase in perceived stress nor with anxiety, depression symptoms, test anxiety or chronic stress at baseline. However, neural acute stress responses at baseline were related to trait anxiety and a general distress factor. Moreover, it could be shown that stress induced activation changes in amygdala, hippocampus, and medial prefrontal cortex were significantly associated with the trajectory of perceived stress but not with the CAR in the SG.
Summing up, the LawSTRESS project successfully assessed multidimensional stress trajectories over 13 months, documented the significant burden, law students preparing for the first state examination are exposed to, and yielded first evidence for the usage of the described neural stress responses as stress vulnerability or resilience marker.

Cortisol activity in daily life and its associations with cognitive within- and between-person processes in recurrently depressed patients and healthy controls

Isabelle Florence **Schricker**, Sibel Nayman, Iris Reinhard, Christine Kuehner

Habitual cognitive processes such as repetitive negative thinking (RNT), but also momentary cognitions such as mindwandering could be vulnerability factors for Major Depressive Disorder (MDD). On the physiological level, cortisol represents an important biological stress marker of the hypothalamic-pituitary-adrenal (HPA) axis. Being a dynamic and non-invasive measure, saliva cortisol can be assessed in daily life via Ambulatory Assessment (AA). So far, consensus exists on a dysregulation of the HPA axis in MDD. However, findings are ambiguous and AA-studies examining both trait and state level effects of cognitions on momentary cortisol in recurrently depressed (rMDD) patients and healthy controls (HCs) are lacking. A sample of 119 (nrMDD=57, ncontrols=62) participants underwent a lab-session, including self-rated questionnaires (RNT, mindfulness) followed by a 5-day AA, where participants indicated the occurrence of mindwandering and levels of mentalshift problems ten times per day via smartphone, and collected saliva cortisol samples five times per day. Via multi-level models, we found habitual RNT, but not mindfulness, to predict higher overall cortisol in daily life, with the effects being stronger in rMDD patients. Momentary mindwandering and mentalshift problems predicted increased cortisol levels 20 min later across groups. Based on additional preliminary analyses, we estimated two MSEM mediation models and found that momentary cognitions did not mediate the effects of habitual RNT on cortisol in daily life. Our results suggest independent mechanisms of action for trait and state cognitions on cortisol activity in daily life and indicate a greater physiological vulnerability toward habitual maladaptive cognitions in rMDD patients.

Comparing the relationship of physiology with affect across laboratory and real-life settings.

Denise .J. **van der Mee**, Martin J. Gevonden, Joyce H.D.M. Westerink, Eco J.C. de Geus

The debate on the ecological validity of laboratory-induced stress as a representation of real-life stress reactivity is ongoing. While there have been many studies on the generalizability of individuals' tendency to respond with low or high stress reactivity in laboratory and real-life settings, the extent to which the affect-ANS coupling in the laboratory generalize to real life settings is understudied. In the current study this cross-domain relationship is directly compared between a laboratory and daily life setting. Data was collected from the same individuals in both settings using measures of ANS activity (inter-beat-interval (IBI), respiratory sinus arrythmia (RSA), pre-ejection-period (PEP), and non-specific skin conductance responses (ns.SCR)) and affect (nine questionnaire items differing in valence and arousal). Multilevel modeling was used to analyze the relationship between ANS and affective valence and arousal in both the laboratory and daily life. The average fixed regression coefficients from these models were compared between the two contexts using a Z-test. The results of this study show that it is possible to validly measure the affect-ANS dynamics in a laboratory setting. This allows for the development of emotion prediction algorithms in a controlled and low-burden laboratory setting with a large number of individuals, which offers researchers the opportunity to optimize their methods before applying them in a real-life setting.

14:30 Paper session 2: Stress in daily life: relevance of work and social context

Chair: Susan Scheibe

Time: 14:30 - 16:00
Location: IJ Zaal

Capturing context in experience-sampling studies on daily-life work stress: A taxonomy and impact benchmarks of daily affective work events

Susanne **Scheibe**, Antje Schmitt, Dannii Yeung

Research on daily-life stress using experience-sampling methods is flourishing. Yet, an unresolved challenge has been to capture the context of stress processes. We focused on the workplace setting and adopted the lens of affective events theory (Weiss & Cropanzano, 1996) to address this challenge. Our study’s goal was to develop a taxonomy and comprehensive measure of affective work events and provide benchmarks for their frequency and subjective impact. Another goal was to provide evidence for content validity and cross-cultural validity across gender, age, and blue- vs. white collar jobs. In Study 1, based on a literature search, we identified 684 events from empirical studies that cited Weiss and Cropanzano’s (1996) seminal chapter and assessed daily work events in working samples. Events were sorted into 32 categories and rephrased with the help of subject matter experts.

Study 2 was conducted to obtain employee frequency and impact ratings of the 32 event categories from employees in the USA (N = 1,145), Germany (N = 937), and China/Hong Kong (N = 1,246). We generated rank orderings of the work events by frequency and impact across the three countries and calculated mean differences for occupational and demographic subgroups. In Study 3, a 10-day diary study (N = 169, 1515 daily observations), we adapted the event checklist for the experience-sampling methodology and examined if the ranking replicates for this study design. Researchers can use our taxonomy to comprehensively capture context in daily-life work stress research and/or to select target events for more specialized research questions.

A genuine triadic measure for capturing stress transmission and synchronization in a family

Shiyao **Wang**, Chiara Carlier, Eva Ceulemans

How stress synchronizes and transmits within a family over time is an important research topic. To assess such synchronization and transmission processes, many statistical methods have been developed that boil down to computing association measures. Most of the measures are dyadic, which restricts the studies to synchronization and transmission between two family members, often mother and child. However, a family is a system, in which all members might influence each other. Hence, to get a more complete understanding of stress synchronization and transmission within a family, other family members should be taken into account, starting with the father. A few studies attempted to do this by computing dyadic associations between all three pairs (mother-father, mother-child, and father-child) and combining the obtained values (e.g., Bodner et al., 2018). However, it has been argued that a genuine triadic approach would yield novel insights. Our study will therefore look into triadic association measures and demonstrate which synchronization patterns are captured by which measure. We also propose a significance testing framework that accounts for serial dependence.

Parenting exhaustion and stress in daily life: A temporal network approach

M. Annelise **Blanchard**, Yorgo Hoebeke, & Alexandre Heeren

Many parents have days where they encounter emotional exhaustion, emotional distance from their children, and feeling fed up with being a parent. Some parents experience these characteristics to a severe extent—a clinical phenomenon termed parental burnout. Parental burnout arises when parents chronically endure severe stress without sufficient resources to cope, which may lead to detrimental consequences not only for the parent, but also for their partner and children. However, uncertainty persists about how these features interact and trigger one another over time (potentially becoming increasingly severe), nor how the daily variations of the family context influence these features. Therefore, in this study (preprint here: https://psyarxiv.com/aef27/), we recruited 50 unselected parents to

rate the core features of parental burnout and the family context daily over 56 days. We used multilevel vector autoregressive models to generate network models. Results suggest that exhaustion contributes to parental burnout: it self-predicts and is closely associated with feeling fed up and finding children difficult to manage. Contextual variables also interact with parental burnout features, illustrating the relevance of examining parenting within the family system context. If future research confirms a central role of exhaustion in parental burnout development, prevention efforts can focus on decreasing parental exhaustion. We are currently collecting data using the same methodology for parents in a severe state of parental burnout, and we plan to also present the preliminary findings from that cohort, to compare the daily experiences of parents from the general population with parents in burnout.

Applying measurement bursts to evaluate changes in within-person dynamics in psychological detachment: Findings from a randomized trial

Dorota **Reis**, Malte Friese

Psychological detachment is crucial for counterbalancing employees' dysfunctional reactions to job stressors, thereby maintaining employee well-being and health. Given its importance for critical work-related outcomes, interventions aiming at improving psychological detachment have been developed in recent years. These interventions mostly inform on overall changes from pre-to-post, but they do not provide insights into the underlying dynamic processes that may drive–or hamper–overall change.
Therefore, in the present study, we conducted a randomized control trial applying a measurement burst design. Across 23 weeks, the participants (N = 389) completed three ESM weeks (pre, post, and follow-up) and several single ESM days parallel to the intervention, resulting in overall 126 measurement occasions per person. We aimed to evaluate the intervention effects in terms of both mean-level changes and changes in variability (i.e., consistency). Therefore, we analyzed the data using multilevel path models and multilevel location-scale models.
We found that, on average, participants reported gains in detachment and decreases in rumination, negative activation, and perceived stress. Notably, individuals with higher levels of detachment also demonstrated a higher consistency in detachment, and variability within individuals decreased throughout the intervention.
Overall, by combining an intervention with a measurement burst design, the study provides unique insights into within-person processes and day-to-day changes that may accumulate into long-term changes in more stable detachment.

Teacher workload, stress, and social interactions: Key takeaways from two ESM studies in Finnish primary and secondary schools.

Patrik **Söderberg**, Anette Bengs, Daniel Ventus

The paper present findings from two ESM studies within project Reboot, a ÅAU research project that applies experience sampling methodology to the study of student and teacher wellbeing and social interactions. While traditional cross-

sectional self-reports of social interactions have been criticized for relying on autobiographical memories of past events (Pellegrini, 2001; Rollins et al., 2018; Gumpel et al., 2014), experience sampling measures have been suggested to address some of these concerns (Berkel et al., 2019; Mölsä et al., 2022).
In spring 2021, a sample of 202 primary and secondary school teachers in Finland completed a startup-session followed by an 8-day period of momentary assessments on workload, stress, and social interactions. Afterwards, user experiences were collected by means of interviews. In fall 2022, the study was replicated with another sample of 125 teachers for a two-week period (10 working days).
In spring 2022, both data sets are prepared and will be analyzed within a dynamic structural equation modelling (DSEM) framework, to explore within and between-level influences on teacher wellbeing. Findings are discussed in terms of intra- and interindividual processes in work-related stress experiences.

14:30 Paper session 3: Applications in Cancer and Covid-19

Chair: Turu Stadler

Time: 14:30 - 16:00
Location: Expo

The Use of Electronic Daily Intensive Longitudinal Methods among Adults with Breast or Lung Cancer: A Scoping Review

Joran **Geeraerts**, Kim de Nooijer, Lara Pivodic, Inez Myin-Germeys, Mark De Ridder, Lieve Van den Block

Background: The use of electronic daily intensive longitudinal methods to assess quality of life in the daily lives of oncology patients is gaining attention. However, a comprehensive overview on the use and capabilities of these methods in cancer care is currently lacking.
Aim: This review aimed to describe how often, in what manner and to which success electronic daily intensive longitudinal methods have been used among breast and lung cancer patients.
Design: Scoping review.
Data sources: Electronic databases (PubMed, Embase, PsycINFO) were searched up to April 2022. We included studies reporting on the use of electronic daily intensive longitudinal methods among adults with breast or lung cancer. Data was extracted on population and study characteristics, study findings, and implementation of the method in research and clinical practice.
Results: We identified 1140 articles and included 42, reporting on 34 studies. Few studies specifically examined advanced-stage disease patients. Study aims and designs varied widely, but mostly concerned physical symptoms, anxiety and depression. Within-person variability enabled examination of associations among constructs within individuals. Participation, compliance and attrition rates seemed

acceptable for most studies, although complete methodological reporting was often lacking. Factors influencing implementation were linked to both patient (e.g. confidence with system) and method factors (e.g. option to use personal devices). Conclusion: Electronic daily intensive longitudinal methods hold promise to provide unique insights into the daily lives of cancer patients. Although they appear feasible and acceptable in some patient populations, future research should focus on understanding the optimal conditions for intensive monitoring.

Daily Feelings of Gratitude are Related to Better Mental Health Outcomes in Breast Cancer Patients: A Daily Diary Study

Joanna **Tomczyk**, Izabela Krejtz, John B. Nezlek

Introduction: Gratitude is known to have beneficial effects on the well-being of various populations. The present diary study examined if daily feelings of gratitude would affect the daily functioning of women with breast cancer and if after a 2-week-long gratitude intervention they would function better than before it.
Methods: Participants were 62 women with breast cancer. Half of them were randomly assigned to the gratitude condition. All participants completed a 14-day diary that measured their daily gratitude, well-being, affect, and other aspects of daily functioning. The gratitude group took part in an intervention that involved wearing a smartwatch that asked them what they were grateful for, three times a day for 14 days. Before and after the study, participants completed a set of trait-level scales.
Results: Daily gratitude was positively correlated with all aspects of good daily functioning, and negatively with negative affect – in both study conditions. There were significant differences in daily perceived social support of women in the gratitude intervention and the control group.
Conclusion: We found that daily feelings of gratitude were associated with the good functioning of the patients in everyday life. Keeping a two-week diary that involved self- monitoring of one's mood and well-being led to better functioning after the study, compared to the initial levels. Yet, research into the effectiveness of gratitude interventions in this population should continue and we offer suggestions for future research. We believe this study contributes to the understanding of mechanisms behind a breast cancer patient's daily functioning.

Electronic monitoring of adherence to multiple medications - Patient experiences and preferences

Gertraud **Stadler**, Yaena Song

Tracking multiple medications poses a challenge for electronic medication monitoring. We present data from a study using an electronic pillbox with blood cancer patients after an allogeneic hematopoietic cell transplant who were prescribed a complex medication regimen. In this mixed methods study, we examined patient experiences of use and preferences.
Cancer patients after alloHCT (N = 33) received an electronic pillbox at first discharge from hospital and were followed for at least 180 days. Most patients (N = 28) were available for interviews about their experiences and preferences using the

electronic pillbox. Most patients used their pillbox immediately after discharge and continued using it beyond 180 days, with large variability in signal transmission rates. The average adherence score was 2.2, considerably lower than the prescribed dosing regimen. In the interviews, patients reported ease of use and benefits of the electronic pillbox, but also challenges and varying preferences regarding pillbox size and other design features. It is feasible to use an electronic pillbox for cancer patients taking multiple medications, although there is room for improvement in the pillbox design. Overall, patients had a positive experience using the electronic pillbox. A user-friendly device would have great potential for a multi-faceted, real-time intervention to facilitate adherence to multiple medication regimens.

Well-Being of Adolescents during the COVID-19 Pandemic: Ambulatory Assessment of Physical and Sport Activity, Social Contacts, and Screen Time

Anne **Eppinger Ruiz de Zarate**, Ansgar Thiel, Gorden Sudeck, Katja Dierkes, Jannika M. John, Andreas M. Nieß, Caterina Gawrilow

During the COVID-19 pandemic, implemented social distancing measures led to behavioral changes and decreased well-being in adolescents. The aim of this study was to examine the relation between daily behaviors that were affected by pandemic-related changes (i.e., physical and sport activity, social contacts, screen time) and adolescent well-being. For this, we conducted a 28-day ambulatory assessment study in Summer 2021. Daily data of 125 German adolescents (11-20 years) was collected every evening through self-report and analyzed with multilevel models. Between and within individuals, physical activity was positively, and screen time was negatively related to well-being. Social contacts were positively related to well-being within individuals only. Explorative analyses merely supported a positive effect of in-person social contacts on well-being but not digital social contacts, and revealed differences between the contexts in which sport activity took place (sports club, leisure time, school). Our findings suggest that physical activity and in-person social contacts are positively related to adolescent well-being and should, thus, be enabled during the pandemic. Further, the negative role of screen time should be considered in health promotion.

Alcohol consumption patterns in the aftermath of COVID-19

Dominic **Reichert**, Friederike Deeken, Hilmar Zech, Andreas Heinz, Michael A. Rapp, Ulrich W. Ebner-Priemer, Markus Reichert

Background: Alcohol use is among the leading causes of death and disability worldwide and is a causal factor in many diseases. Here we aimed to investigate influences of COVID-19 lockdown measures on alcohol consumption (AC), to research within-person predictors of AC, and to study real-life insights into temporal patterns of AC.
Methods: In a large quantitative, intensive-longitudinal multicenter cohort study (German Collaborative-Research-Center TRR 265), we used Ecological Momentary Assessment data (EMA; overall compliance rate of 88.39%) to examine daily ratings

of AC (main outcome) across a 1-year period per participant. In our multi-level models, we introduced subject specific behavioral predictors (intention to limit drinking, social isolation), general temporal patterns (weekends and holidays) and two lockdown phases (emergency break and light lockdown), and between-subject covariates (AUD criteria, sex, age).
Results: 347 participants (average age of 34; 16 to 64 years; 37% female) showed higher AC [grams alcohol per day] at weekend-days versus weekdays (ß = 8.68; p < .001). Intention to drink less alcohol predicted lower AC (ß = -10.75; p < .001) and AC was slightly heightened during emergency break (ß = 2.90; p = .040).
Conclusions and Relevance: Our EMA-study within a large AUD patient cohort and a novel real-life intensive longitudinal data assessment across a 1-year period fully replicated findings initially revealed by Deeken et al. (2022), therewith providing robust real-life evidence describing temporal and behavioral AC patterns and strengthening the case for explicit goal setting and targeting temporal patterns as a tractable strategy in AUD therapy.

How the Outbreak of War in Ukraine Impaired Psychological Well-Being Across Nations – Insights from the CoCo Project

Julian **Scharbert**, Sarah Humberg, Lara Kroencke, Thomas Reiter, Sophia Sakel, Julian ter Horst, Katharina Geukes, Maarten van Zalk, Markus Bühner, Mitja Back

The Russian invasion of Ukraine on February 24, 2022, has had devastating effects on the Ukrainian population and the global economy, environment, and political order. However, little is known about the war's global psychological impact, that is, its effect on the mental well-being of individuals outside Ukraine. Here, we present an international (17 countries), longitudinal ESM study (N = 1,341; total assessments = 44,894) conducted during the months surrounding the outbreak of war that allowed us to investigate its psychological effects and individual differences in stress responses to it. We start by providing some background to the international ESM study, which was part of the global "Coping with Corona" (CoCo) project. Then, we present our analyses regarding the psychological impact of the outbreak of war in Ukraine: Our results demonstrate that the humanitarian, economic, and ecological consequences of the Russian invasion extend to a harmful psychological impact beyond the borders of Ukraine. Importantly, we found systematic differences in well-being trajectories over the weeks following the Russian invasion, as recovery in well-being depended on an individual's personality. We end by providing an outlook on how we have broadened the scope of the CoCo project in the wake of the outbreak of war and concurrent societal crises (e.g., inflation, climate change, energy crisis) and how we are now incorporating mobile sensing and social network assessments to improve our understanding of mental stress and well-being during times of crises.

14:30 Paper session 4: Applications in interpersonal dynamics and social support

Chair: Caroline Zygar-Hoffmann

Time: 14:30 - 16:00
Location: Studio

In the Mood: How Sexual Desire is Predicted by Romantic Partners' Emotional States

Liesse **Frérart**, Claudia De Roovere, Laura Sels, Eva Ceulemans, Erick Janssen, Peter Kuppens

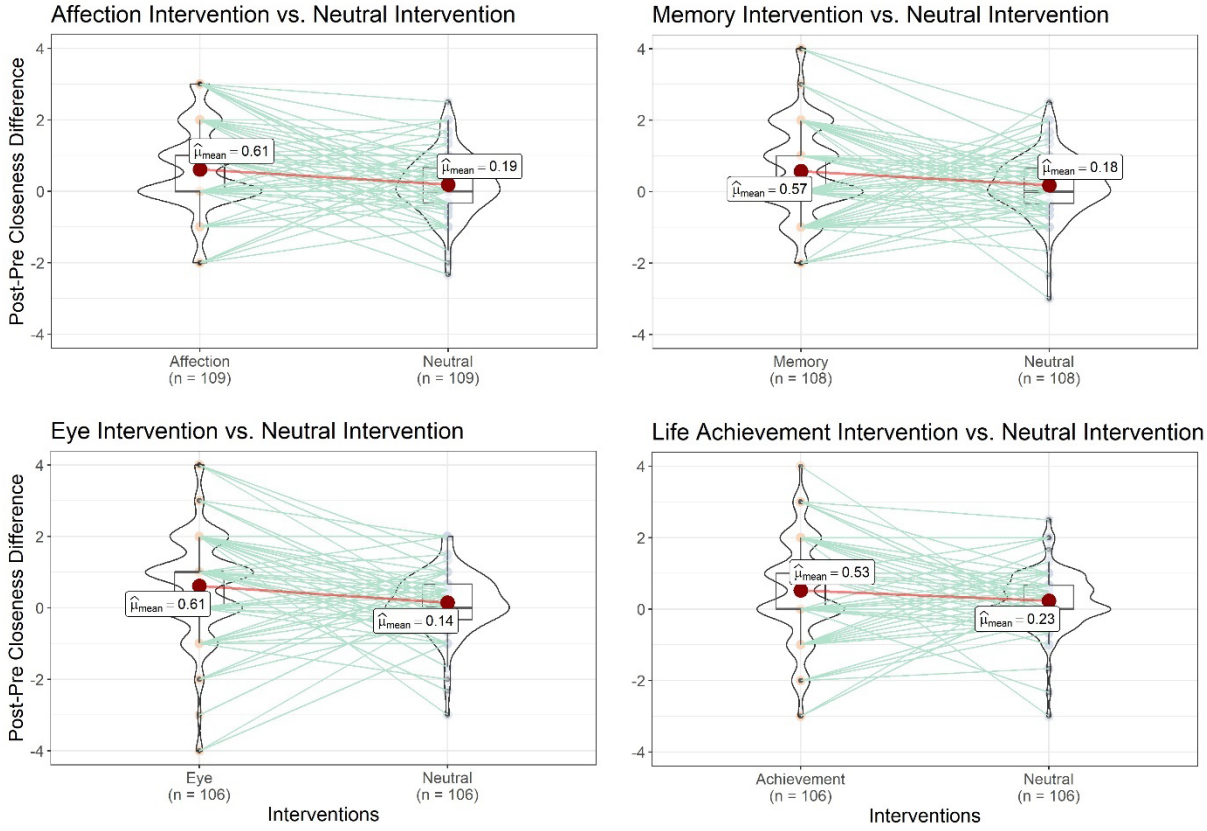
The relation between mood and sexual desire has been the object of significant scientific and public interest. How mood shapes and is shaped by sexual desire is typically studied within one and the same individual, yet sexual desire typically takes place in the context of a relationship between people. To obtain a complete picture of the relation between mood and sexual desire, we therefore examined the (temporal) interplay between mood and sexual desire both within and between partners in a romantic relationship. Specifically, using data from an experience sampling study of both partners of 94 heterosexual romantic couples (N = 188), we investigated how one partner's mood (in terms of positive and negative affect) predicts their own sexual desire as well as that of their partner, and vice versa. Results of both concurrent and temporal analysis confirmed bidirectional relations between mood and sexual desire both within and between partners, such that (1) both a person's own and their partner's positive mood predicted an increase in sexual desire, and a person's own and their partner's negative mood predicted a decrease in sexual desire. Inversely, (2) both a person's own and their partner's sexual desire predicted an increase in positive mood, and a person's own and their partner's sexual desire predicted a decrease in negative mood.

Using Ecological Momentary Interventions To Elicit Momentary Feelings of Closeness To One's Relationship Partner

Caroline **Zygar-Hoffmann**, Lara Cristoforo, Lisa Wolf, Felix D. Schönbrodt

Relationship closeness is considered important for relationship satisfaction and is often claimed to act as a buffer against various stressors. This talk reports on a study in which four micro-interventions were examined for their ability to experimentally elicit feelings of closeness with one's relationship partner. Using a combination of experience sampling, event sampling and ecological momentary interventions, individuals reported their experiences of closeness (assessed with the IOS) for one week before and after completing either a neutral task or a task meant to enhance relationship closeness each day (sample size ranges between 106 and 109, depending on the task). The closeness tasks included showing physical affection, sharing a childhood memory, looking each other in the eyes for five minutes, and discussing shared life achievements, whereas the neutral tasks consisted of sharing media with an acquaintance. Confirmatory, preregistered intention-to-treat analyses on a within-person level showed that, on average,

closeness increased more on days when one of the four studied closeness tasks was performed than on days when the neutral tasks were performed. Exploratory analyses showed considerable interindividual variability, as well as declining effect sizes across time within the day. The attached figure illustrates the mean differences as well as the variability. The evaluated interventions can be used for research on causal effects of (short-term) closeness in everyday relationship life, and provide an evidence base for smartphone-based interventions for instance in counseling settings. Open data and materials for the study are available (osf.io/agchm).



Investigating the joint association of outdoor and social contexts on movement behaviors: A cross-country ecological momentary assessment study

Chih-Hsiang, C-H. Y., **Yang**, Abhishek, A. A., Aggarwal, Shang-Ti, S-T. C., Chen, Mengya, M. X., Xia

Ecological momentary assessment (EMA) has been used to identify the impact of social and environmental contexts on movement behaviors. However, few EMA studies to date focused on the interface of multiple contexts. This study combined two EMA studies collected among college students in US and Taiwan (TW) to fill this research gap. College students in each country responded to up to 6 EMA surveys across 7 or 14 days during waking time. For each EMA survey, they reported if they were sitting, standing, or moving, staying outdoors or indoors, and alone or with someone. A total of 6,072 momentary EMA surveys from 279 participants (US=118; TW=161) were analyzed. Compared to staying indoors and alone, participants were

more likely to report movements with higher energy expenditure if they were outdoors and not alone (p<.001), indoor and not alone (p<.01), or outdoor and not alone(p<.001). They were more likely to report moving than sitting if they were staying outdoors, regardless of being alone or not (ps<.001). However, US students were more likely to report movement behaviors with higher energy expenditure, as well as moving than sitting at any EMA survey (ps<.001). These models adjusted for participants' sex, age, and BMI.This cross-country EMA study suggested that outdoor context may be more evident than being alone or not in promoting proximal physical activity. Future EMA studies are encouraged to capture various contextual items to study the diversity and the joint effects of social and environmental factors for promoting active lifestyles.

Does the Relationship between Affect and Social Interactions among Adults Experiencing Homelessness Differ during Moments when at a Shelter versus Not?

Jamie M. **Gajos**, Jason A. Oliver, Emily T. Hébert, Scott T. Walters, & Michael S. Businelle

Background: The prevalence of alcohol use disorders is higher amongst adults experiencing homelessness (AEH) compared with domiciled adults. Greater exposure to heavy drinkers increases personal risk for heavy alcohol use. AEH spend substantial periods of time at shelters and report greater pressure to use alcohol when near shelter locations, as well as greater negative affect when near a shelter. It is unclear if the relationship between affect and 1) interacting with people and 2) being near someone AEH drank alcohol with before differs when AEH are at a shelter versus not.
Methods: AEH reporting alcohol misuse (n = 72) completed five daily smartphone-based ecological momentary assessments (EMAs) over 28 days, using the InsightTM mHealth platform. Generalized multilevel modeling examined whether the association between negative and positive affect and social interactions varied during moments when AEH were at a shelter versus not.
Results: Respondents (Mage= 48, 85% Male, 69% Non-White) reported being at a shelter approximately 42% of the time, interacting with people nearly half the time (49%), and being near someone they drank with before one third of the time (30%). When AEH were interacting with someone they drank with before, they had significantly lower positive affect when at a shelter (b = -0.17, p < 0.05), versus when not (b = 0.00, p = 0.94).
Conclusion: AEH are likely to interact with previous drinking partners while at shelters. It may be important to deliver real-time treatment messages targeting affect in these moments, as well as deliver alcohol reduction/abstinence messages.

Table 1: Association between Momentary Affect, Social Interactions, and Shelter Location

	Negative affect	Positive affect
Interacting with people		
Fixed effects	*b* (*SE*)	*b* (*SE*)
Intercept	**1.86** (0.41)**	**2.32** (0.37)**
Social item (prompt-level)	**-0.07** (0.03)**	**0.12** (0.03)**
Shelter (prompt-level)	**0.15** (0.03)**	**-0.11** (0.05)**
Social item X Shelter (prompt-level)	-0.04 (0.06)	-0.08 (0.07)
Social item (person-level)	0.14 (0.31)	0.15 (0.29)
Shelter (person-level)	**0.80** (0.37)**	-0.48 (0.35)
Random effects	Est. (*SE*)	Est. (*SE*)
Variance (intercept)	**0.51** (0.09)**	**0.45** (0.08)**
Variance (social item slope)	**0.03** (0.01)**	**0.02** (0.01)**
Variance (shelter slope)	**0.04** (0.01)**	**0.14** (0.04)**
Covariance (intercept, social item slope)	-0.05 (0.02)	-0.03 (0.02)
Covariance (intercept, shelter slope)	0.01 (0.03)	-0.08 (0.04)
Covariance (social item slope, shelter slope)	-0.01 (0.01)	-0.01 (0.01)
Near someone AEH drank with before		
Fixed effects	*b* (*SE*)	*b* (*SE*)
Intercept	**1.84** (0.38)**	**2.53** (0.31)**
Social item (prompt-level)	0.03 (0.04)	0.00 (0.03)
Shelter (prompt-level)	**0.15** (0.03)**	**-0.12** (0.05)**
Social item X Shelter (prompt-level)	-0.01 (0.08)	**-0.18** (0.08)**
Social item (person-level)	**1.16** (0.25)**	**-0.80** (0.24)**
Shelter (person-level)	**0.80** (0.32)**	-0.31 (0.29)
Random effects	Est. (*SE*)	Est. (*SE*)
Variance (intercept)	**0.39** (0.07)**	**0.41** (0.08)**
Variance (social item slope)	**0.04** (0.01)**	**0.03** (0.01)**
Variance (shelter slope)	**0.04** (0.01)**	**0.15** (0.04)**
Covariance (intercept, social item slope)	-0.03 (0.02)	**-0.08** (0.03)**
Covariance (intercept, shelter slope)	0.01 (0.02)	**-0.11** (0.04)**
Covariance (social item slope, shelter slope)	-0.00 (0.01)	0.00 (0.01)

Note: Models control for gender, race, age. $^{**}p \leq 0.01$; $^{*}p \leq 0.05$, Significant findings are presented in bold.

The power of one-sided relationship: Mitigating loneliness through parasocial relationships with real and virtual figures

Tasuku **Igarashi**, Takuya Yoshida, Taro Hirashima, Haruhiko Mitsunaga

In modern society, tackling loneliness is a pivotal and challenging issue to solve with priority. One clue for the challenge is that loneliness is conceptualized as a cognitive discrepancy between one's current and ideal social situations. We examined whether people alleviate loneliness by employing parasocial relationships (imaginary social relationships) with real (e.g., celebrities/athletes) and virtual (e.g., fictional characters) figures to achieve ideal psychological outcomes in social contexts. We collected intensive longitudinal data from 502 crowdsourcing workers in Japan for two weeks (four times per day) using an experience sampling (ES) method on

smartphones. We measured trait loneliness and depression before and after the ES and state loneliness, daily activities, and subjective evaluations of the activities during the ES. Daily activities involved solitary activities (baseline), face-to-face/computer-mediated interactions with others, thinking about real others, and thinking about parasocial relationships. The dataset included about 26000 responses (response rate = 93%). We used two-part residual dynamic structural equation modeling (RDSEM) for analysis. Trait loneliness after the ES was significantly related to state loneliness during the ES under controlling depression. Compared to the baseline, the experience of face-to-face/computer-mediated interactions decreased state loneliness directly. Notably, thinking about parasocial relationships decreased state loneliness through the evaluations of the experience as positive, ideal, and cathartic. In contrast, thinking about real others increased state loneliness via the interpretations of the experience as habituated and self- and past-related. The findings imply that humans' imaginative capacity to envision ideal social connections can significantly mitigate loneliness.

Misremembering Solitude? Self-Concepts Distort Retrospective Reports of Daily Solitude-Affect Associations

Jennifer C **Lay**, Yuen Wan Ho, Da Jiang, Jimmy T K Tse, Iris H L Ip, Dwight C K Tse

Affect recall is key to psychological assessment and everyday decision-making. However, self-concepts (e.g., extraversion or independent self-construal) may bias retrospective affect reports such that they deviate from daily lived experiences. Does this experience-memory gap also apply to common experiences of solitude – time spent with no in-person or virtual social contact? UK university students (N = 104; 81.7% female; 78.9% White, 10.6% Asian, 10.6% other/mixed ethnicity) living under pandemic lockdown completed daily time-use diaries and reports of affective states and social context over 14 days. Afterwards, participants recalled how their affect fluctuated depending on the amount and type of social contact they had each day. Regression models controlling for daily solitude-affect slopes showed that individuals higher in introversion retrospectively reported feeling less stressed on days when they spent more time in solitude. Similarly, those higher in self-determined (intrinsic) motivation for solitude recalled feeling less activated (energised, stressed) on high-solitude days. Individuals with higher independent self-construal recalled feeling less lonely on high-solitude days. Findings suggest that self-concepts may fill gaps in memory of how solitude shapes our affective experiences. We show further how cultural self-concepts (e.g., independent self-construal) shape solitude-seeking and affective memory. We will also discuss findings from an ongoing follow-up study of UK students (N = 66+) examining the experience-memory gap for solitude experiences (affective states) using 5 momentary assessments per day over 7 days. This study builds on our daily level design by using concurrent assessments and examines longer-term wellbeing implications of (in)accurate affect recall.

16:00 Tea break / Sponsor exhibition

Time: 16:00 - 16:15
Location: Sponsor stand / Foyer

16:15 Symposium 9: Ecological Momentary Interventions - Adapting intervention components to individuals' living environments

Chair: Ulrich Reininghaus

Recent years have seen rapid advances in mobile health assessment and intervention techniques. Ecological momentary assessment (EMA) and interventions (EMIs) use cutting-edge digital technology to facilitate interactive sampling in real-time. EMIs allow for individualized treatments integrated into daily life and target transdiagnostic mechanisms in individuals' living environments based on EMA data, thereby lowering barriers to care and allowing for ecological translation of prevention and intervention strategies.
In this symposium, we will present four innovative applications of EMIs and discuss future directions, e.g. ways to further personalize and improve intervention components. First, Anita Schick, will present findings from an exploratory randomized controlled trial (RCT) of a hybrid self-compassion EMI evaluated in a youths with current distress, broad at-risk mental state or first episode of severe mental disorder. Second, Mary Rose Postma, will report results of a RCT on a hybrid self-esteem EMI in youth exposed to childhood adversity. Third, Rafael Bonnier, will explore characteristics of individuals in the early stages of psychosis that benefited more or less from an Acceptance and Commitment Therapy in Daily-Life. Finally, Janik Fechtelpeter, will present a study where EMI components are allocated based on a learning algorithm in a micro-randomized controlled trial design.

Time: 16:15 - 17:15
Location: Grote Zaal (Main Theatre)

Effects of a novel, transdiagnostic ecological momentary intervention for prevention and early intervention of severe mental disorder in youth (EMIcompass)

Anita **Schick**, Isabell Paetzold, Christian Rauschenberg, Dusan Hirjak, Tobias Banaschewski, Andreas Meyer-Lindenberg, Jan R. Boehnke, Benjamin Boecking, Ulrich Reininghaus

Background/Hypothesis: Digital interventions targeting transdiagnostic mechanisms in daily life may be a promising translational strategy for prevention and early

intervention of psychotic and other severe mental disorders. We aimed to investigate the feasibility and initial signals of efficacy of a transdiagnostic, compassion-focused, hybrid ecological momentary intervention for improving resilience (i.e., EMIcompass) in youth with early mental health problems.
Study Design: In an exploratory, assessor-blind randomized controlled trial, youth aged 14-25 with current distress, broad at-risk mental state or first episode of severe mental disorder were randomly allocated to experimental (EMIcompass+treatment as usual (TAU)) or control condition (TAU). Data on primary (stress reactivity) and secondary candidate mechanisms as well as candidate primary (psychological distress) and secondary outcomes were collected.
Study Results: Criteria for feasibility of trial methodology and intervention delivery were met (n=92 randomised participants). No serious adverse events were observed. Initial outcome signals were evident for reduced momentary stress reactivity, aberrant salience as well as enhanced momentary resilience and quality of life across post-intervention and 4-week follow-up. No outcome signals were observed for self-reported psychological distress, but there was suggestive evidence on reduced observer-rated symptoms at 4-week follow-up.
Conclusions: Our findings provide evidence on feasibility and initial signals that EMIcompass may reduce stress reactivity and improve quality of life. A definitive trial is now warranted.

The SELFIE-trial: a Transdiagnostic Self-esteem Ecological Momentary Intervention in Youth exposed to childhood adversity

Maud Daemen, Mary Rose **Postma**, Ramon Lindauer, Iris Hoes - van der Meulen, Dorien Nieman, Philippe Delespaul, Josefien J.F. Breedvelt, Mark van der Gaag, Wolfgang Viechtbauer, Koen Schruers, David van den Berg, Claudi Bockting, Therese van Amelsvoort, Ulrich Reininghaus

Aims: SELFIE is an Ecological Momentary Intervention (EMI) in which the Experience Sampling Method (ESM) is a basis for tailoring the intervention to specific needs of the individual, at moments when it is needed most. The intervention targets low self-esteem in youth exposed to childhood adversity, which is a promising strategy to minimize the deleterious impact of childhood adversity. The aim of the SELFIE-project is to test the efficacy of this EMI.
Methods: In a randomized controlled trial, youth aged 12-25 with prior exposure to childhood adversity, were randomly allocated to the experimental (6-week SELFIE-intervention in addition to treatment as usual, TAU) or to the control condition (TAU only). Data is collected pre- and post-intervention and at 6-, 18- and 24-month follow-up.
Individuals allocated to the experimental condition received the SELFIE intervention which is administered through a smartphone-based PsyMate® App to allow for personalized, interactive, real-time and real-world transfer of intervention components in individuals' daily lives. Guidance is offered through three sessions with a trained therapist and e-mail contact.
Results and conclusion: To our knowledge, this is the first EMI focusing on improving self-esteem transdiagnostically in youth exposed to childhood adversity. The potential effects of this study can help to minimize the deleterious impact of

childhood trauma by improving self-esteem, and thereby, preventing the development of adult mental disorders. Data is currently being analyzed, and we expect to be able to present preliminary results at the SAA conference 2023.

The association of personality and childhood trauma with clinical outcomes in a randomized controlled trial of Acceptance and Commitment Therapy in Daily-Life (ACT-DL)

Rafaël **Bonnier**, Inez Myers-Gemys., Ginette Lafit, Glenn K., Evelyne VA., Frederick S., Lieuwe dH., Thomas V., Ulrich Reininghaus

Aims
This study aims to determine which individuals might benefit more or less from using ACT-DL (Vaessen et al., 2019) as a treatment for early psychosis. To this end, we will investigate whether demographics like age, gender and education level, personality traits neuroticism and extraversion and childhood trauma moderate the effect of ACT-DL on psychotic distress negative symptoms, global functioning (clinical outcomes) and psychological flexibility (process outcome) over time in Ultra-High-Risk and First Episode Psychosis individuals. Addressing these questions will help guide future clinical implementation of ACT-DL in psychiatric care.
Methods
In a randomized controlled trial (1), participants in the early stages of psychosis received ACT-DL intervention in addition to standard psychiatric care. ACT-DL consisted of eight manualized ACT sessions (45–60 min), administered face-to-face by a trained clinician and the ACT-DL app, an ecological momentary intervention (EMI), to aid in applying the learned skills in their daily lives. We will expand on the results found in Myin-Germeys et al.'s paper(2) and use multivariate-multilevel models to examine if subgroups of participants within the experimental condition (n=71) might improve more, less or even worsen on outcomes like psychotic distress, negative symptoms and social functioning. Data was collected pre- and post-intervention and at 6 and 12 month follow-up.
Preliminary results
Person characteristics gender, level of extraversion, level neuroticism and education affect the efficacy of the ACT-DL intervention on improving negative symptoms, positive symptoms and social functioning. The level of psychological flexibility is not affected by any of the studied person characteristics.

Living Lab AI4U - Artificial Intelligence for Personalized Digital Mental Health Promotion in Youth

Janik JF **Fechtelpeter***, Christian CR Rauschenberg*, Selina SH Hiller, Christian CG Goetzl, Silvia SK Krumm, Daniel DD Durstewitz, Ulrich UR Reininghaus**, Georgia GK Koppe**
*contributed as joint first authors
*contributed as joint last authors

While young people are often affected by mental health problems, their use of preventive interventions remains limited. Given their affinity towards smartphone applications (apps), apps which assess proxies of mental health and administer interventions designed to improve mental health in daily life could provide a useful prevention strategy for this group. Moreover, by integrating AI based prediction tools into these apps, this strategy could be further personalized and successfully tailored to the individual user.
Following exactly this approach, at the AI4U living lab we integrate a novel AI algorithm into a smartphone application which collects ecological momentary assessments (EMA) on a user's mental health and administers ecological momentary interventions (EMI) for mental health promotion. The AI algorithm is trained on the user's joint EMA, EMI, and sensor data, and is then applied to simulate future EMI effects. Based on this simulation, the algorithm then probabilistically selects the EMI it deems most effective for a given individual.
We use a training scheme capable of dealing with missing values and irregular sampling. The algorithm's ahead-prediction performance is compared to linear moving average models, while the impact of algorithmically informed versus random EMI allocation on mental well-being is evaluated in consecutive ongoing micro-randomized controlled trials (MRT).
Initial evidence suggests that the algorithm outperforms simpler comparison methods in ahead prediction. This implicates a strong need to employ nonlinear models for EMA prediction, and to make model training resilient to variable data quality. Currently, an improved version of the algorithm is deployed in the second MRT.

16:15 Symposium 10: Addressing challenges with the implementation of Open Science practices in Clinical ESM research

Chair: Olivia J. Kirtley

The use of experience sampling methods (ESM) in clinical psychology research is burgeoning. To determine the credibility we afford clinical psychology research, the quality of the methods used to generate evidence is key. Open science practices (OSPs) have been posited as approaches that can advance credibility in research. Whilst increasing numbers of researchers are using OSPs, implementation of these practices in clinical ESM research remains uncommon. Learning and implementing open science practices is challenging, which creates barriers for researchers wishing to use these approaches in their clinical ESM studies. In this set of talks we will discuss real-world examples of how we can overcome challenges of implementing open science practices in clinical ESM research to boost transparency, reproducibility, and replicability. First, Julie Janssens (KU Leuven, Belgium) will discuss the challenges of using Registered Reports with pre-existing ESM data to investigate self-harm in adolescents. Second, Jonas Dora (University of Washington, USA) tackles barriers to data sharing and preregistration in substance use research.

Third, Olivia Kirtley (KU Leuven, Belgium) will talk about the challenges of determining the quality of open ESM items in the context of the ESM Item Repository. Finally, Cassandra Brandes (Northwestern University, USA) will discuss how ESM researchers can use techniques from clinical psychology to foster open science behaviour change. The symposium will end with an 'open science clinic' for clinical ESM researchers in the audience to describe challenges they have encountered and to receive support from the speakers.

Time: 16:15 - 17:15
Location: IJ Zaal

Using pre-existing Experience Sampling Method data when implementing Open Science practices: Challenges and opportunities

Julie J. **Janssens**, Ginette Lafit, Olivia J. Kirtley

There is a huge amount of existing Experience Sampling Method (ESM) data, and this will continue to grow as the popularity of ESM increases. In ESM research, and especially longitudinal ESM studies, data are often collected with multiple primary research questions in mind, and many possibilities for researchers to conduct secondary data analysis. Many open science practices, such as pre-registration and Registered Reports, are geared towards researchers working with data that do not yet exist, potentially leaving researchers who work with pre-existing ESM data feeling that such open science practices are not for them. Whilst there are unique challenges to implementing open science practices in studies using pre-existing ESM data, these are not insurmountable. In this presentation, I will offer an early career researcher's perspective on post-registrations and Registered Reports using pre-existing ESM data and provide potential solutions to some common challenges, including power analyses and data-dependent decision-making. Both advantages and disadvantages of using pre-existing data in ESM studies when implementing open science practices for both exploratory and confirmatory testing will be highlighted. I will also discuss steps that can be taken to limit data access and increase transparency about data knowledge in (post-)registrations using a template or tutorial. In addition, I will explain how to approach power analysis with pre-existing data (i.e., sensitivity power analysis) and describe one example of a data check-out system that can facilitate transparency in ESM studies using pre-existing data.

Open Science lessons for accelerating ESM research from a NIDA-funded study on alcohol and marijuana use

Jonas **Dora**

The past decade taught us that the scientific literature in psychology is severely biased. Biased research not only wastes limited resources (time, effort, money) but ultimately can impede progress and lead to the application of interventions that are ineffective or potentially even harmful. The extent to which ESM research is biased is unknown, partially due to extensive replication work being unfeasible. I argue that this makes it even more important that we engage in best practices in our ESM work

to ensure that our studies are highly credible. For example, as ESM researchers focusing on addiction, we have a responsibility towards patients to improve the prevention and treatment of substance use disorders over time. In this talk I will focus on my experiences with a NIDA-funded study of alcohol and marijuana use to outline how we as ESM researchers can use tools and principles from Open Science (preregistration; sharing of data, code, and materials; large-scale Team Science collaboration) to increase the credibility and trustworthiness of our ESM studies. I will present an ESM Open Science research workflow that we have developed in our lab over the last years. I will discuss concrete challenges I have encountered developing this workflow, how I solved some of them successfully, and what failures taught me for my work moving forward. I hope to convince you in this talk that incorporating Open Science into your ESM workflow is feasible and worthwhile.

Determining the quality of open experience sampling method (ESM) items within the ESM Item Repository

Olivia J. **Kirtley**, Anu P. Hiekkaranta, Yoram K. Kunkels, Inez Myin-Germeys, Gudrun Eisele

Knowing which items have been used to assess constructs of interest in experience sampling method (ESM) studies and whether they are psychometrically valid is important for evaluating the evidential value of a particular study, and for research transparency and replicability. This may be especially important in the clinical ESM area, where ESM items may be used to develop predictive models of risk for certain clinical phenomena and, eventually, to inform treatment decisions. The ESM Item Repository is an open science initiative to increase transparency and replicability in ESM research by facilitating sharing of ESM items in a public repository. Whilst ensuring items are findable increases transparency and the potential to replicate studies, determining the quality and validity of ESM items remains a practical challenge. Currently, we do not have a gold-standard for ESM item quality or a set of agreed, standardised practices for evaluating the psychometric properties of ESM items. To begin to address these knowledge-gaps, the ESM Item Repository team conducted a preregistered, four-stage Delphi study to develop a quality assessment tool for ESM items, with N=23 experts participating in all four rounds. The Delphi process resulted in a core set of 10 criteria and 15 supplementary criteria that could be used to assess the quality of ESM items. These criteria can be used by researchers to inform their decisions about which items to use in their studies and to help researchers evaluate the measurement quality of existing ESM studies.

Enhancing scientific reform using clinical intervention principles

Cassandra M. **Brandes**, Christopher J. Hopwood, Aleksandra Kaurin, Kevin M. King, A. Solomon Kurz, P. Priscilla Lui, Shirley B. Wang, Rowan A. Hunt, Olivia J. Kirtley, Jennifer L. Tackett

Open science tools have great promise for advancing transparency and replicability in psychological science. However, these methods remain underutilized in several subfields of psychology despite large-scale efforts to reform scientific practices.

This uptake has been particularly slow in areas such as clinical psychology and among research using resource-intensive collection methods. In this project, we consider potential contributors to this spotty implementation and offer suggestions for addressing them. We argue that all scientific reform efforts are, themselves, behavioral modifications, and as with other interventions (e.g., therapy), education alone is often insufficient for affecting change. Because of its extensive focus on best practices in behavioral intervention, we maintain that lessons from clinical psychological research could greatly enhance scientific reform efforts. Drawing from metascientific studies, our observations, and the clinical intervention literature, we discuss how scientists' ambivalence to changing their methods may reflect both structural barriers within the academy and suboptimal communication strategies by methodologists. Finally, we offer a list of concrete recommendations for addressing these challenges based in clinical intervention science, focusing on the task of increasing open science utilization in ambulatory assessment research.

16:15 Symposium 11: Substance use in daily life: From measurement to intervention

Chair: Andrea M. Wycoff

The papers in this symposium focus on using ambulatory assessment methods to better measure, understand, and intervene on substance use as it unfolds naturally in individuals' daily lives. Substance use is associated with considerable negative health outcomes yet remains highly prevalent. Better understanding substance use patterns, correlates, and intervention windows will help improve efforts to reduce problematic use. Given its unique ability to capture complex and dynamic processes over time, ambulatory assessment is particularly well-suited to study substance use. Exemplifying this, Dr. Janssen will present data highlighting complexities related to polysubstance use including alcohol, tobacco, and cannabis, and clarifying measurement considerations related to modeling polysubstance use phenomena. To understand another aspect of polysubstance use, Dr. Wycoff will present data examining how using cannabis at the same time as alcohol may influence perceived driving impairment and willingness to drive while intoxicated, compared to when individuals are only consuming alcohol. In the context of intervention, Dr. Parnes will present data on within-person associations between cannabis use and sleep among adolescents over the course of cannabis use treatment, with implications for incorporating sleep changes into substance use treatment. Finally, Dr. Gebru will present a novel protocol leveraging the morning after drinking as an intervention window to provide personalized feedback to young adults who engage in heavy drinking. Collectively, these presentations illustrate the use of ambulatory assessment to better assess, analyze, and understand the complex ways that individuals use substances in everyday life, while incorporating these insights into viable treatments.

Time: 16:15 - 17:15
Location: Expo

Modeling of Complex Substance Use Data: Multilevel Latent Classification or Factor Analysis

Tim **Janssen**, Kristina M. Jackson, Robert Miranda, Rebecca Carrara

Background: Daily behaviors of interest are often complex, and expressed as combinations of various indices. For example, daily substance use may be expressed as combinations of alcohol use, tobacco, and marijuana use. The nature of these combinations are meaningful to understanding these behaviors. In these cases, latent classification can help establish daily patterns of behavior that are not otherwise readily modeled. In contrast, behaviors that are common indices of one underlying daily phenomenon may be expressed using multilevel factor analysis. Intensive longitudinal data (ILD) allows modeling and examining correlates of this classification or this/these factor(s) among both daily and between-subjects characteristics in order to address substance use.
Method: Using mobile survey data from U.S. high schoolers (N=109, ages 15-17 years, 57% female, 54% White, 11% Asian, 23% Black, 13% other) we demonstrate multilevel latent classification. We characterize daily patterns of behavior in terms of alcohol, cannabis, and tobacco use, and use our latent factor analysis approach to characterize daily impulsivity. We examine both within-person and between-person correlates of these outcomes.
Results: Among use days, we identified a three-class solution to our multilevel classification: one with alcohol use only, one with tobacco and marijuana use, and one with combined use of all three. Days classified as combined use were more likely to be weekend days ($p<.01$), and to occur among white participants ($p=.04$).
Discussion: Careful modeling of complex ILD survey data may allow for more insightful inference from ambulant assessment. Conversely, misrepresenting phenomena as factors may lead to erroneous conclusions.

Differential influences of alcohol, cannabis, and their simultaneous use on perceived impairment and willingness to drive

Andrea M **Wycoff** PhD, Denis M McCarthy PhD, Timothy J Trull PhD

Alcohol-impaired driving is highly prevalent and a leading cause of death. Cannabis is commonly used among people who drink alcohol and using alcohol and cannabis simultaneously is associated with greater frequency of alcohol-impaired driving. Laboratory studies demonstrate harmful effects of simultaneous use on driving ability compared to alcohol use alone, yet driving under the influence of cannabis is perceived as low risk. We tested the influences of alcohol, cannabis, and their simultaneous use on perceived driving impairment and willingness to drive in daily life. Participants were 88 adults aged 18-44 (M age 25.22 years, 60.2% female, 85.2% white) who reported using alcohol and cannabis simultaneously at least twice per week. They completed 14 days of ambulatory assessment and reported their alcohol and cannabis use, perceived driving impairment, and willingness to drive “right now” and “one hour from now” on an average of 5.14 surveys per day. Adjusting for total

amount of alcohol consumed, results from multilevel models include greater perceived driving impairment when using alcohol (b=0.39, SE=0.05, p<.001) and cannabis (b=0.37, SE=0.03, p<.001) separately, but greater odds of being willing to drive right now (OR=2.29, 95% CI=[1.38, 3.81], p=.001) and in one hour (OR=3.69, 95% CI=[2.15, 6.34], p<.001) when using alcohol and cannabis simultaneously compared to using alcohol by itself. Simultaneous cannabis use may contribute harmfully to in-the-moment decisions to drive under the influence of alcohol and should be addressed in prevention efforts targeting alcohol-impaired driving.

Time-Varying Associations Between Cannabis Use and Sleep during Adolescent Cannabis Treatment

Jamie E. **Parnes**, Robert Miranda Jr.

Adolescent and young adult (AYA) cannabis use can result in greater harms than adult use; however, AYA cannabis interventions have mixed effectiveness. One understudied factor that may influence treatment outcomes is sleep. While AYA may report cannabis use-related subjective improvement to sleep, objective sleep studies suggest use may actually impair sleep. Moreover, sleep difficulties can motivate use, are common in outpatient cannabis treatment, and can influence relapse. This secondary analysis examined how cannabis use on a given day related to sleep duration and trouble that night during AYA cannabis treatment. AYA (N=64, ages 15-24, 50% female) received a psychosocial intervention plus topiramate vs. placebo, while completing a 6-week ecological momentary assessment study. Time-varying effects modeling was used to examine within-person associations between cannabis use, sleep duration, and sleep trouble. Results indicated that cannabis use on a given day was associated with shorter sleep duration that night from study days 3-26 (b range -0.51, -0.75), while use was not associated with trouble sleeping. Conversely, grams used on use days was associated with increased trouble sleeping that night from study days 25-36 (b range 0.10, 0.17), although grams used was not associated with sleep duration. Findings depict that earlier in treatment, use frequency predicted shorter sleep duration, and later in treatment, use quantity predicted poorer sleep quality. Clinical implications include the importance of focusing on sleep during treatment, how to set AYA expectations regarding sleep changes during treatment, and suggest that sleep changes may be leveraged to increase motivation for use reduction.

Alcohol Feedback, Reflection, and Morning Evaluation (A-FRAME): Protocol for a Pilot Trial of a Smartphone-Delivered Alcohol Intervention for Young Adults who Drink Heavily

Neo **Gebru**, Kate B. Carey, Nancy P. Barnett, Jennifer E. Merrill

Background: Many young adults drink heavily and experience negative alcohol consequences. The morning after drinking may represent a “teachable moment” not yet targeted for harm reduction. This presentation will review the protocol for a study examining mornings after drinking as an optimal time to provide a novel, theory-

based personalized feedback intervention (PFI) to reduce hazardous drinking.
Methods: We developed a PFI that integrates baseline data with daily surveys about yesterday's drinking, and that can be delivered to users' mobile phones. Consistent with the transtheoretical model, intervention strategies include event-specific feedback (e.g., prior night blood alcohol concentration), contrasted with both drinking goals set at baseline and norms (e.g., peers' drinking). An initial prototype was refined via end-user feedback, to include additional topics (e.g., spending), choice of broader range of goals (e.g., drinks per day), and aggregated feedback at 2- and 4-weeks to supplement feedback provided the morning after each drinking day. The refined 4-week PFI will be delivered in an open trial to 20 heavy drinking young adults, who will be interviewed to inform further refinement. Subsequently, 132 participants will be randomized to PFI or assessment only to test feasibility, acceptability, and efficacy.
Discussion: Innovations of the intervention include mobile delivery of feedback in multiple doses that occur close in time to drinking; choice of feedback; and feedback informed by daily and mobile assessment of recent key drinking events. Evidence of initial efficacy will support a scalable intervention for heavy drinking that is theory-based and delivered at potentially optimal times.

16:15 Symposium 12: Dynamic Associations Between Daily Events and Affective, Personality States

Chair: Ketaki Diwan

This symposium presents recent findings on the dynamic association between events and affective and personality states in daily life. Four studies using the experience sampling methodology will be presented. The studies link daily events with psychological states, including affect (Studies 1 and 2), personality (Study 3), and self-esteem (Study 4) across timelines of hours, days, and years. The studies use age-diverse samples, ranging from young adulthood to old adulthood, and focus on diverse contexts, including stressful life phases such as COVID-19 and the educational transition period. First, Klaiber et al. examine whether event-related affect changed from the time during the COVID-19 lockdown to after the lockdown in a sample of N= 341 adults. Second, Pauly et al. examine whether affective reactivity to daily positive and negative events differed in older adults (N = 108) on days when they report higher versus lower time savoring. Third, Chereches et al. examine moment-to-moment fluctuations in Big Five personality states and the degree of carry-over effects of states across moments when performing the same or other activities in a sample of N=276 young adults. Fourth, Diwan et al. examine individual differences in the contingency of state self-esteem on daily study- and work-related events during N = 333 young adults' transition from vocational education to becoming a teacher. In sum, these studies provide novel insights into the links between daily events and affective and personality states in periods of stress and in the context of age-related changes.

Time: 16:15 - 17:15
Location: Studio

From the lockdown to the new normal: Changes in event-related affect from spring 2020 to summer 2022

Patrick **Klaiber**, Eeske van Roekel, Anita DeLongis, Nancy L. Sin

The emergence of the novel COVID-19 disease and the lockdown measures implemented to curb its spread affected most aspects of daily life. Past work on daily stress processes suggests that stressor-related affect is greater during times of more severe stress or lower availability of coping resources. We examined whether event-related affect (covariation of daily event occurrence and negative or positive affect) differed among people who completed week-long daily diaries both in early 2020 (first COVID lockdown; wave 1) and in the summer of 2022 (wave 2). The sample consisted of 341 adults ages 18-80 (mean = 51 years; 88 % women) from the US and Canada. As expected, positive affect was higher and negative affect lower in wave 2 compared to wave 1. However, people reported more daily stressors but also more positive events in wave 2 compared to wave 1. Interestingly, positive events and stressors tended to co-occur in wave 1 but not in wave 2. In addition, stressor-related fluctuations in positive and negative affect (i.e., higher negative affect and lower positive affect on stressor days vs. non-stressor days) were more pronounced during wave 1 compared to wave 2. There were no differences in event-related affect to positive events across the two waves. This work supports notions that stressors are more tightly linked to affect during times of high demands such as the COVID-19 lockdown. Potential reasons for the difference in the same-day co-occurrence of positive events and stressors between wave 1 and wave 2 will be discussed.

Time savoring and affect reactivity to daily events in old age

Theresa **Pauly**

According to socio-emotional selectivity theory, older adults maintain high levels of well-being due to a greater present time orientation, superior emotion regulation competence, and a bias for positive information. Time savoring can be defined as the use of thoughts and actions to increase the intensity, duration, and appreciation of positive experiences. The current study aimed to examine the role of time savoring for affective reactivity to daily positive and negative events in old age. For this purpose, a sample of 108 older adults aged 65–92 years took part in a daily diary study. Over 14 days, participants reported daily positive and negative events, time savouring, negative affect (NA), and positive affect (PA). NA was increased and PA was decreased on days when negative events occurred. NA was decreased and PA was increased on days when positive events occurred and when time savoring was higher than usual. Importantly, participants showed lesser NA reactivity to negative events on days when time savoring was higher than usual. On a between-person level, individuals who generally reported more negative event days showed higher NA and lower PA, on average. Individuals who generally reported higher time

savoring showed higher PA, on average, and a higher decrease in NA on days with positive events. Findings highlight the relevance of everyday time savoring and its potential to modulate affect reactivity in older adults. Promoting and preserving time savoring may contribute to well-being among this age group.

Conscientious now, conscientious later? An ambulatory assessment study on the short-term dynamics of personality states and their dependence on daily activities

Flavia FS **Chereches**, Inga I Schwabe, Anne AK Reitz

How different are personality states from one moment to the other? Does their expression depend on the type of activities performed? In this pre-registered study, we examined the extent to which Big Five personality states fluctuate from moment to moment (the extent of within-person variability relative to between-person variability) and the extent to which they are stable from moment-to-moment (carry-over effects). In addition, we studied the contingencies of personality states by examining the extent to which personality states carried over from moment to moment when people performed the same type of activity (e.g., work-related activities) and when people changed activities (e.g., shifting from work to leisure activities). Data comes from 276 young adults assessed over 14 days (3 assessments per day). Results from multilevel models showed that a larger proportion of the total variance in personality states could be explained by within-person variability than by between-person variability. This finding suggests that personality states change from moment to moment. Results of two-level autoregressive models showed medium to small carry-over effects for all personality states, suggesting that previous states linger on and affect current states. For the contingency between personality states and activities, we expect to see stronger carry-over effects for all personality states when the same type of activity is performed compared to when there is a shift in activities. Our findings will help uncover the degree to which people's personality is stable in daily life and will add to research investigating the importance of activities for personality state expressions.

Contingency of State Self-Esteem on Daily Events During The Transition to Becoming a Teacher

Ketaki (K.A.) **Diwan**, Anouke (A.) Bakx, Evelyne (E.) Meens, Anne (A.K.) Reitz

Young adults differ in self-esteem change during the education-to-work transition. Little is known about the short-term (state) processes underlying this individual variability. We examined the contingency of state self-esteem on daily study- and work-related events during Dutch students' transition from vocational education to becoming a teacher. We followed 4 cohorts of bachelor students over 8 months in their teacher education program during which they increasingly engaged in internships. We used dynamic structural equation modeling to analyze data from 333 participants across three waves of 14-day experience sampling assessments. We examined whether state self-esteem was contingent on daily study- and work-

related events within days, whether individuals differed in this contingency, and whether teacher identity predicted individual differences in this contingency. Positive (negative) study- and work-related events positively (negatively) predicted state self-esteem within-days, suggesting that state self-esteem was contingent on daily events. Individuals differed in the extent to which state self-esteem was contingent on daily study- and work-related events, however, teacher identity did not explain these individual differences. Exploratory analyses suggested that individual differences in contingency were greater in the first wave compared to later waves. These findings suggest that a) mastery of daily study- and work-related events influences state self-esteem during the transition to becoming a teacher and b) individuals differ in the extent to which they stake their self-worth on the mastery of daily study- and work-related events.

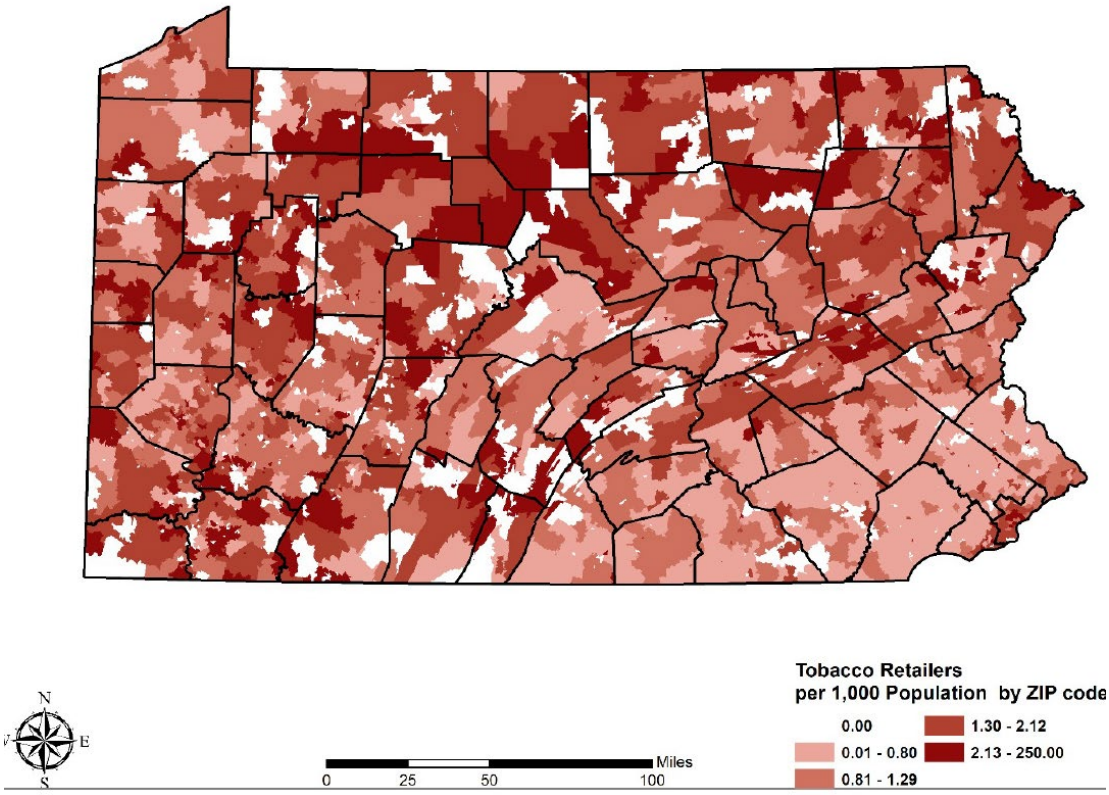
17:15 Poster session 1

Posters #1 to #33
Time: 17:15 - 18:15
Location: Foyer

Poster 1: Geospatial Perspective of the Pennsylvania Tobacco Retail Environment

Sophia I. **Allen**, Yosef Bodovski

Introduction: More than 480,000 deaths are caused each year in the U.S. due to cigarette smoking. Quitting smoking reduces the risk of premature death, however, a disparity exists in annual quit rates between African Americans and White individuals who smoke (4.9% vs. 7.1%). Despite making more quit attempts than White smokers, African Americans are less likely to remain abstinent from smoking long-term. Previous literature has shown that psychosocial factors (e.g., stress) and an individual's physical environment contribute to tobacco-related behaviors and inhibit smoking cessation. The aim of this study was to examine the physical environment (tobacco retailer density) of smokers who used the text messaging service of the Pennsylvania Quitline.
Methods: We identified tobacco retailers (TRs) who were currently licensed to sell tobacco in Pennsylvania using the Tobacco Products Tax Licenses dataset from the Pennsylvania Department of Revenue. The list is updated monthly with data to include the retailer name, address (geocode), licensing type, and county. The American Community Survey 5-year estimates geodatabase was used to derive numbers for rural/urban areas and population. TR density per 1,000 people was calculated.
Results: Overall, there were 14,727 TRs in Pennsylvania's urban (n=9,709) and rural (n=5,018) areas and a mean density of 1.8 TRs per 1,000 population.
Conclusions: The findings suggest that the proportion of TRs are located in the urban areas of Pennsylvania; however, additional analysis is needed to determine whether TRs are located in areas with a higher proportion of African Americans. This research will inform future mHealth smoking cessation interventions.



Poster 2: Physiological signals in daily life among tobacco, alcohol and cannabis users: Discriminating stress from craving episodes

Emmanuelle **Baillet**, Chloé Vacher, Cassandre Romao, Hakim Si-Mohammed, Camille Jeunet-Kelway, Fuschia Serre, Marc Auriacombe

Context: Addiction is characterized by a loss of control over use of reinforcers. Craving is a clinical phenomenon defined as a strong urge to use. Changes overtime in the craving intensity is a predictor of relapse. Yet, identifying/reporting craving episodes can be difficult for some patients. Stress has also been associated with increased risks of relapse and craving. While craving is associated with stress-like changes in autonomic arousal, it demonstrates unique neurobiological changes. The physiologic differentiation of stress and craving could constitute a preventive tool to avoid relapse. Objective: To discriminate stress from craving through the analysis of physiological signals captured in daily-life among participants enrolled in outpatient addiction treatment. Method: The protocol is a 14-day observational mixed methods study in daily life. It combines wearable sensors (to measure Blood Volume Pulse, Electrodermal Activity, skin temperature and accelerometry) with the Ecological Momentary Assessment (EMA) method proposing signal- (4 times/day) and event-contingent (triggered by the participant) surveys allowing the collection of variables including craving or stress. We will use machine learning to extract the most discriminant features from the physiological signals to perform classification analyses to discriminate craving from stress. Expected results: We expect that combination of the collected signals and their respective features will allow us to

disentangle craving vs. stress episodes with differentiation accuracies rate around 75% as like previously literature. Perspectives: A better detection of craving, with good sensibility and specificity, may enable the development of relapse prevention interventions in daily life.

Poster 3 The relationship between trait-like stress eating and acute stress effects on food choice

Ann-Kathrin Arend, Max Finger, Christoph **Bamberg**, Jens Blechert, Julia Reichenberger

Introduction: Stress may lead to an increased uptake of unhealthy foods and a decrease of healthy eating. However, it is unclear why only some individuals react in this way. To address this puzzle, we asked whether acute stress eating relationships depend on trait-like stress-reactivity.
Methods: We used Ecological Momentary Assessment (EMA) to measure momentary stress experiences alongside trait questionnaires of stress eating in 97 individuals with a wide BMI-range. After completing the Salzburg Stress Eating Scale for trait-like stress eating, participants reported acute stress, in signal-based EMA prompts for eight days. They reported the composition of their food in six (un-)healthy categories (vegetables, fruit, carbohydrates, fatty food, salty snacks, sweets). We fit multi-level models with fixed effects for trait-like stress eating on level two and acute stress on level one and random slopes for acute stress levels and random intercepts for each participant on level one to the amount eaten from (un-)healthy food categories.
Results: We found that individuals with higher trait-like stress eating levels did consume more salty snacks, less vegetables but also more fruits when acutely stressed (see Table 1).
Discussion: The present results speak against a general effect of stress on unhealthy food intake. Instead, our finding support an inter-individual difference model of stress eating: There may be individuals which are especially vulnerable to stress-induced unhealthy eating behaviour, in that they consume more food from certain unhealthy categories, such as salty snacks, and less healthy vegetables, while others do not show this stress-reactivity.

Table 1. Consumption of different food categories predicted by state stress (L1 stress), trait stress eating (L2 SSES), and their multilevel interaction (MLI stress*SSES).

Food groups	Zero-inflation model		Conditional model	
	β_{ZI}	CI_{ZI}	β_{cond}	CI_{cond}
Sweets				
L1 Stress	0.03***	[0.001, 0.04]	-0.004	[-0.001, 0.01]
L2 SSES	-0.14	[-0.41, 0.12]	0.03	[-0.13, 0.19]
MLI Stress*SSES	-0.004	[-0.002, 0.01]	0.01	[0.0, 0.02]
Fruits				
L1 Stress	0.001	[-0.02, 0.02]	-0.08	[-0.02, 0.04]
L2 SSES	-0.13	[-0.46, 0.2]	0.08	[-0.07, 0.23]
MLI Stress*SSES	0.003	[-0.02, 0.02]	0.01*	[0.002, 0.03]
Vegetables				
L1 Stress	-0.01	[-0.03, 0.003]	-0.001	[-0.01, 0.004]
L2 SSES	-0.006	[-0.26, 0.25]	0.05	[-0.06, 0.15]
MLI Stress*SSES	0.01	[-0.01, 0.03]	-0.01*	[-0.01, 0.0]
Carbohydrate-rich foods				
L1 Stress	-0.02	[-0.004, 0.0002]	-0.002	[-0.0008, 0.0003]
L2 SSES	0.06	[-0.02, 0.32]	0.03	[-0.007, 0.12]
MLI Stress*SSES	0.01	[-0.0008, 0.003]	-0.002	[-0.0008, 0.0005]
Fatty foods				
L1 Stress	0.0	[-0.02, 0.02]	0.01	[-0.02, 0.04]
L2 SSES	-0.006	[-0.38, 0.27]	0.13	[-0.11, 0.37]
MLI Stress*SSES	0.0004	[-0.01, 0.02]	-0.01	[-0.04, 0.02]
Salty snacks				
L1 Stress	0.02	[-0.02, 0.06]	-0.04*	[-0.07, -0.002]
L2 SSES	-0.35	[-0.92, 0.21]	0.25	[-0.32, 0.82]
MLI Stress*SSES	-0.0007	[-0.03, 0.03]	0.05*	[0.01, 0.09]

Note: Values are unstandardised *β-coefficients* and the lower and upper limit of the 95% confidence interval in brackets. The *Zero-inflation model* estimates the likelihood of the dichotomous effect whether eating occurs or not. The *Conditional model* estimates continuous effects how much food is consumed.

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05

Poster 4: Assessing subjective cognition in everyday life: The value of using the Experience Sampling Method in a memory clinic sampling with mild cognitive impairment

Sara Laureen **Bartels**, Simone J.W. Verhagen, Rosalia J.M. van Knippenberg, Ilse Keijdener, Frans R. Verhey, & Marjolein de Vugt

Background: Neuropsychological tests and retrospective self-reports used in memory clinics provide a stationary and memory-biased picture of cognitive functioning. A diary technique known as the Experience Sampling Method (ESM) can capture dynamic patterns of symptoms in context. However, the added value of the

ESM in neuropsychological services is understudied. This study evaluates how momentary subjective cognition relates to contextual factors and traditional instruments in a memory clinic sample with mild cognitive impairment (MCI).
Methods: People with MCI (n=19, 73.6% male, mean age 64.8 yrs.) were prompted to complete a smartphone-based diary 8 times/day for 6 consecutive days. Diaries assessed momentary subjective memory, concentration, and language problems, and other momentary factors (e.g., mood, fatigue, activities). Moreover, clinical tools (Mini Mental State Examination (neuropsychological screening), Deterioration Cognitive Observee (proxy-tool), Cognitive Failure Questionnaire (retrospective self-report)) were used. Multilevel regression analysis was conducted.
Results: The average compliance rate was 79% and n=691 diary entries were analyzed. Within-person fluctuations of momentary cognitive functioning was observed, with subjective memory problems being most dominant. Preliminary results show that mood, activity-related and social stress were significantly related to momentary cognitive functioning. Clinical scores showed no/ weak correlations with momentary outcomes.
Conclusions: Next to traditional tools used in diagnostics, the ESM can provide professionals with a more fine-graded understanding of their patients' daily experiences. Assessing this new construct, i.e., contextual cognition, in practice enhances the patients voice and may influence decision-making processes. Steps to advance the ESM in aging are outlined.

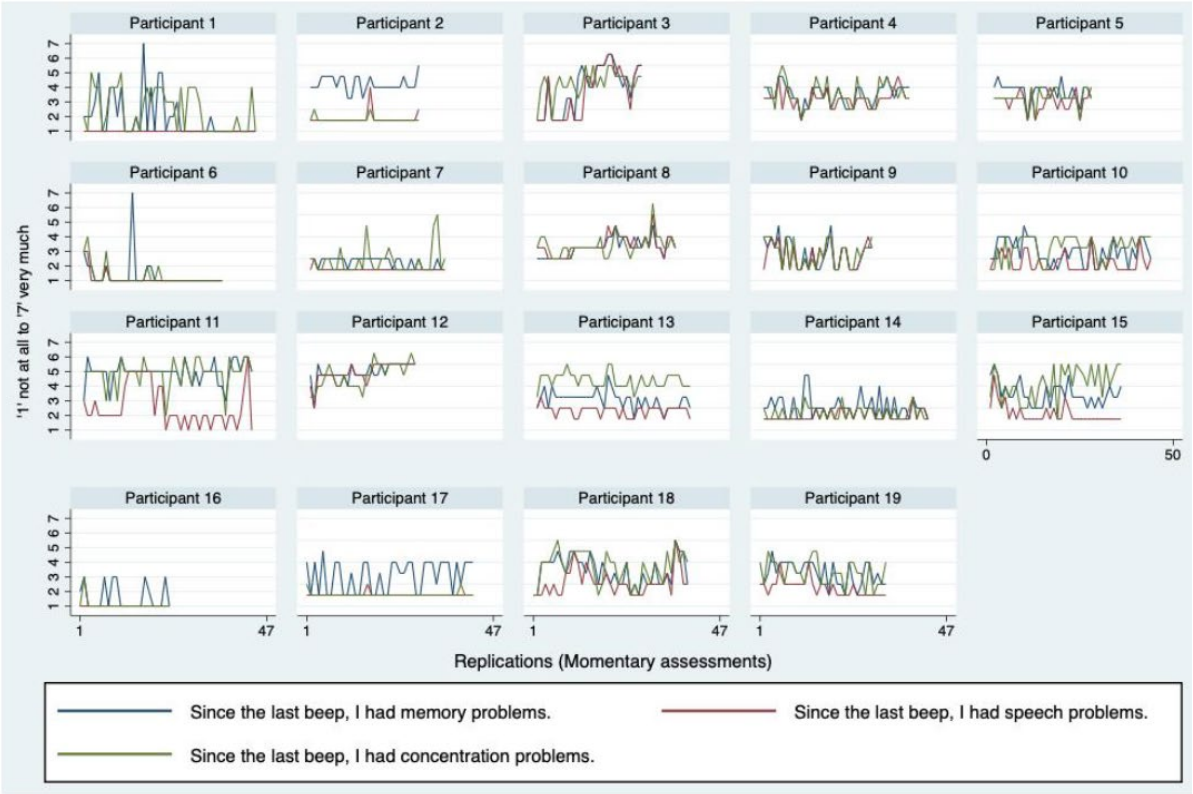


Figure 1. Fluctuations of subjective momentary cognitive functioning in people with MCI.

Poster 5: Stress is negatively associated with flow experiences in daily life

Karen **Bartholomeyczik**, Christof Weinhardt, Ulrich Ebner-Priemer

Experimental research has found that high stress-related physiological activation decreases flow. We aim for evaluating if this translates to self-reported stress and flow in daily life. We expect that high stress precludes simultaneous flow. As part of a larger study, knowledge workers (i.e. working on mental tasks for at least four hours per day; N = 38) completed smartphone-based e-diaries on three consecutive days. Ten times per day (N = 955 total observations), participants reported their current task (work yes/no), flow (three items from Flow Short Scale, Rheinberg et al., 2019) and stress (one item, Linnemann et al., 2018). We assessed multilevel correlations between flow and stress on within- and between-subjects level. Visual inspection of panel plots (Figure 1) indicated opposing trends in individual flow and stress at similar observations. Statistical analyses confirmed moderate to high negative correlations between stress and flow (within-subject: r = -.42, between-subjects: r = -.61). We found similar tendencies when splitting observations in work and other tasks. Our findings show that (1) more stressed individuals experience less flow, (2) the more stressed a person currently feels, the lower is her simultaneous flow intensity, and (3) the discriminant relationship between the two concepts is task-independent. Even though our findings are in line with earlier studies indicating that high stress inhibits flow, our study does not allow causal conclusions. Since earlier studies found an inverted u-shaped association between flow and stress, we next aim to apply non-linear multilevel models.

Poster 6: Moving together: the impact of social interactions and physical activity on well-being of patients with negative and depressive symptoms

Anastasia **Benedyk**, Alexander Moldavski, Markus Reichert, Christoph von der Goltz, Heike Tost, Andreas Meyer-Lindenberg

Negative symptoms, such as avolition, apathy, social withdrawal, and anhedonia, are prevalent in schizophrenia (SZ), but difficult to distinguish from depressive symptoms in major depressive disorder (MDD). Existing research on these symptoms is limited by infrequent clinical ratings that suffer from recall bias and lack ecological validity. Smartphone- and sensor-based ecological momentary assessment (EMA) provides the opportunity to investigate daily social interactions and physical activity, which can improve mood in patient populations with different symptom severity.
In this study, two groups of patients (n=53 SZ and n= 52 MDD) were subjected to an EMA protocol, including daily e-diaries and wrist sensor accelerometry, as well as repeated clinical inventories over 24 weeks. The results indicate that SZ patients' mood was not affected by negative symptom severity, while increasing depressive symptoms were associated with low valence in both groups. Furthermore, MDD patients appeared to benefit from social interactions and had a more positive mood when surrounded by others, especially when experiencing severe symptoms. Conversely, mild depressive symptoms could be alleviated by physical activity, but this benefit was offset when subjects were alone. Physical activity alone did not improve mood for patients with severe symptoms.
This work aims to conduct a transdiagnostic investigation of the daily-life psychological underpinnings of negative and depressive symptoms in SZ and MDD to identify unique and shared mechanisms in both disorders. A clear differentiation between negative and depressive symptoms with the help of EMA could improve diagnostic procedures and contribute to better intervention options for different symptom severities.

Poster 7: Mechanisms of change of app-based interventions to reduce perseverative cognition in the vulnerability for depression

Marlijn E. **Besten**, Marieke K. van Vugt, Harriëtte Riese, André Aleman, Marie-José van Tol

Background: Major Depressive Disorder (MDD) is the most prevalent psychiatric disorder and is characterized by high relapse rates. Persistent negative thinking and rumination (i.e., perseverative cognition [PC]) are key characteristics of MDD that often persist in the remitted phase. Therapeutic techniques, including fantasizing and mindfulness, seem potent in reducing relapse, putatively by enhancing positive attitudes and acceptance of thoughts, respectively. The study aims to investigate 1) the psycho-physiological and cognitive mechanisms by which one-week App-based training of fantasizing vs. mindfulness affect PC and 2) whether pre-therapeutic individual characteristics of individuals predict superior effectiveness of one

intervention over the other in reducing PC.
Methods: Remitted MDD patients (N=50) and healthy controls (N=50) perform a diary study using ecological momentary assessment and a cognitive task in combination with heart rate variability and actigraphy measurements. Baseline measures are compared to measures during one-week App-based training of fantasizing and mindfulness.
Preliminary Results: Remitted MDD patients reported higher rumination levels and showed worse task performance on an attention task than HC. Data collection for examining the effects of fantasizing and mindfulness on reducing PC is still ongoing and the current sample is too small to present results on that now. Results are expected in June 2023. We hypothesize distinguishable changes in thought content reported after mindfulness (predominantly a reduction in the perseverative character of thoughts) vs. positive fantasizing (predominantly an increase in the number of positive thoughts).

Poster 8: Real-time analysis of ecological momentary assessments and ecological physiological assessments to trigger interventions during stress in real life

Sophie A. **Bögemann**, Judith M.C. van Leeuwen, Alex van Kraaij, Jeroen Weermeijer, Walter de Raedt, Raffael Kalisch, Inez Myin-Germeys, Erno J. Hermans

Ecological momentary interventions (EMIs) offer great potential to overcome many of the barriers associated with mental health care, including support outside sessions, waiting time, and high costs. Here, we explore how EMIs for stress-related symptoms can be optimized by real-time, personalized triggering based on psychological and physiological stress signals, because this would allow delivery of interventions at the moment when they are most effective.
The DynaMORE consortium developed a real-time analysis pipeline based on the RADAR-BASE platform using both ecological momentary assessments (EMA) and ecological physiological assessments (EPA). We use two smartphone apps: 1. the RADAR aRMT app (adapted for DynaMORE) to upload EMA and 2. the DynaMORE Chill+ app (IMEC) to upload 10 minutes of EPA data acquired right before each EMA. EPA is collected with the Chill+ wristband. EMA/EPA data is analyzed in real time at the Donders Institute, where features are extracted to allow adaptive online triggering of EMIs.
The pipeline is deployed in DynaMORE's longitudinal intervention (DynaM-INT) study. This study starts with a calibration week, where standardized EMA/EPA distributions are calculated to determine personalized thresholds for the identification of stressful real-life situations. During subsequent intervention weeks, EMA/EPA are compared to each individual's baseline threshold in real time to decide on momentary delivery of interventions on the participant's smartphone. Thresholds are adjusted on a daily basis to accommodate signal drift. We will discuss the decision algorithm based on simulations and initial real-life data from this project.

Poster 9: Associations Among Personality Traits, Gender, and Alcohol Consumption in Daily Life

Anthony L **Bokshan**, Alison M Haney, Olivia M Warner, Timothy J Trull

Individual differences like personality traits and gender are differentially related to alcohol (mis)use (Lui et al., 2022). However, our understanding of these theoretically dynamic associations is largely based on cross-sectional research. This study combines two clinical Ecological Momentary Assessment (EMA) samples (N=70, 50% women, 54% with Borderline Personality Disorder) to characterize the relationship between personality domains, gender, and drinking occurrence in daily life.
Personality was assessed at baseline using the NEO-PI-R (Costa & McCrae, 1992). Participants completed 6 or more EMA reports a day for up to 28 days and reported on their drinking behaviors at each report.
We used logistic regression with generalized estimating equations to predict momentary drinking occurrence from personality domain scores and gender, with diagnostic status, day of week, time of day, and the presence of companions included as covariates.
Across participants, higher Neuroticism (OR = 0.98, $p < .001$) and Openness (OR = 0.98, $p < .001$) scores were negatively associated with drinking occurrence in daily life. Extraversion (OR = 1.01, $p < .01$) and Conscientiousness (OR = 1.03, $p < .001$) were positively associated with drinking alcohol, though the direction of association for Conscientiousness facets varied. There was a significant interaction between gender and Agreeableness in predicting drinking occurrence, such that higher Agreeableness was associated with increased likelihood of drinking in men (OR = 1.02, $p < .001$) and decreased likelihood of drinking in women (b = 0.99, $p < .01$).
Further characterizing such differences in associations between personality traits and drinking behaviors across gender and context may help identify more personalized targets for intervention among those with problem alcohol use.

Poster 10: Machine-learning stress prediction using vocal, facial and physiological cues

Marketa **Ciharova**, Khadicha Amarti, Ward van Breda, Martin Gevonden, Sina Ghassemi, Annet M. Kleiboer, Christiaan H. Vinkers, Milou S. C. Sep, Heleen Riper

Machine learning algorithms have recently experienced fundamental progress thanks to important theoretical and technical breakthroughs, such as new deep learning architectures, as well as increased computational capacity available to researchers. These methods, if found reliable and valid, may directly contribute to the prediction of mental states, and subsequently the prognosis of mental disorder onset, course and/or treatment response in the future. Sensitivity to daily lived stress may predict many associated mental and physical conditions. Therefore, automatic prediction of current stress severity could help to detect and thus diminish risk for stress-related disorders early. In the current study, the Trier Social Stress Test will be administered to college students (N = 100), their voice and facial expressions will be recorded, and cardiovascular and electrodermal physiology will be measured by an

ambulatory system. Performance of an artificial deep neural network algorithm based on vocal and facial cues in predicting current levels of stress will be evaluated in comparison to scores on the State-Trait Anxiety Inventory (STAI)-State and Subjective Units of Distress Scale (SUDS), completed by the participants at several time points. Moreover, it will be explored whether adding physiological data into the prediction would improve the performance of the algorithm. At the SAA Conference 2023, we will present preliminary results related to the performance of the algorithm in predicting stress severity.

Poster 11: The relation between older adults' cognitive abilities in the lab and frequency of natural speech in everyday life

Christina, Röcke; **Demiray**, Burcu; Neff, Patrick; Martin, Mike

Having infrequent social interactions is a risk factor for poorer cognitive performance, faster cognitive decline and poorer executive functioning. We examined the frequency of real-life speech production as an indicator of social interaction in older adults' daily lives. We used the Electronically Activated Recorder (EAR), which periodically records sounds and speech in everyday life (Mehl, et al., 2001) to unobtrusively observe real-life conversations. We examined whether and how the frequency of real-life speech is associated with key indicators of cognitive ability and sociodemographic variables. Our sample includes 150 healthy older adults, aged 65-91 years. For 30 days, participants wore the EAR that collected audio samples of 50 seconds every 18 minutes. Cognitive abilities were assessed with lab-based performance tasks covering crystallized and fluid intelligence markers. Audio data were analyzed to identify files with participants' speech by comparing their real-life voice data to lab-recorded ground-truth voice data. The final sample consists of 90'825 audio files from 87 adults with ground-truth data. We applied Elastic net regressions. Significant predictors of speech frequency were partnership status, hearing, processing speed, years of education and verbal knowledge (i.e., vocabulary) - in descending order of variable importance. Having a partner, lower levels of hearing and higher education were associated with higher frequency of real-life speech. Higher levels of processing speed and verbal knowledge were associated with higher frequency of real-life speech. There was no effect of age. Results are discussed in relation to the importance of real-life language production, as both a social and a cognitive activity, for cognitive aging.

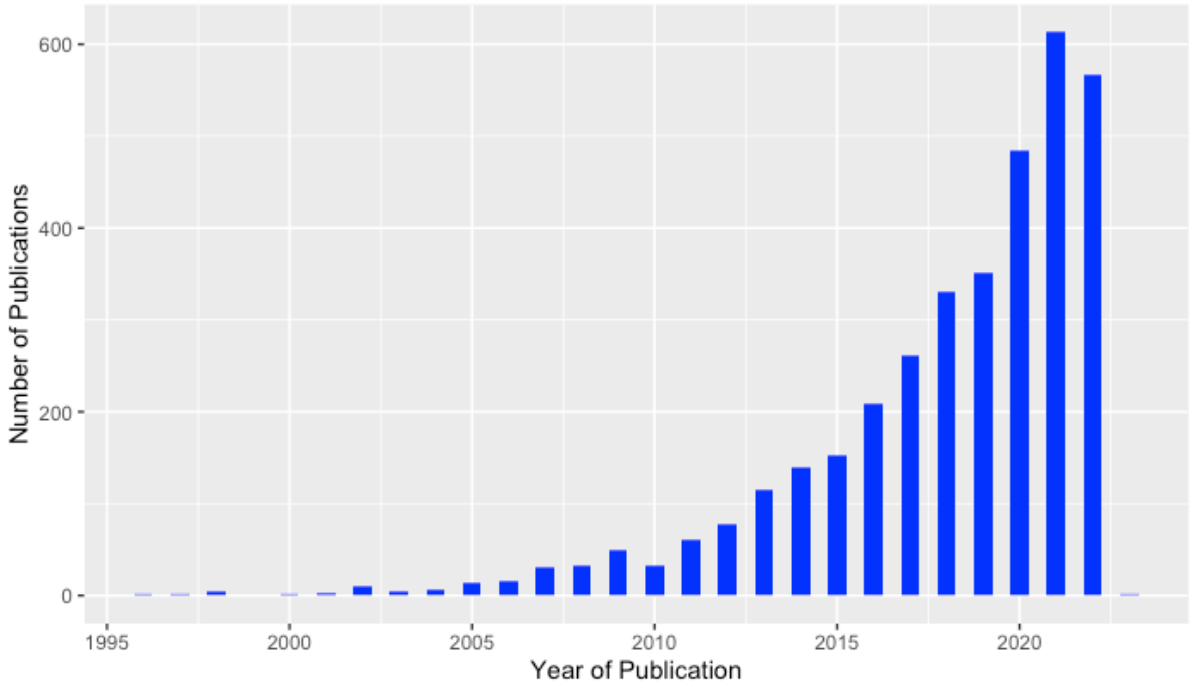
Poster 12: Naturalistic assessments of inhibitory control across the lifespan: Systematic review of inhibition measures in real-world settings

Larisa-Maria **Dinu**, Tobias U Hauser, Tim J Smith, Eleanor Jane Dommett

Inhibitory control is essential in our daily lives and refers to the ability to suppress or delay responses to achieve a goal. Despite measurement advancements, constrained, non-naturalistic experimental paradigms remain the norm in cognitive neuroscience (Hartley, 2022; Nastase et al., 2020). However, these methods fail to account for the complexities of everyday life (Munakata et al., 2011). To advance our understanding of cognition we must take an ecological approach (Hartley, 2022).

Nonetheless, to date, we lack a comprehensive review of studies measuring inhibition using such methods, which are defined as methods using dynamic, contextualised, continuous and often multisensory stimuli with high ecological validity (Aliko et al., 2020).
Here, we reviewed published studies using naturalistic assessments to measure inhibition across the lifespan. Studies needed to include at least one naturalistic method of assessing inhibition, such as self-reported, smartphone- or external sensor-assessed inhibition (e.g., through ecological sampling methodologies; ESM); or a laboratory assessment of inhibition capturing naturalistic behaviours (e.g., gamified tasks, virtual reality). The search identified 8003 studies, with 5649 screened for title and abstract.
Because no fit-for-purpose quality appraisal tool could be identified for the reporting of naturalistic or real-world methodologies, two quality appraisal tools will be used: a quality appraisal tool (Liao et al., 2020) adapted by Kwasnicka et al. (2021) for ESM studies, and the Appraisal tool for Cross-Sectional Studies (AXIS; Downes et al., 2016) for non-ESM studies. Findings from the review would a valuable resource for researchers interested in both the development and application of naturalistic paradigms.

Figure 1. Publications using Ecological Momentary Assessments by Year



Poster 13: Does the Procedure Matter? Applying a Multiverse Analysis Approach to Ambulatory Assessment Data to Examine the Robustness of Findings on Negative Emotion Differentiation

Sabrina **Ecker**, Charlotte Ottenstein, Dominik Vollbracht, Tanja Lischetzke

Negative emotion differentiation (NED) – the extent to which individuals are able to experience and distinguish between emotional states of negative valence in a fine-

grained manner – is commonly assessed using momentary emotions in ambulatory assessment studies. However, there is variation in how researchers process ambulatory assessment data in the context of NED, for example, at which level of compliance participants are excluded. The present research's objective is to use a multiverse analysis approach (i.e., conducting the analysis of interest across all reasonable combinations of decisions) to scrutinize whether such differing decisions in NED assessment and NED data processing affect the robustness of empirical results on NED's relationships with other constructs. We will include decisions on the compliance threshold for exclusion, the item set, the aggregation of ambulatory assessment data on momentary emotions to a NED index, the handling of negative indices, and the transformation of indices. The analyses of interest are twofold: First, we will examine the robustness of the bivariate correlation between NED and depressiveness on the person level. Second, we will investigate the robustness of the buffering effect of NED on stress reactivity which corresponds to a cross-level interaction in a multilevel model. For both analyses, we will perform a separate multiverse analysis. The ambulatory assessment data will be collected from February through April. Results of the multiverse analyses will be presented and discussed in light of recent calls for more research transparency.

Poster 14: How does habit decay in daily life? An intensive-longitudinal study on sedentary behavior

Robert, R. E., **Edgren**, Dario, D. B., Baretta, Jennifer, J. I., Inauen

Habit is defined as the cognitive representation of a cue-behavior association that is learnt through repetition. Habits are long-lasting and characterized by automaticity. This makes them a useful resource for maintaining healthy behaviors, but also poses challenges for disrupting unhealthy habits. Past intensive-longitudinal research in daily life suggests habit formation to be an idiosyncratic process that follows a nonlinear time-trend. Research on habit decay in daily life, on the other hand, is lacking, even though breaking unhealthy habits is a common challenge people face. For the first time, we investigate with intensive longitudinal data how habit strength decays over time when trying to disrupt an unwanted habit. We investigate this at the example of prolonged sedentary behavior (SB), which has been shown to be highly habitual and poses a serious behavioral health-risk. In this observational intensive-longitudinal study, 56 participants (mean age 36 years, 87% female) from the general population were instructed to disrupt a self-selected habit related to SB with the help of implementation intentions over 12-weeks. Habit strength was assessed in end-of-day e-diaries using the Self-Report Behavioral Automaticity Index. In this exploratory investigation, change in habit strength will be modelled at the person-specific and group level using linear, quadratic, cubic, asymptotic and logistic models. Findings will shed light on how and when habit strength changes over time, and how this process differs at the individual level. Study findings could inform future behavioral change intervention development targeting cue-behavior associations.

Poster 15: Identifying Individual Barriers of Autistic Students in Everyday School Life – An Experience Sampling Approach

Theresa **Eicher**, Kathrin Berdelmann, Florian Schmiedek

An increasing number of autistic students attend German mainstream schools. However, they often perform poorly or fail in standard educational institutions. A key challenge for the inclusion of autistic students is the identification, consideration, and elimination of autism-specific barriers (e.g., sensory stressors) at school. Barriers to the inclusion of autistic students have typically been investigated by considering the perspective of school staff and parents. Taking students' perspectives into account, however, shows that problems identified by parents and teachers do not necessarily match those reported by children. Since barriers are highly individual and may not be easily observable for teachers, the subjective experience of the students needs to be considered.
Here, an ongoing study is presented, which aims to investigate individual barriers of autistic and non-autistic students in everyday school context using experience sampling. A pilot study with one daily assessment over a period of two weeks currently is conducted to test the feasibility of our approach. We expect to enroll N = 40+ children until April 2023. Preliminary findings will be presented that will show how many and which barriers students from third to sixth grade (8–13 years) experience in school. Based on these findings, we aim to gain empirical insights on individual profiles of barriers, explore within-person associations with subjective wellbeing, and differences in the strength of such associations. The aim is to develop an app that can be used by teachers together with children in the everyday school context to support the identification of individual barriers.

Poster 16: WEarable sensor Assessment of physicaL and eaTing beHaviours (WEALTH): The Ecological Momentary Assessment protocol

Steriani **Elavsky**, Tomas Vetrovsky, Michael Janek, Jitka Kuhnova, Richard Cimler, Antje Hebestreit, Christoph Buck, Greet Cardon, Jean-Michel Oppert, Leopold K. Fezeu, Janas Harrington, Alan Donnelly, on behalf of the WEALTH consortium

Background: Accurate measurements of physical (PB) and eating behaviours (EB) and their context – measured using Ecological Momentary Assessment (EMA) - are critical for understanding the determinants of healthy lifestyles. This presentation introduces the EMA protocol within the WEALTH project aiming at developing data processing methods for research-grade and commercially available accelerometer device data through a combination of machine learning and EMA methods.
Methods: The research design includes a 9-day free-living EMA data collection with the concurrent use of accelerometer devices (Actigraph, Fitbit, ActivPAL, Falster 6). Four centres (Ireland, Germany, France, Czechia) will recruit a gender-balanced convenience sample of 600 participants aged 18-64 years (150 in each centre). By means of free-living EMA data collection (using the HealthReact system), participants complete self-initiated reports of EB, time-based assessments (6 per day) of the environmental, social, and psychological context of PB and EB, and event-triggered assessments of contexts of walking (10min with step count ≥ 60), running

(10min with step count ≥ 140), or prolonged sitting (20min with 0 step count).
Findings: The EMA data will facilitate the development and validation of machine learning algorithms detecting PB and EB, and answer research questions on the relationship between intermittent walking and/or standing, prolonged sitting and unhealthy snacking, or between PB and behavioural compensation through increased sitting and snacking.
Discussion: The results will be applicable to research on PB and EB, for surveillance and monitoring at the population level of PB and EB and in public health interventions to promote healthy PB and related EB.

Poster 17: Interpersonal Style and Depression Symptoms in Victims of Bullying Before and After Transitioning Out of High School

Minita **Franzen**, Peter J. de Jong, René Veenstra, Marije aan het Rot

We propose that interpersonal style of victims of bullying may explain their depression risk. Applying EMA methodology, we assessed interpersonal behaviours, perceptions, and affect during everyday social interactions in adolescents' final high school year (T1) and one year later (T2). At T1, we expected victims to have a more maladaptive interpersonal style compared to non-involved adolescents. At T2, we examined whether these differences remained after transitioning out of the bullying environment.
Participants at T1 were 27 self-reported victims and 56 non-involved adolescents; 9 victims and 26 non-involved adolescents also completed T2. At both time points, participants recorded their social interactions on their smartphones for 14 days. Interpersonal behaviours and perceptions were assessed in terms of dominance-submissiveness and agreeableness-quarrelsomeness.
At both time points, victims reported more depression symptoms than non-involved individuals. At T1, victims generally reported perceiving others as less agreeable and feeling more negatively than non-involved adolescents. At T2, these overall differences were not found. However, victims specifically reported perceiving others as less agreeable than non-involved adolescents when interacting with individuals who they perceived as highly dominant.
When still in high school, victims were different from non-involved adolescents in their perceptions of others and affect across social situations. After transitioning out of high-school, these differences became subtler and context-specific, whereas depression symptoms remained. These persisting characteristics of their interpersonal style may help explain why victims report more depression symptoms also long after the actual bullying has taken place.

Poster 18: Combining an Experimental Paradigm with Experience Sampling to Explore the Role of Emotional Memory in Mental Disorders

Inga Marie **Freund**, Jacqueline Peters, Marie K. Deserno, Arnold A. P. van Emmerik, Renée M. Visser, Merel Kindt

The network theory of psychopathology posits that mental disorders arise from direct causal interactions between symptoms rather than specific underlying causes.

This perspective provides new tools for understanding symptom development, comorbidity, and facilitates idiosyncratic treatment approaches. Meanwhile, decades of research have shown that emotional memory lies at the core of mental health conditions. In fact, various cognitive behavioural interventions are thought to work by targeting the underlying emotional memory. To better understand the specific role of emotional memory and moving towards bridging the network theory with previous theories, we aim to test whether changes in emotional memory explain variation in symptoms over time. We exposed 107 students to the Trier Social Stress Test (TSST), a standardised procedure that provokes psychosocial stress, to induce a personally meaningful and sensory-rich emotional memory. During one week before and after the TSST, participants assessed their mood four times daily using experience sampling. One week after the TSST, we measured their emotional memory of the event in terms of their self-reported response to auditory, olfactory, and visual cues that were directly related to the TSST vs unfamiliar controls. In line with our aim, we will integrate the measure of emotional memory into a post-TSST temporal network of the participants' mood. We hypothesise that the changes in mood over time following the TSST may be better explained when including the emotional memory of the event. By combining an experimental paradigm with experience sampling we intend to model the role of emotional memory in mental illness in a controlled yet ecologically-valid manner.

Poster 19: "Get used to it?" - Background incivility as a buffer between daily incivility and psychological strain

Caroline **Gahrmann**, Petra L. Klumb

Workplace incivility does not occur in a vacuum. To understand how employees experience and react to incivility, it is necessary to consider the social context in which it occurs. We advance insight into the role of social context and investigate background incivility as a potential boundary condition in the relationship between incivility and psychological strain. Drawing on prior research, we assume that employees' exposure to background incivility (inferred from within-person data aggregated over days) attenuates the relationship between day-level incivility and end-of-day strain. We utilized data from two experience sampling studies to test our hypotheses. In the first study, we examined temporary agency workers over five workdays. Here, background incivility buffered the effect of daily incivility on angry mood. In the second study, we examined employees with various occupational backgrounds over ten workdays. Here, background incivility did not buffer the effects of daily incivility on angry mood or cognitive interference. In both studies, we measured predictor and outcome variables concurrently. Thus, we cannot draw inferences about the structural relationships between our study variables. Nevertheless, based on our results and previous research, we recommend that practitioners implement interventions that reduce the occurrence of incivility at the day-level. Our research further demonstrates the need to investigate factors that explain how employees experience incivility in their daily work lives. This insight would help identify particularly vulnerable groups regarding short-term and medium-term strain reactions.

Poster 20: "Executive Functioning as a Predictor of Daily Stress Reactivity and Recovery: An Ecological Momentary Assessment Study"

Elise **Grimm**, Shevaun D. Neupert, Marine Scalbert, Stefan Agrigoroaei

This study is one of the few recent contributions that considers executive functioning as a protective factor against stress. A unique feature of our approach is the integration of multiple executive functions (inhibition, flexibility, updating, working memory) as predictors of both stress reactivity and recovery to daily, naturally occurring stressors. Participants completed computerized cognitive tasks in the laboratory. Over the next seven days, participants received six notifications a day on the M-Path smartphone application, scheduled in 2-hour intervals from 9:00 am to 9:00 pm. Participants also had the opportunity to spontaneously report stressors outside of notifications. At each beep, they responded to items regarding their current mood and specified whether they had encountered a stressor since the last notification. Participants also reported the type of stressor and level of stress, as well as perceptions of threat/challenge, control over the stressor, and implemented emotion regulation strategies. Data collection is expected to last until March 2023 to reach 120 participants (current N = 60). Multilevel analyses will follow our pre-registered plan (https://osf.io/uz6js/). We expect that individuals with higher executive functioning, especially cognitive flexibility, should show lower daily stress levels. We also expect higher executive functioning to predict less increases in subjective stress on days where a stressor is reported. Similarly, executive functioning should predict a faster return to baseline after the occurrence of a stressor. Finally, cognitive appraisals and emotion regulation will also be examined as mediators to enable a better understanding of modifiable protective factors that may promote healthy stress responses.

Poster 21: "The Role of Mood and Stress for Physical Activity Intentions: Insights from Ecological Momentary Assessment"

David DH **Haag**, Jan David JDS Smeddinck, Jens JB Blechert

Background
Intentions play a crucial role in physical activity (PA) engagement. However, various internal and external factors can facilitate or impede the formation of intentions. Momentary affect is one of those internal factors but is often overlooked by the mostly between-person-based health behavior models due to its fluctuating nature. In this study, we use Ecological Momentary Assessment (EMA) to examine the relationship between internal states like mood and stress with PA intentions on a within-person, intra-day level. Our focus is to further understand how those internal states may impact the formation of PA intentions and ultimately influence behavior.
Methods
Each day, for three weeks, 35 healthy participants (aged 23-67) completed four EMA prompts on momentary affect and stress, as well as upcoming barriers (PA incompatible external circumstances) and PA intentions. We used generalized logistic mixed-effect modeling to test within-person antecedents of PA intentions.
Results

Perceived external barriers impeded the formation of PA intentions. Happy and active moods were positively associated with PA intentions, while relaxed and tired moods showed a negative association. Surprisingly, stress was positively associated with PA intentions.
Conclusion
Our study is the first to provide evidence that, on the within-person level, stress might even facilitate the formation of PA intentions. This suggests a need for a more nuanced understanding of the relationship between stress and health behavior intentions. Further, we found that both momentary affect and stress play a decisive role in the formation of PA intentions and, thus, are underrepresented in current health behavior models.

Poster 22: A Touch of Cognition: Using Smartphone Interactions as Predictors of Everyday Cognition

Maximilian **Haas**

For over a decade, smartphones have progressively made their way into our daily lives. Other than being an everyday companion for personal purposes, the constantly improving performance of technological devices also makes them suitable assistants to professionals in different domains (e.g., mobile health). Lately, research has focused extensively on the impact that smartphones have on our everyday behavior. Recent studies outline that benefits at a personal level also come with a potential cost: Indeed, it has been shown that excessive smartphone usage may have a negative effect on attention, memory, and reward processing. Although research on how smartphones may influence our behavior and cognition is growing, virtually nothing is known about how cognition actually translates through smartphone interactions. In the present study, 40 younger (aged 18 to 30 years) and 40 older adults (aged 60 to 86 years) completed measures of everyday memory, daily stress and affect on a smartphone during two weeks. We sampled different parameters of smartphone interactions and investigated their relation to cognitive measures from the laboratory as well as their role in interindividual differences in cognitive performances.

Poster 23: Tell me how I feel! Development of an algorithm to predict depression symptoms based on wearable data

Leona **Hammelrath**, Manuel Heinrich, Paul Burggraf, Hannes Schenk, Christine Knaevelsrud

Timely detection of depression is important to initiate adequate treatment and reduce the risk of future episodes. Wearables (e.g., fitness trackers and smartwatches) are a promising data source for alert systems that can detect depression promptly without the necessity to complete questionnaires. To date, drawing a clear conclusion about the usefulness of remote sensing data as symptom markers in depression is difficult, as methods and reporting vary strongly across studies. Several studies found promising correlations of sensor-based information on sleep quality and variability, and physical activity with depression. In

the current study, we explore the potential of sensor data for predicting depression and compare their predictive value against questionnaires. Participants (> 500) share passively collected data covering activity (e.g., steps during the day), sleep quality (e.g., length of sleep) as well as heart rate at rest, and complete comprehensive assessments of psychopathology. State of the art machine learning models will be trained on (1) passive sensing data only or (2) a combination of passive sensing data and questionnaire items to predict depressive episodes as measured with the PHQ-8. We will present the latest version of our algorithm and evaluate the incremental value of sensor data above and beyond questionnaires. Opportunities and challenges of implementing wearable technology into depression detection and treatment are discussed.

Poster 24: Where elite rowing meets bipolar disorder: From force graphs to circadian physical activity pattern

Holger **Hill**, Julia Clemens, Esther Mühlbauer, Iris Reinhard, Emanuel W Severus, Michael Bauer, Ulrich W Ebner-Priemer

The modulation of circadian physical activity (cPA) depending on clinical states in bipolar disorder (BD) is regarded as an important diagnostic feature. However methods and results in analysing cPA in BD are heterogeneous and it's reproducibility should be improved (Murray et al. 2020). We therefore tested if an approach to analyse within-crew coordination in rowing (Hill 2002) could be transferred successfully to the analysis of cPA pattern in BD.
Thirty BD-outpatients participated for one year in an AA study (Ebner-Priemer et al. 2020). Clinical ratings were assessed fortnightly. Physical activity was assessed with a wrist-worn acceleration sensor and analysed for one-minute intervals for each day separately. Firstly, the individual circadian pattern of all euthymic days were averaged. From this euthymic average each single day was subtracted and differences in mean activity (MeanDiff) and in the activity pattern (FormDiff) were computed.
Due to dropouts and nonwear times > 360 min/day, activity data were available from 2669 days (23 patients). Multilevel analyses revealed a significant lower activity (MeanDiff) and a higher FormDiff for depressive episodes compared to the euthymic state, and the opposite pattern for the (hypo)manic states.
The results clearly revealed that the chosen approach is suitable to analyse cPA pattern in BD. The differences in mean physical activity between clinical states were hypothesized. The differences in the activity pattern (FormDiff) point to a more variable or distorted cPA pattern in depressive episodes compared to euthymia, and to a more robust (or stereotypical) pattern in (hypo)manic episodes compared to euthymia.

Poster 25: Providing help when needed – A pilot study of assessing and treating rumination in real time

Inken **Höller**

Internal entrapment, feeling trapped due to internal circumstances such as rumination, has been shown to be a risk factor for depression and suicidal ideation. Reducing rumination is therefore important for the prevention and treatment of both. In cognitive behavioral therapy (CBT), there are several interventions directly targeting rumination. Yet, CBT is not always available for those in need and even if, there are two complicating factors. First, practicing therapy strategies alone at home might be demanding for patients fighting depression and second, rumination is rather a state than a trait underlying temporal instability. The main goal of this study was to pilot a study combining Ecological Momentary Assessment and Ecological Momentary Intervention in a community sample.
N = 15 participants were assessed for rumination, internal entrapment, depression, hopelessness, and suicidal ideation five times a day for seven days using a Smartphone App (movisensXS). Different interventions derived from the CBT of depressive rumination" by Teismann et al. (2012) were presented to participants when they reported rumination. Compliance of participants as well as the evaluation of the study were analysed.
Participants' compliance was improvable with M = 69.41%. Compliance did not correlate with depression, rumination, or age. There were no gender differences. Overall, participants evaluated the study as effective. They reported high engagement in the interventions and a subjective improvement of rumination.
The study gives important insights on the acceptance and design of such a study and delivers important starting points for improving the study before conducting it in a clinical sample.

Poster 26: "Psychological and physical stress predicts alcohol intake in persons with mild to moderate Alcohol Use Disorder"

Sabine **Hoffmann**, Judith Zaiser, Patrick Bach, Falk Kiefer

Perceived stress is a risk factor for excessive alcohol consumption in both women and men. Stress-exposure triggers alcohol intake and craving in persons with alcohol use disorder (AUD). However, the relationship of experienced and biologically measured stress on drinking behavior has not yet been studied. We aim to answer the question of whether different types of perceived stress influence alcohol consumption over several weeks.
121 participants with mild to moderate AUD (according to DSM-5) were recruited from a multi-centre study cohort between May 2020 and September 2022. According to a randomization, participants were added to one of three experimental groups: Psychological Stress group (N=40), Physical Exercise group (N=41), and Control group (CTRL) (N=40). Along with the stress challenge and cue-exposure, alcohol craving and cortisol levels were assessed and alcohol use data were collected during a twelve-month follow-up. Over this period, we measured daily alcohol intake, craving and mood via ecological momentary assessment. To analyze the effects of psychosocial stress, cortisol levels, and reported craving on alcohol use in the follow-up period we use linear mixed models.
We identified that perceived stress modulates the drinking behavior in the follow up. Participants with higher perceived stress (during the experiment) have more alcohol intake across all and during weekends. In addition, a higher cortisol

response/cortisol reactivity during experimental stress-induction and higher mean cortisol levels lead to more alcohol consumption especially in males.

Poster 27: 'Will I get dementia?' - Development of a questionnaire for the ambulatory assessment of subjective cognitive decline in elderly people

Franziska **Kiene**, Mandy Roheger

Subjective cognitive decline (SCD) is a condition in which individuals, mostly people aged >60 years, report cognitive impairment and are concerned about a progression of decline – even though the impairment is not yet detectable by neuropsychological testing. Literature shows that individuals with SCD are at a higher risk of suffering from dementia or mild cognitive impairment (MCI) in the future. In addition, SCD is associated with a decreased quality of life and stress: SCD is perceived as a stressor and individuals with increased stress levels are more likely to report SCD. Especially due to the increasing proportion of elderly people, it is important to understand SCD and relating factors such as stress levels to be able to develop effective intervention and prevention measures. So far, there is no questionnaire for the assessment of possible SCD symptom fluctuations and possible influencing factors in the everyday life of individuals and for tracking SCD over days or weeks. Therefore, the aim of this study was to develop a questionnaire for the ambulatory assessment of SCD by conducting focus group discussion with people affected by SCD and a pilot testing of the designed ambulatory assessment questionnaire. The results and the developed questionnaire provide the basis for further longitudinal studies for ambulatory SCD measurements over several weeks to investigate SCD symptoms and symptom fluctuations in the everyday life of people as well as the possible influence of affect, stress and the situation a person is currently in.

Poster 28: Borderline identity disturbance interacts with poor sleep quality to predict higher levels of negative emotion: A daily diary study

Kelly V. **Klein**, Ella Sudit, Nathaniel R. Herr, Alanna M. Covington, Kathleen C. Gunthert

Borderline Personality Disorder (BPD) is characterized by emotion dysregulation, particularly difficulties controlling negative emotions. While emotion dysregulation is intensified by physiological vulnerabilities like sleep quality, the impact of poor sleep on daily levels of negative emotions among individuals with BPD has received little attention in the literature. The present study sought to evaluate whether BPD symptoms, specifically identity disturbance, impact the relation between daily sleep quality and negative emotions.
A sample of 81 couples (n=162) from the DC area were recruited for a three-week daily-diary study. Participants completed baseline measures assessing BPD symptomology, identity disturbance (Borderline Identity Disturbance Self-Report; BIDS), and emotion dysregulation, as well as daily sleep quality assessments in the morning, and daily emotion assessments in the evening.
Mixed-model regression analyses, which accounted for the multi-level nature of the data (i.e., days within participants within couples) and controlled for baseline

depression and neuroticism, revealed a significant interaction between sleep quality and BIDS predicting daily negative emotions. The interaction was such that the relation between poor sleep and negative emotionality was stronger for those higher in BIDS.
These results extend research on the relation between physiological vulnerabilities and emotional reactivity. Specifically, this research strengthens our understanding of the interplay between sleep quality and identity disturbance and their impact on daily emotional functioning of individuals with BPD. Results provide empirical support for therapeutic efforts seeking to improve sleep quality as a strategy for reducing negative affect among individuals with identity disturbance.

Poster 29: Back health in everyday life: Investigating the interplay of cognitions, emotions and sensor-based, daily life physical activity, among individuals with and without low back pain

Karolina **Kolodziejczak**, Lea O. Wilhelm, Nina Lederle, Lara Thiel, Valerie Zipper, Christoph Stein, Lena Fleig

Back health is an important aspect of physical well-being that requires increased attention in modern societies. One of the most prevalent and disabling complaints related to back health is low back pain (LBP). Research on spinal morphology and motion has traditionally utilized cross-sectional designs, but pointed out to the importance of investigating behavioral and psychosocial parameters related to LBP in daily life. Integrating the insights from health psychology and pain medicine, we examine the interplay of physical activity (PA), cognitions, and emotions for experiencing LBP. To do this, we combine a continuous assessment of PA using accelerometry (movisens Move 4) and Ecological Momentary Assessment of behaviors, affect and pain using a smartphone-based app (movisensXS) on 14 consecutive days. Participant recruitment has started in January 2023 and is currently ongoing. In total, 230 participants (115 persons with LBP and 115 asymptomatic individuals) aged 18 to 64 will be included. We hypothesize that PA-related and pain-related cognitions will be associated with PA engagement, the pattern of findings depending on whether the cognitions enhance or diminish PA in the presence of pain. Additionally, compared to asymptomatic individuals, we expect lower levels of PA and more negative affect among persons with LBP. Investigating daily life dynamics of PA, cognitions, and emotions with LBP may provide new insights into modifiable behavioral and psychosocial correlates of LBP, which in turn can be targeted for prevention and treatment of LBP. A better understanding of factors related to LBP is crucial for improving back health in the society.

Poster 30: Generalizability of Ecological Momentary Assessment research to users of illegal substances with an untreated substance use disorder

Laura LL **Lambert**, Charlotte CK Kervran, Emmanuelle EB Baillet, Léa LD Donnadieu, Marc MA Auriacombe, Fuschia FS Serre

Context: Most Ecological Momentary Assessment (EMA) studies, including in addiction research, have been conducted among students or patients. However, users of illegal substances with an untreated substance use disorder (SUD), which tend to have greater precariousness and higher severity, are excluded from such research limiting generalizability. Craving, an unwanted intense urge to use substances, could play a role in this severity. However, little is known about the feasibility and validity of EMA method in this population. Aims: To study the feasibility, acceptability and validity of an EMA protocol to capture daily life craving and substance use among current users of illegal substance with an untreated SUD. Method: Participants diagnosed with a SUD are recruited in both Harm Reduction settings (HR), which offers services for people with higher addiction severity, more precariousness, and limited access to health care, and Addiction Clinics (AC) in France. After an inclusion visit, they completed a two-week EMA protocol to collect mood, craving and substance use four time per day. Feasibility, acceptability and validity of the EMA protocol (e.g., acceptance rate, average response rate, compliance rate across time, acceptance, convergent validity of craving and substance use assessments) will be explored according to inclusion settings (HR vs AC). Preliminary results (ongoing recruitment): The average response rate in EMA was 74.5 % in HR group (n=19) and 77.5% in AC group (n=59). Perspectives: EMA method may improve understanding of addictive behavior, and implication of craving in substance use among active illegal substance users with an untreated SUD.

Poster 31: Capturing change in emotional state in everyday life with different instruments - Differences between 2- and 3-factorial emotion models.

Matthias F. **Limberger**, Markus Reichert, Andreas Meyer-Lindenberg, Heike Tost, Inga Niedtfeld, Philip S. Santangelo, Ulrich W. Ebner-Priemer

Emotions and moods are frequently measured constructs in Ecological Momentary Assessment (EMA) studies. In order to analyze the influence of emotions on other constructs, it is essential to capture the change in these, which is reflected in the variance within subjects. In addition, accuracy and brevity are also crucial criteria. We compared two commonly used instruments for measuring emotions: the Multidimensional Mood Questionnaire (MDBF) and a questionnaire with six positive and nine negative items in a study with 347 participants from a community sample (age 18-28 years), using an electronic diary with nine to 22 queries per day. We tested both instruments' psychometric properties, distributions, variances, and ability to detect change on item- and scale-level. All scales of the MDBF, as well as the Positive Affect scale, showed satisfactory to good results, whereas the Negative Affect scale and its items showed a highly skewed distribution with floor effects and a poor ability to capture change. Our results indicate that the selection of items, especially for Negative Affect, should be done very carefully to ensure direct, untransformed processing of the data.

Poster 32: Day-by-day changes in situation-specific hand washing: Effects of a very brief planning intervention

Noemi NL **Lorbeer**, Jan JK Keller, Nina NK Knoll, Lena LF Fleig

Background: Hand washing can prevent the transmission of infectious diseases such as SARS-CoV-2. As many persons wash their hands rarely or non-effectively, behavior change interventions are needed to promote frequent hand washing. We examined day-by-day changes in situation-specific hand washing across 3 months following a theory-based planning intervention.
Methods: Following a baseline assessment, N = 89 (age: M = 24.15, SD = 6.33) participants were asked in a very brief, online-based intervention to plan up to two situations (cues A and B), for which they would form a new hand washing habit. The frequency of daily cue occurrence and situation-specific hand washing were assessed via end-of-day diaries across 3 months. To examine day-by-day changes, multilevel models were fit.
Results: Most participants (84%) chose to generate hand washing plans for two situations (cues A and B), and 16% of the participants created plans for one situation (cue A). Whereas the frequency of daily cue occurrence remained stable over time, situation-specific hand washing significantly increased across 3 months following the intervention (situation A: b = 0.23, SE = 0.07, p = .002; situation B: b = 0.27, SE = 0.09, p = .003). For situation A, cues related to meal preparation or having a meal were more likely to be enacted than other cues.
Discussion: This theory-based, very brief and potentially scalable intervention appears promising to promote hand washing in hygiene-relevant situations. Future studies could test effects of the intervention using a randomized controlled design.

Poster 33: Combining event-based Ecological Momentary Assessment and ambulatory Heart Rate Variability monitoring to explore associations between subjective feelings of stress and their biological correlates

Tomas **Mika**, Agustín Manresa-Rocamora, Julie Delobelle, Jitka Kuhnova, Michael Janek, Richard Cimler, Delfien Van Dyck, Tomas Vetrovsky

Background
Chronic stress has been linked to various negative health effects, including increased risk of cardiovascular disease, impaired immune function, and decreased cognitive performance. Understanding the associations between subjective feelings of stress and its biological correlates is essential for elucidating the underlying mechanisms of stress-related disorders and developing effective interventions. This study aims to explore associations between momentary levels of stress and the activity of the autonomous nervous system (ANS) in free-living individuals.
Methods
Forty healthy participants aged 18-40 will be followed in their natural environment for one week. Their momentary stress levels, stressful events, and social and environmental context will be assessed up to 12 times a day, using a combination of time- and event-based Ecological Momentary Assessment (EMA). The event-based

surveys will be triggered by two consecutive minutes of heart rate above an individually set threshold while the participant is sedentary, using real-time sensing platform HealthReact. The activity of ANS will be assessed by ambulatory heart rate variability (HRV) monitoring using electrode patches. The associations between momentary levels of stress, preceding stressful events, context, and parameters of HRV will be explored using multilevel modelling.
Discussion
By drawing on advances in wearable sensor technologies, this study will enable triggering EMA surveys when heart rate is high but physical activity is low, thus sampling moments with potentially increased stress levels. The study's results will contribute to a better understanding of the associations between stress levels and ANS activity and help develop methods for ambulatory monitoring of stress.

19:30 Conference dinner

Time: 19:30 - 22:00

Location: Café-Restaurant de IJ-kantine
NDSM-kade 5, 1033 PG Amsterdam

(tickets required)

Tuesday June 6, 2023

08:00 - 18:00: Check-in for the conference is available all day.

9:00 Day opening

Household announcements by the SAA local organizing committee and introduction of the keynote speaker by dr Brenda Penninx.

Time: 09:00 - 09:15
Location: Grote Zaal

9:15 Keynote Lecture Faith Matcham

Digital Sensing in Major Depressive Disorder – Long-term engagement with remote measurement technologies, and early indicators of relapse prediction.

Faith Matcham, University of Sussex

Remote Measurement Technologies such as wearable devices and smartphone sensors have potential to revolutionise the way in which we monitor chronic conditions. Providing high-frequency, objective information with minimal burden to the user, we can gather a rich understanding of daily variability in symptoms, contextualised against self-reported experiences.
The Remote Assessment of Disease and Relapse – Major Depressive Disorder (RADAR-MDD) was a longitudinal cohort study, aiming to examine the feasibility of long-term digital sensing in an MDD population, and use data collected via remote measurement technologies to identify early signs of relapse. The study recruited over 600 individuals with recurrent MDD from sites in London, Amsterdam and Barcelona, and asked participants to wear a FitBit, answer app-delivered questionnaires, and provide passively-collected smartphone sensor data for a median follow-up time of 18 months. The resulting dataset is the largest multiparametric digital dataset in a clinical population in the world
This lecture will share some of the key learnings from this international research project. We will discuss the feasibility and acceptability of large-scale passive and active data collection in people with recurrent MDD and examine the predictors of long-term engagement with remote monitoring. Some of the latest findings from our analyses, examining longitudinal predictors of depression severity and relapse will be presented alongside some of the critical implications for clinical implementation..

Time: 09:15 - 10:15
Location: Grote Zaal (Main Theatre)

10:15 Coffee break / Sponsor exhibition

Time: 10:15 - 10:30:
Location: Sponsor stand / Foyer

10:30 Symposium 13: Everyday emotional experiences: Tracing implications for multiple domains of functioning

Chairs: Antje Rauers & Lisanne Pauw

Emotions play a crucial role in shaping people's cognitions and behaviors, their social relationships and their health. The aim of this symposium is to bring together ambulatory studies that advance our understanding of how everyday emotions relate to these multiple outcomes. The symposium showcases six talks that demonstrate the value of combining ambulatory methods with additional innovative approaches to address these questions. First, Catharine Evers will use experience sampling data to investigate the reciprocal relationship between emotion regulation and momentary self-control, focusing on the role of suppression and reappraisal. Second, Minxia Luo will present a multimethod daily-diary study examining the role of affect and cortisol for links between leisure activities and working memory. Third, Michaela Riediger will present measurement-burst data examining longitudinal links between everyday emotional experiences and physical health across the adult lifespan. Fourth, Michael Boiger will present a dyadic daily diary study investigating associations between emotional differences, coping strategies, and relationship functioning among intercultural couples. Continuing the study of romantic couples, Lisanne Pauw will present two dyadic experience sampling studies examining the consequences of six interpersonal emotion regulation strategies for emotional and relational wellbeing. Finally, Antje Rauers will present a dyadic experience sampling study investigating if disclosing everyday emotional experiences to others enhances people's emotional clarity. Taken together, the present symposium sheds light on how everyday emotional experiences may help or harm daily functioning across a wide range of domains.

Time: 10:30 – 12:00
Location: Grote Zaal (Main Theatre)

Everything Under Control? Daily Dynamics of Self-Control and Emotion Regulation

Catharine **Evers**, Loes van den Bekerom, Monika H. Donker, Tim Mainhard

Self-control and emotion regulation seem to be interrelated, and this interplay may not only vary between people, but also within individuals over situations and time. However, research on this reciprocal relationship as it occurs in the daily life of

individuals is scarce. The present study therefore investigated the within-person reciprocal relationships between momentary self-control and emotion regulation (i.e., reappraisal and suppression) by means of experience sampling.
Measures included short assessments of emotions, self-control, and emotion regulation five times per day during four days. The real life context was focused on students in an academic setting, and related to emotions that hinder students' goal progress (i.e, studying). Each measurement moment tackled momentary self-control, the intensity of diverse emotions, and the extent to which these interfered with goal progress. If participants indicated that emotions hindered their goal progress, momentary emotion regulation (suppression and reappraisal) was assessed. The final dataset included a total of 1874 reports of 111 undergraduate university students.
Results based on dynamic structural equation modelling (DSEM) revealed that, at within-participants level, suppression at one timepoint was related to depleted self-control thereafter, while such disadvantageous effect was absent for reappraisal. Momentary self-control, then, predicted the employment of subsequent reappraisal, but also future self-control. At between-participants level these results were not found.
Findings highlight the importance of experience sampling in gaining more insight into how self-control and emotion regulation interact and are discussed in light of the importance of situational influences.

Leisure activity and working memory in older age: The mediating role of affective states and salivary cortisol

Minxia Luo, Elisa Weber, Theresa Pauly, Karolina Kolodziejczak, Denis Gerstorf, Nilam Ram, Christiane A. Hoppmann, Gizem Hülür, Christina **Röcke**

Activity engagement has protective effects for cognitive abilities in older age; but the underlying mechanisms are not well understood. This study examined the short-term predictive effects of leisure activity for working memory and the role that affective states (valence and arousal) and cortisol play for linking the two. We examined 8,124 data points from 241 participants residing across Germany from the German Socio-Economic Panel (SOEP). Over seven days, participants (aged 56–88 years) reported their present activity and affective states, completed ambulatory working memory tasks, and provided saliva samples five times per day. Results from multivariate time series analyses showed that engagement in leisure activity was predictive of better working memory performance as captured about 6 hrs later. Moreover, positive affect (high- and low-arousal) partially mediated this temporal association. That is, engagement in leisure activity was associated with higher concurrent positive affect (high- and low-arousal), which in turn was associated with better working memory performance as captured about 6 hrs later. In contrast, negative affect and cortisol did not have mediator effects, but cortisol was positively related to subsequent working memory 6 hrs later. In sum, our findings suggest that engagement in leisure activity may have benefits for working memory performance through enhancing high- and low-arousal positive affect and potentially highlighting a neuroendocrine pathway involving cortisol release.

Affect-Health Coupling from Adolescence to Old Age: Evidence from a Longitudinal Experience-Sampling Study

Michaela **Riediger**, Fabian Münch, Jennifer Bellingtier, Elisabeth Blanke, Cornelia Wrzus, and Gloria Luong

While there is consensus that physical and emotional well-being are related, divergent claims have been made about possible age-related differences. This study aimed to investigate potential age-related differences in concurrent and prospective associations between everyday affective experiences and individuals' health and physical well-being. We used two waves of measurement burst data (wave 1: N = 398, 12 – 90 years; wave 2: N = 365, 14 – 88 years; inter-wave interval: M = 2.53 years). Per wave, participants provided 54 experience samples of their momentary affective and physical well-being. In addition, several person-level health indicators were assessed, including subjective health as well as number and severity of health conditions and complaints. Overall, results point to an age-related increase in affect-health coupling: The older participants were, the more strongly were health problems associated with lower concurrent affective well-being. Age moderations also emerged for prospective affect-health links, both across shorter (hours) and longer time intervals (years). Dynamical structural equation modelling showed an age-related increase in cross-lagged associations between individuals' time series of momentary emotional and physical well-being, assessed while participants pursued their normal daily routines. Similarly, moderated cross-lagged panel models yielded age-related increases in cross-lagged associations between everyday emotional well-being and indicators of physical health, assessed 2.5 years apart. Such age moderations emerged in both directions of cross-lagged associations (i.e., affect predicting later health, and health predicting later affect). This suggests that both the affective relevance of health impairments and the health-protective role of daily affective experiences may become more pronounced with advancing age.

Emotion dynamics in daily life: Challenges and opportunities for intercultural couples

Michael **Boiger**, Anna Schouten, Bertjan Doosje

There are cultural differences in the typical emotional dynamics between romantic partners. The present research starts from the idea that in the daily lives of intercultural couples, these cultural differences meet. We suggest that this creates both a challenge and an opportunity: Depending on how intercultural couples deal with emotional differences in situ, these may weaken or strengthen their relationship over time.
Using a 14-day daily diary study with N=55 East-West intercultural couples and N=73 Belgian monocultural couples, we found that intercultural couples experience on average more emotional differences in daily life than monocultural couples. These emotional differences can explain the lower relationship satisfaction found in intercultural compared to monocultural couples. However, we also found that successful coping strategies on days with conflicts can mitigate the impact of emotional differences on relationship satisfaction. When couples experienced

substantial emotional differences, relying on open communication aggravated the situation. In comparison, approaching differences with openness and curiosity came with higher relationship satisfaction
Our findings highlight the importance of considering the role of cultural differences in emotions in intercultural relationships, and suggest that intercultural couples can use emotional differences are not at the mercy of the differences they encounter.

Let me help you: The relationship between interpersonal emotion regulation and emotional and relational wellbeing in daily life

Lisanne S. **Pauw**, Rui Sun, Giulia Zoppolat, Francesca Righetti, Anne Milek

When in emotional distress, people often get support from others in regulating their emotions, a phenomenon termed interpersonal emotion regulation (IER). Despite the prevalence of IER, we know remarkably little about the relative effectiveness of specific IER strategies for improving emotional and relational wellbeing in daily life. Here, we report two preregistered, ecological momentary assessment studies, in which we examined how the use of six key IER strategies relates to emotional and relational wellbeing among romantic couples in daily life. Study 1 focused on enacted IER as reported by the regulator, whereas Study 2 focused on perceived IER as reported by the regulated partner. Using an experience sampling design (N = 136), Study 1 showed that when people reported to have given advice or encouraged their partner to suppress their emotions, their partners experienced impaired emotional wellbeing. When people reported to have distracted their partner, their partner experienced enhanced positive affect and closeness. The use of interpersonal reappraisal, acceptance and ignoring was unrelated to partners' momentary wellbeing. Using a daily diary design, Study 2 (N = 361) showed that perceptions of being ignored by the partner were associated with impaired emotional and relational wellbeing on the same day. The perceived use of other IER strategies was unrelated to momentary wellbeing. The present set of studies illuminates how IER processes shape people's emotions and relationships in ecologically valid settings. Our findings indicate that enacted and perceived regulatory behaviors are associated with differential outcomes, highlighting the complex nature of interpersonal emotion dynamics.

Can you help me sort this out? Affect differentiation after disclosing recent daily hassles

Antje **Rauers**, Doris Montag, Michaela Riediger

People often claim that telling others about recent daily hassles (social sharing) "helps" them. This seems at odds with empirical research showing that people often feel worse – instead of better – after disclosing negative experiences, possibly because this partly reactivates the initial experience. In this dyadic experience-sampling study, we tested the notion that social sharing may serve affective benefits other than decreased negativity. Specifically, we tested the hypothesis that social sharing allows people to obtain more clarity about the exact nature of their negative emotions. For example, talking about an experience may help people realize that

they are disappointed, rather than feeling vaguely upset. N=100 younger (20-30 years) and older couples (69-80 years) provided M=87 experience-sampling reports. Participants repeatedly documented their daily hassles, social sharing with their partners, and how helpful sharing was. Participants' repeated ratings on four negative affect items were used to compute a time-varying index of people's momentary emotion differentiation (Erbas et al., 2021).
In contrast to our hypothesis, multilevel analyses showed that social sharing was associated with lower – instead of higher – emotion differentiation, if compared to hassles that remained undisclosed. However, emotion differentiation was higher if the sharing episode was perceived as particularly helpful. This suggests that social sharing may indeed be perceived as "helpful" if it comes with greater emotional clarity. On average and in the short term, however, everyday social sharing seems to typically involve even more – instead of less – emotional turmoil.

10:30 Symposium 14: The patient at the centre: Personalized approaches to ambulatory assessment in clinical research and application

Chair: Lino von Klipstein

Ambulatory assessment (AA) allows us to collect rich data on the experiences of individual patients suffering from psychopathology. Through AA, clinical researchers are able to shift their approach away from group-based research, where heterogeneity can be problematic, towards more idiographic, personalized approaches, where heterogeneity is embraced. Personalization offers an opportunity to navigate the complexity of psychopathology more successfully. At the same time, personalization is a challenging balancing act between choices that reflect the individual and choices that reflect generalizable psychological constructs. In this symposium, we present talks that navigate this challenge to use personalized AA in clinical research and practice.
The first two speakers present approaches to personalizing the AA assessment tool in order to operationalize contextual factors (von Klipstein) and psychological rigidity (Servaas). The remaining three speakers present person-level analyses of AA data in the service of identifying individual predictors of sleep (Li), identifying individual key eating disorder symptoms that can be matched with interventions (Ralph-Nearman), and providing clinicians with network-model feedback on individual patients (Hall). Overall, this symposium highlights the potential and challenges of using personalized approaches to AA to capture aspects of psychopathology.

Time: 10:30 - 12:00
Location: IJ Zaal

Opening the contextual black box: A case for idiographic experience sampling of context for clinical applications

Lino **von Klipstein**, Marie Stadel, Fionneke M. Bos, Harriëtte Riese, Michelle N. Servaas

The experience sampling method (ESM) is increasingly investigated as a clinical tool for various applications. It is therefore important to consider how ESM might need to adapt to this new, clinical setting. In this talk, we propose a shift in how ESM assesses context, which we believe offers more clinically relevant information on individual patients. Being able to place a patient's experience in context is essential in clinical settings. What is pathological in one context, can be adaptive in another. While ESM assesses in context, ESM research has paid relatively little attention to assessing the context, a situation that has been referred to as the "contextual black box". Current ESM context items generally serve the nomothetic goal of capturing contextual factors that are shared across individuals. We argue, that such items have limited clinical utility, as the sacrifice too much specificity and make assumptions that can be problematic on the individual level. We propose a more idiographic approach to ESM context assessment and present three avenues: i) qualitative ESM items, where participants respond to open questions by filling in text; ii) personalized response options and self-learning items, where participants help to define personally relevant response categories s; and iii) personalized ESM items, where participants help to define concepts relevant to assess for their particular case. We discuss advantages and disadvantages of such an idiographic approach and discuss future directions for ESM in research and practice.

The many faces of rigidity: a personalized experience sampling approach

Michelle N. **Servaas**, Philip L. Von Klipstein, Aliye C. Taslioglu Sayiner, Moritz L. Hausmann, Date C. van der Veen, Robert A. Schoevers, Laura F. Bringmann, Harriëtte Riese

The aim of the current study is to better understand rigidity by exploring how negative and positive core beliefs fluctuate over time and how they are associated with experienced stress and severity of depressive symptoms. Furthermore, we investigated whether rigidity can predict the course of depressive symptoms over a period of 8 months.
To this end, we used data of the Therap-i study1 wherein personalized core beliefs and experienced stress were measured five times a day for eight weeks during psychological treatment for individuals with major depressive disorder (MDD). The ESM items capturing core beliefs were based on case conceptualization of the patient's psychopathology and created in collaboration with the patient and their clinician during psychological treatment for MDD. Furthermore, depressive symptom severity was assessed several times, namely before, during and after (follow-up period of six months) the ESM monitoring period.
First, we observed that fluctuations in core beliefs and their relationship with experienced stress are very person-specific. Second, a significant positive relationship was found between rigidity and the severity of depressive symptoms. Third, rigidity predicted the severity of depressive symptoms over a period of 8 months.

To conclude, rigidity in core beliefs is an informative concept on the course of depressive symptoms over a period of eight months. However, more research is needed to provide more definite answers as to whether this concept can be used as a transdiagnostic, long-term predictor for course of psychiatric illness and risk of chronicity.

Personal predictors of sleep in older patients with cognitive impairments and depression: a series of eight single-subject studies

Zijun,Z, **Li**, Harriëtte, H, Riese, Richard, RC, Oude Voshaar, Marij, M, Zuidersma

ABSTRACT
Objective: Sleep disturbances are highly prevalent and co-occurring with depression in older individuals. Knowledge of predictors for sleep disturbances are currently derived from group-based studies from which it is not possible to identify personal predictors. In the current replicated single-subject study we aim to test personal predictors of sleep disturbances in older individuals diagnosed with depression and cognitive impairments.
Methods: Twelve individuals (≥60 years) with depression and cognitive impairments were recruited at the UMC Groningen. Eight participants were finally included in data analysis. Data were collected with daily self-report diaries (sleep quality, behavioural and contextual predictors) and actigraphy (total sleep time and sleep efficiency) for 63 consecutive days. Generalized Least Squares analyses were applied on time-series data from each individual separately to identify personal predictors of sleep disturbances.
Results: Personal predictors of sleep disturbances differed between participants. Caffeine and alcohol consumption, moderate and intensive physical activity, positive and negative affect, social interactions and daytime naps were identified as significant predictors for sleep disturbances in some individuals but not in others. Some behaviours even had opposite effect on sleep in different persons. For example, more intensive physical activity was associated with lower sleep quality in two participants (β(SE)=-0.005(0.002); β(SE)=-0.019(0.008)), while it was associated with higher sleep quality in one other participant (β(SE)=0.01(0.005).
Conclusions: When treating sleep disturbances, interesting intervention targets may differ between persons. Our findings emphasize the need of a more personalized approach both in research and clinical practice.

Personalised digital therapeutics for eating disorders

Christina **Ralph-Nearman**, Jesse Rae, Cheri A. Levinson

Eating disorders, such as anorexia nervosa (AN) and atypical AN, are serious psychiatric disorders, and are among the highest mortality rates of all mental health illnesses. The gold-standard treatments for adults with eating disorders have minimal success. Further, relapse is extremely common, with nearly half of individuals relapsing within months after discharging from higher levels of care. To add to the complexity, there is high heterogeneity among eating disorders, even

between individuals with the same eating disorder diagnosis. For instance, two individuals with AN may endorse very different symptoms (e.g., shame vs. fear of weight gain) that drive and maintain their illness. Thus, there is an urgent need for personalized and digital therapeutics to identify and target eating disorder symptoms that drive the individual's pathology. We will present findings from a two-part quantitative and qualitative pilot evaluating a new personalized digital mobile therapeutic called Awaken Digital Guide. This therapeutic uses a data-driven, personalized approach to identify the key eating disorder symptoms and matching evidence-based treatment for each key symptom. We will discuss clinician and patient feasibility, useability, and acceptability results from eating disorder-specialized therapist and patient pairs who used and evaluated the new personalized mobile therapeutic for eating disorders. We will consider the importance of user-input within the development and dissemination of adoptable, scalable, and personalized digital mental health therapeutics to promote well-being.

The clinical utility of EMA-based network models: Methodology and therapist perceptions of the TheraNet project

Mila **Hall**, Julian A. Rubel

Introduction: Network analyses can visualize individual patients' EMA data and have been lauded for their potential clinical uses. Giving therapists further information about their patients can improve therapy outcomes. The TheraNet project focuses on how clinically useful EMA-based network models are. Method: We will present and explain the EMA design within TheraNet, as well as qualitative results from therapist interviews and focus groups. One-on-one interviews captured therapists' first reactions to the EMA-based feedback, while focus groups of 3-4 therapists each took place later as a way to gauge therapists' reactions later in the study. Both (N_interviews = 32; N_groups = 5) were analyzed descriptively using content analysis, in an effort to summarize what therapists said. Results: Therapists' comprehension of the EMA-based network models at the beginning of the study was good, though many therapists reported forgetting the interpretations over time during the focus groups. Several wishes for future studies were voiced in the focus groups, with a particular focus being placed on personalization of EMA assessments and short, easily-accessible interpretation aids for therapists. Discussion: The TheraNet project is ongoing, but already provides evidence for the curiosity and interest of therapists in receiving EMA-based network feedback. These types of studies should be planned carefully, including how to support therapists in their interpretations of the data. Several contextual factors should be also taken into account, such as other ongoing research and general therapist workload.

10:30 Symposium 15: Stress and Emotional Eating in Everyday Life

Chair: Ann-Kathrin Arend

The impact of stress and emotions on eating behavior is widely discussed, yet psychometric and experimental findings on stress and emotional eating (SE and EE) are inconsistent (e.g., Evers et al., 2018). Thus, research with ecological validity seems warranted. Therefore, this symposium delivers an update of the field:
Alea Ruf will present data which argue against a particular risk for SE in ADHD. Simone Lüthi will talk about the moderating role of stressor type: While work-related stressors led to less snacking, interpersonal stressors led to more snacking. Maurane Desmet will present data from a network-analysis of EMA data on eating behavior of 12- to 16-yearold adolescents. Jens Blechert combines EMA, laboratory, and psychometric data of adults with healthy BMI by structural equation modelling showing that they tap into the same underlying emotional eating construct. Julia Reichenberger will present a network-analysis of EMA data from females with eating disorders. In AN-r, higher calorie consumption led to less positive and more negative emotions. In AN-bp it led to less negative emotions. Ann-Kathrin Arend will present a machine learning approach that selects individual binge-eating antecedents. The results show a high degree of heterogeneity between the individual subsets of binge-eating antecedents.
In sum, SE and EE theories need to account for this high variability between-person (i.e., psychopathology and age) and within-person (i.e., stressor-type and distinct emotions), as it drives different effects (i.e., more vs. less) in different aspects of eating behavior (i.e., calorie intake, snacking, binge-eating).

Time: 10:30 - 12:00
Location: Expo

Stress eating in adult ADHD – An Ecological Momentary Assessment study

Alea **Ruf**, Andreas B. Neubauer, Ulrich Ebner-Priemer, Andreas Reif, Silke Matura

Background: Originally conceptualized as a neurodevelopmental condition restricted to childhood, it is now recognized that Attention Deficit Hyperactivity Disorder (ADHD) persists into adulthood, with around 2.5-2.8% of adults reporting clinically-significant symptoms. Considerable evidence supports the presence of a close link between adult ADHD and obesity. Beyond that, individuals with ADHD seem at risk for disordered eating, particularly overeating, and show emotion regulation deficits and maladaptive stress coping strategies, while reporting elevated levels of perceived stress. Objective: Since these findings suggest that individuals with ADHD might be at particular risk for stress eating (i.e., overeating as a response to stress), the present study assessed the stress and eating relationship in 38 adults with ADHD using Ecological Momentary Assessment. Methods: Over a period of three days, participants reported perceived stress and state-impulsivity eight times a day (signal-contingent) and recorded food intake (event-contingent). It was assessed whether emotion regulation, trait-impulsivity, and state-impulsivity moderate the stress and eating relationship. Multilevel two-part models were used to study the relationship between stress and the occurrence as well as the amount of food intake. Results: Stress was not related to the occurrence and the amount of food intake. Trait- and state-impulsivity as well as emotion regulation did not moderate

the stress and eating relationship. Conclusions: No evidence was found that individuals with ADHD are at particular risk for stress eating. Yet, future studies are needed to replicate these findings. Individuals with ADHD could benefit from preventative measures targeting overeating and should therefore be studied further.

The relationship between perceived stress and unhealthy snacking in everyday life: The type of stressor matters

Simone **Lüthi**, Melanie Bamert, Jennifer Inauen

Objective: Stress influences our health directly via automatic physiological reactions, but also indirectly via changes in health behavior. Especially everyday stress is related to an increased consumption of unhealthy snacks. This study examines the relationship between experienced stress and unhealthy snacking in everyday life. In addition, moderation effects of the type of stressor are analyzed. Methods: Students at the University of Bern (N = 66) participated in an intensive longitudinal study over a period of four days. The experienced stress and the number of unhealthy snacks consumed were recorded eight times a day (2'310 observations analyzed). The results were analyzed using generalized estimating equations. Results: Overall, no relationship was found between experienced stress and unhealthy snacking, but work-related stressors moderated the effect. At times when work-related stressors were reported as opposed to other stressors, less unhealthy snacking was reported for the subsequent two hours (B = -0.51, SE = 0.24, p = .037). In addition, individuals who experienced more stress on average, consumed more unhealthy snacks when experiencing an interpersonal stressor compared to other stressors. Conclusion: The present work suggests that considering the type of stressor is important for understanding the relationship between stress and unhealthy snacking in everyday life. Whereas work-related stressors seem more relevant for eating decisions in the moment, interpersonal stressors could adversely affect unhealthy eating for persons who experience stress regularly. Interventions tailored to the type of stressor seem promising to mitigate stress effects on eating behavior.

Ecological momentary assessment study of factors associated with eating behavior

Maurane **Desmet**, Rui Sun, Sieske Franssen, Anne Roefs, Caroline Braet

Introduction. The childhood ‘obesity epidemic’, referring to the global increasing prevalence of obesity in children and adolescents is considered to be one of the greatest public health challenges of the twenty-first century. Although the aetiology of obesity is complex and multifactorial, maladaptive eating behavior including overeating and eating highly palatable foods is a key element in the onset and maintenance. Research has shown that different factors play a role in eating and dietary intake behavior but these rely on retrospective self-report questionnaires or laboratory paradigms. These methods lack ecological validity and are a subject to retrospective bias. Naturalistic studies of intrapersonal and interpersonal factors in maladaptive eating are lacking, particularly in adolescents. The current study used

Ecological momentary assessment (EMA) via a smartphone application to collect data in real-time in participant's natural environment. The study is part of a European project in which three countries were involved (Belgium, The Netherlands and France)
Method. Participants were 68 adolescents from 12 to 16 years old with obesity (M = 14.24, SD = 1.58, 61.76% girls; adjusted BMI M = 154.05, adjusted BMI SD = 23.30). A network-analysis will be done to test the factors associated with eating behavior.
Results and discussion. The analyses are currently ongoing.

Interindividual differences in emotional eating: a multi-method approach

Jens **Blechert**, Rebekka Schnepper, Ann-Kathrin Arend, Takuya Yanagida, Julia Reichenberger

Background: Emotional eating (EE) refers to eating in response to emotions instead of hunger. Popular in lay psychology, the evidence base for the validity of this concept is surprisingly mixed: some meta-analyses find EE only in eating disordered patients, others only in restrained eaters, which suggest that only certain subgroups show EE. Some of this divergence might be further be due to different measurements of interindividual differences related to EE.
Methods: Three EE measures were obtained from 102 non-eating disordered participants with a wide BMI-range. First, psychometric questionnaires were completed. Second, image-stimulated food craving ratings after negative vs. neutral emotion induction was measured. Third, ecological momentary assessment (EMA) probed the relationship between momentary negative emotions and momentary food cravings across 10 days.
Findings: Confirmatory factor analysis fitted one latent factor to the shared variance among these three measures. This latent EE factors correlated positively with subclinical eating disorder symptoms and BMI but not with restrained eating.
Discussion: The one factor solution hints at the existence of a single common EE construct behind three different measurements. Individual differences in EE are supported by the data and are related to eating and weight (psycho)pathology but not to restrained eating. EE differs between individuals and is relevant to mental and physical health.

Networks of emotions and eating behavior in different eating disorders and weight-related diseases

Julia **Reichenberger**, Sercan Kahveci, Ann-Kathrin Arend, Jens Blechert

Negative and positive emotions can influence various aspects of eating behavior across the eating disorder spectrum (restrictive and binge-purge Anorexia Nervosa (AN-r; AN-bp), Bulimia Nervosa (BN) and Binge Eating Disorder (BED)) and weight-related disorders (i.e., individuals with overweight and obesity). Moreover, eating behavior has also been shown to influence subsequent emotions. The current study aimed at assessing the mutual relationships between emotions and eating behavior in daily life through using a network modeling approach.

Females were interview-diagnosed with either AN-r (n=31), AN-bp (n=26), BN (n=42) or BED (n=37) and the samples of healthy controls (n=58) and overweight/obese individuals (n=46) were ED free. All individuals completed eight days of Ecological Momentary Assessment (EMA) with six prompts per day asking about current emotions, desire to eat, hunger and retrospective calorie intake.
Networks showed marked differences but also similarities between the different groups. Whereas the network of individuals with BN was least connected, the network of individuals with AN-r was most strongly interconnected. Interestingly, in individuals with AN-r, higher calorie consumption led to less subsequent positive and more subsequent negative emotions, whereas in individual with AN-bp it led to less subsequent negative emotions.
This is the first study that conducted network models across the eating disorders and weight-related diseases using daily life EMA data. Several interesting mutual relationships between emotions and eating behavior have been found that are in line with previous research and inform ED interventions. Future studies might incorporate weight- and body image-related aspects and include male participants.

Toward Individualized Prediction of Binge-Eating Episodes Based on Ecological Momentary Assessment Data

Ann-Kathrin **Arend**, Tim Kaiser, Björn Pannicke, Julia Reichenberger, Silke Naab, Ulrich Voderholzer, Jens Blechert

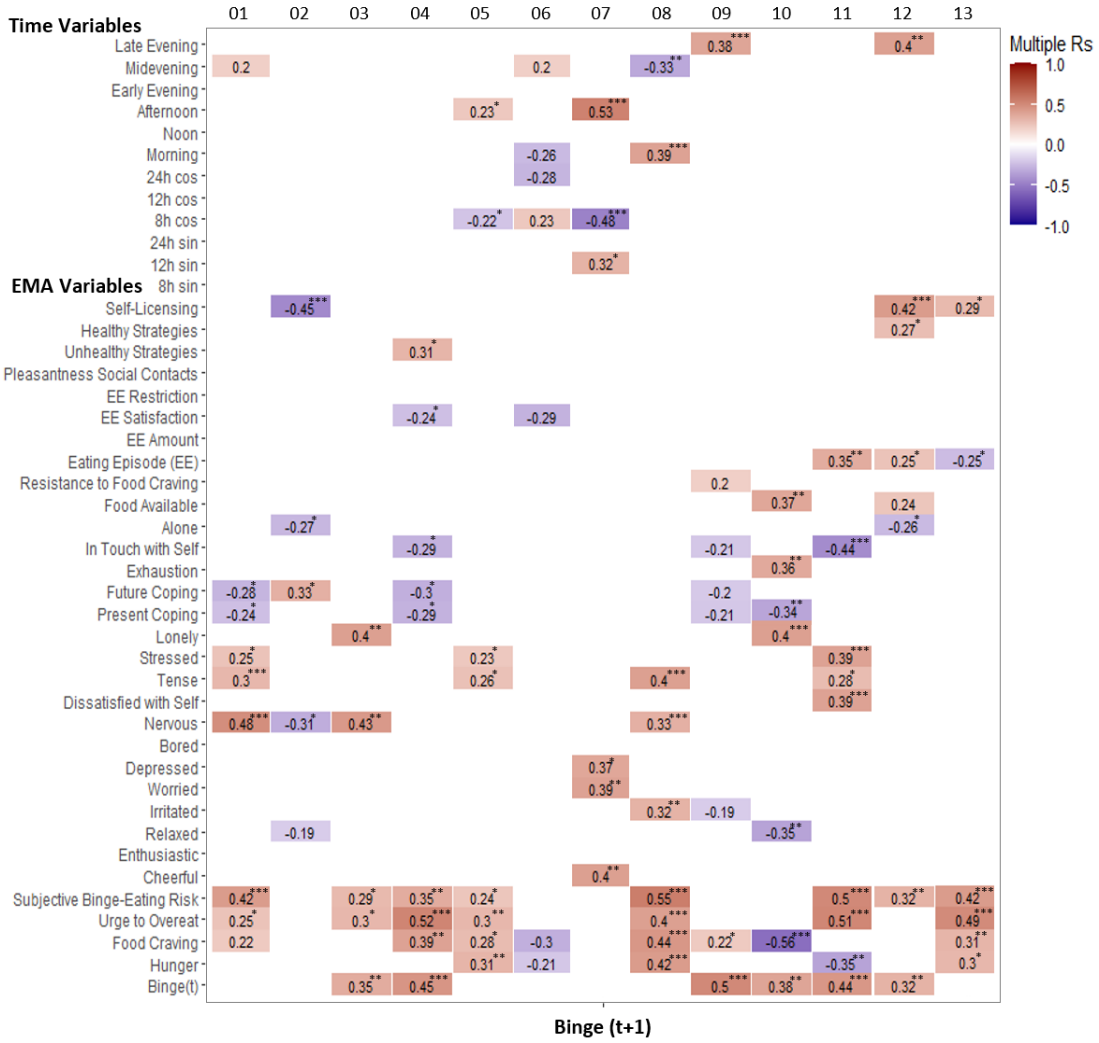
Introduction: Prevention of binge eating through mobile just-in-time adaptive interventions requires prediction of respective high-risk times, e.g., through preceding affective states or associated contexts. Yet, these factors and states are highly idiographic and thus prediction models based on averages across individuals often fail.
Methods: We first derived a novel EMA-item set that covers a broad set of potential idiographic binge-eating antecedents from literature research and an eating disorder focus group. The final EMA-item set (6 prompts per day for 14 days) was assessed in female patients with Bulimia Nervosa and Binge-Eating Disorder. We used a correlation-based machine learning approach to select parsimonious, idiographic item subsets and predict binge-eating occurrence from EMA data.
Results: On average 67.3 (SD=13.4, range 43-84) EMA observations were analyzed within participant (N=13). The derived item subsets predicted binge-eating episodes with high accuracy on average (mean AUC=.80, mean 95% CI [0.63, 0.95]; mean specificity=.87; mean sensitivity=.79; mean maximum reliability of rD=.40, and mean rCV=.13). Across patients, highly heterogeneous predictor sets of varying sizes (M=7.31, SD=1.49, range 5-9 predictors) were chosen for the respective best predicting models. (See Figure1 for idiographic predictor selections and Table1 for their idiographic prediction accuracies.)
Discussion: Thus, predicting binge-eating episodes from psychological and contextual states seems feasible. Yet, predictor sets were highly idiographic, implying that theories on binge eating need to account for this high between-person variability. Ultimately, a radical shift from purely nomothetic models towards idiographic prediction models and theories seems warranted.

Table 1 Model fit indices for prediction of binge eating in the next 2.5 hours (t+1) with idiographic Best Items Scale that is Cross-validated, Unit-weighted, Informative, and Transparent item selections per participant.

	Participants												
	01	02	03	04	05	06	07	08	09	10	11	12	13
Model fit indices													
AUC[a] (95% CI)[b]	0.92 (0.75-1.00)	0.97 (0.92-1.00)	0.84 (0.70-0.98)	0.51 (0.23-0.80)	0.73 (0.45-1.00)	0.93 (0.77-1.00)	0.93 (0.83-1.00)	0.85 (0.75-0.95)	0.63 (0.41-0.85)	0.75 (0.58-0.93)	0.72 (0.53-0.92)	0.60 (0.29-0.90)	0.98 (0.94-1.00)
Specificity	0.84	0.89	0.74	1.00	0.86	0.85	0.90	0.81	1.00	0.74	0.87	0.91	0.96
Sensitivity	1.00	1.00	.86	.45	.67	1.00	1.00	.80	.56	.73	.69	.56	1.00
Derivation step (within-sample performance)													
r_D[c,d] (SD)	0.48 (0.04)	0.42 (0.05)	0.53 (0.04)	0.33 (0.05)	0.34 (0.03)	0.47 (0.06)	0.53 (0.06)	0.51 (0.10)	0.10 (0.22)	0.46 (0.06)	0.50 (0.06)	0.18 (0.10)	0.32 (0.23)
Validation step (out of sample performance)													
r_{CV}[d,e] (SD)	0.41 (0.34)	0.10 (0.56)	–0.02 (0.72)	0.36 (0.38)	0.38 (0.62)	–0.36 (0.28)	0.29 (0.30)	0.54 (0.42)	–0.11 (0.46)	0.34 (0.27)	0.27 (0.64)	0.08 (0.78)	–0.56 (0.57)

[a]AUC: Area Under the Curve.
[b]95% CI: Bootstrapped 95% CI of the AUC.
[c]r_D: Multiple *R* of the unit-weighted scale in the derivation step.
[d]r: Pairwise Pearson Correlation of the predictor subsets (at t) with time-shifted binge-eating episodes (at t+1).
[e]r_{CV}: Average cross-validated multiple *R* of the derived scale.

Figure 1. Idiographic predictor subsets for binge eating with Pairwise Pearson Correlations (Multiple Rs) of each selected predictor of binge eating in the next 2.5 hours (t+1).



Notes. The predictors (at t) with the highest multiple Rs (pairwise Pearson correlations) with time-shifted binge-eating episodes (at t+1) were selected. All listed items were selected as idiographic predictors of binge eating, independent of their significance. However, we additionally calculated the significance of the correlations for the context (*, **, and *** indicate that the correlations are significant at a level of .05, .01, and .001,
respectively; 2-tailed).

10:30 Symposium 16: Using Ambulatory Methods in the Study of Self-Injurious Thoughts and Behaviors

Chairs: Kelly L. Zuromski & Glenn Kiekens

Suicidal and non-suicidal self-injury, collectively termed self-injurious thoughts and behaviors (SITBs), are a significant public health issue worldwide. Despite many years of study, SITBs remain challenging to predict and prevent. Fortunately, recent technological advancements have made it possible to study SITBs as they unfold in

real-time in daily life, which has the potential to significantly improve our understanding of SITBs and inform prevention efforts. In this symposium, we will present six empirical studies in which ambulatory methods, including smartphone-based ecological momentary assessment (EMA) and wearable biosensors, are used to study SITBs in both adolescents and adults. First, we will present data on how the wording, response options, and timing of EMA items may influence participants' self-reported SITBs (Christensen). Second, we will evaluate whether individuals who engage in SITBs experience affective-cognitive states differently than those without a history of self-injury (Kiekens). Next, we will present data from two studies examining interpersonal risk factors for SITBs, including the impact of the COVID-19 pandemic on social isolation using EMA and smartphone GPS data (Fortgang), and the quality and quantity of social interactions assessed using EMA (Kirtley). In the fifth presentation, we will examine the association between sleep problems and SITBs using both EMA and wearable biosensor data (Zuromski). Finally, we will present results of a novel digital phenotyping approach in which EMA and text data from screenshots of participants' smartphones are used to predict suicidal thoughts (Jacobucci). Together, these presentations will highlight the promise of ambulatory methods for better understanding and predicting SITBs.

Time: 10:30 - 12:00
Location: Studio

Wording, timing, rating: How EMA methodological choices impact observed data patterns in suicide and self-injury research

Kirsten **Christensen**, Amanda Bianco, Sarah E. Victor

Researchers constructing ecological momentary assessment (EMA) batteries often make assumptions about how respondents interpret different question wording, response options, and time frames assessed. However, little research has tested these assumptions. We compared "at this moment" and "since the last survey" reports of suicide ideation (SI) and non-suicidal self-injury (NSSI) urges in 93 participants during a 2-week EMA protocol. Young adults with recent NSSI urges/behaviors completed 2 current SI items and 2 current NSSI urge items on a 1-5 Likert-type scale, and 1 item each assessing since last survey SI and NSSI urges with no/yes response options. Although current SI and NSSI urges also occurred "since last survey", 61% of responses with non-zero current SI reported no "since last survey" SI, and 38% of responses with non-zero current NSSI urges reported no "since last survey" NSSI urges. The discrepancy decreased, but persisted, when using a cut-off of 2 versus 1 on the Likert-type scale (Table 1), suggesting some participants required a higher threshold for endorsing yes on binary questions. Results suggest inconsistent responses to questions intended to gather overlapping information are common, which could be attributed to different interpretations of items or careless responding. Analyses will be replicated in a sample of suicidal transgender/nonbinary adults for which data are currently being processed. Results will also examine associations between discrepant responses and other variables

(e.g., time enrolled in EMA, time since last survey, demographics) and differences across question wording. Implications for measurement of SI and NSSI urges in EMA will be discussed.

Table 1. Percent of responses with discrepant reports of current and "since last survey" SI and NSSI urges.

	Cut-off of 1 on the 1-5 scale for current SI/NSSI urges	Cut-off of 2 on the 1-5 scale for current SI/NSSI urges
Suicide ideation		
Percent of responses with current SI that reported no "since last survey" SI	61.48	46.78
Percent of responses with no "since last survey" SI that reported current SI	23.90	9.10
NSSI urges		
Percent of responses with current NSSI urges that reported no "since last survey" NSSI urges	37.85	23.30
Percent of responses with no "since last survey" NSSI urges that reported current NSSI urges	16.24	5.82

Comparing affective and cognitive states in daily life between emerging adults with and without past-year non-suicidal self-injury

Glenn **Kiekens**, Penelope Hasking, Matthew, K., Nock, Evan Kleiman, Olivia J. Kirtley, Marlies Houben, Mark Boyes, Ronny Bruffaerts, Inez Myin-Germeys, Laurence Claes

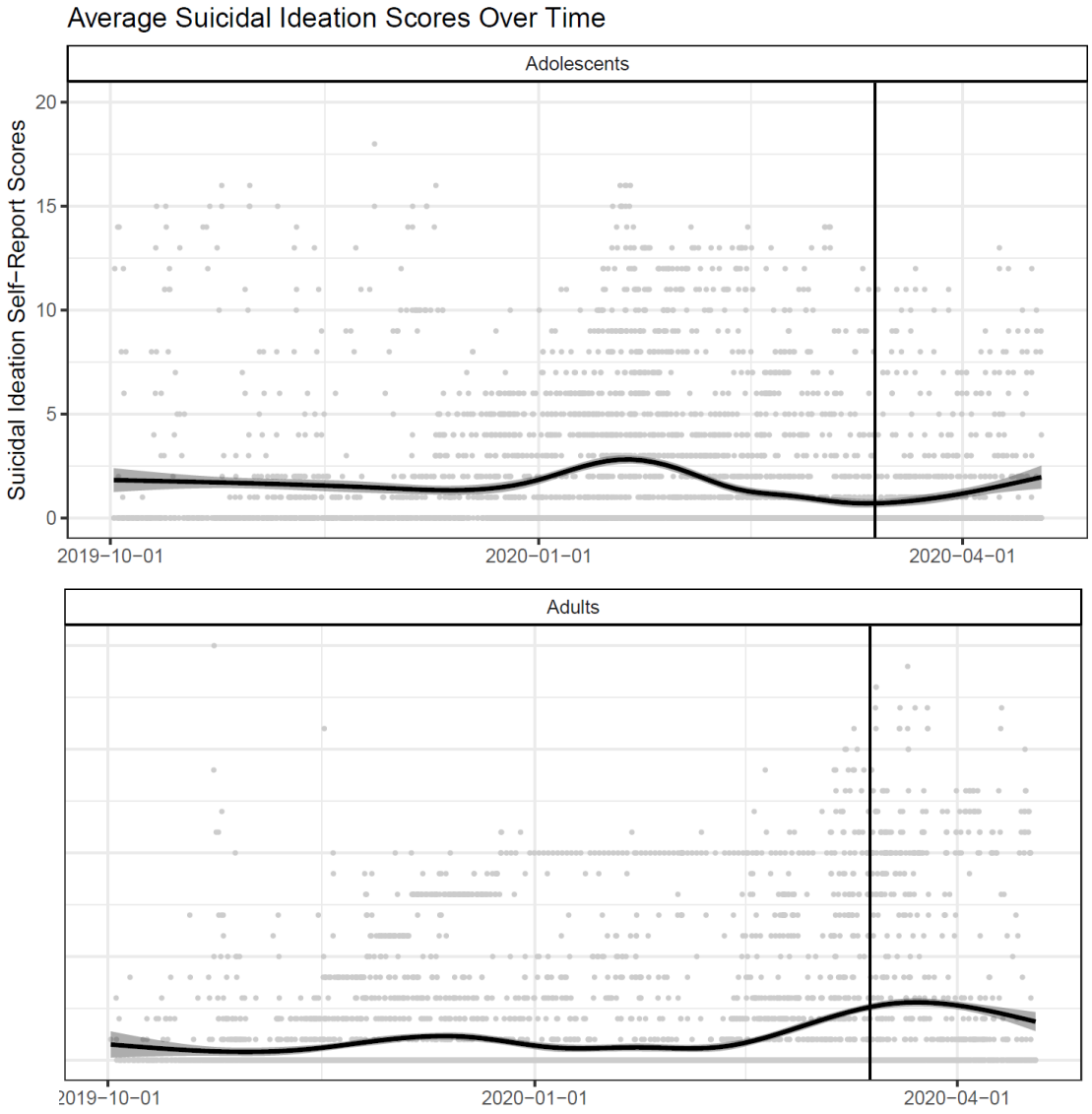
Although the literature suggests trait-like differences in affective and cognitive vulnerabilities between individuals with and without a history of non-suicidal self-injury (NSSI), little is known about how these dispositional differences are experienced in the natural environment. In the present study, we compare the intensity, self-regulatory effects, interaction, and variability of affective (negative and positive affect) and cognitive states (rumination, self-criticism) in daily life between individuals who do and do not engage in NSSI. Using experience sampling methodology (ESM), 60 emerging adults (ages=18-22 years) with and without past-year NSSI (equally distributed) completed a baseline battery of questionnaires and an ESM sampling protocol consisting of eight questionnaires per day for 12 days (in total, 96 questionnaires per participant), resulting in 4,587 assessments (median compliance=83.3%). In a dynamic structural equation modeling framework, dynamic parameters (i.e., mean intensity, carryover effects, spillover effects, and within-person variability) were evaluated using multilevel vector autoregressive models. Emerging adults who engage in NSSI experience higher intensity and greater variability of negative affect, rumination, and self-criticism, whereas lower intensity and greater variability of positive affect. In addition, past-year NSSI predicted stronger affect-cognition interactions over time, with stronger spillover effects of negative and positive affect on subsequent rumination and self-criticism in individuals who engage in NSSI. Depressive symptoms and trait levels of emotion dysregulation and self-criticism partially explained these differences. Our findings provide evidence of more aversive affective-cognitive dynamics in the everyday lives

of people who self-injure and point to the potential relevance of boosting positive emotions to buffer dysfunctional cognitions.

Increase in Suicidal Thinking During COVID-19

Rebecca G. **Fortgang** , Shirley B. Wang, Alexander J. Millner, Azure Reid-Russell, Anna L. Beukenhorst, Evan M. Kleiman, Kate H. Bentley, Kelly L. Zuromski, Maha Al-Suwaidi, Suzanne A. Bird, Ralph Buonopane, Dylan DeMarco, Adam Haim, Victoria W. Joyce, Erik K. Kastman, Erin Kilbury, Hye-In S. Lee, Patrick Mair, Carol C. Nash, Jukka-Pekka Onnela, Jordan W. Smoller, Matthew K. Nock

There is concern that the COVID-19 pandemic may increase risk for suicide. In the current study, we used ambulatory assessment to test whether suicidal thinking increased during the early phases of the pandemic and whether such thinking was predicted by increased isolation. Participants were 55 people (n=24 adults, n=31 adolescents) with suicidal thinking or a recent suicide attempt who were participating in a 6-month intensive longitudinal study of suicidal thoughts and behaviors. Using ecological momentary assessment (EMA), we examined suicidal thinking and isolation before and after the COVID-19 pandemic was declared a national emergency in the U.S. (March 13, 2020). An objective measure of social isolation was additionally quantified using GPS data gathered passively from a subset of participants' smartphones (n = 25). We found that suicidal thinking increased significantly among adults (OR = 4.01, $p < .001$) but not adolescents (OR = 0.84, $p = .07$) after the onset of the pandemic (Figure 1). In both groups, we observed notable heterogeneity in the trajectory of suicidal thoughts. Feeling isolated also significantly increased (OR = 2.96, $p < .001$), and predicted suicidal thinking during the pandemic. Time spent at home significantly increased (b = 7.18, 95% $p < .001$), but this did not predict suicidal thinking, indicating the primary importance of subjective isolation. We also explored continued trends in suicidal thinking and isolation during later phases of the pandemic. Given the importance of social distancing policies during surges of COVID-19, these findings support the need for digital outreach and treatment.



Investigating the role of daily-life social interaction quality and quantity and their relationship to self-harm thoughts and behaviours in adolescents

Olivia J. **Kirtley**, Ginette Lafit, Robin Achterhof, Benjamín Šimsa, Noemi Hagemann, Karlijn S. F. M. Hermans, Anu P. Hiekkaranta, Aleksandra Lecei, Inez Myin-Germeys

All major ideation-to-action theoretical models of suicidal behaviour underscore the role of interpersonal processes in the development and escalation of self-harm thoughts. Adolescence is a critical period of interpersonal development and the typical age of onset for self-harm. However, little research has investigated how naturally occurring social interactions relate to self-harm thoughts and behaviours in adolescents. In this study, we investigate the between- and within-person relationships between quality and quantity of daily life social interaction, and lifetime and current history of self-harm thoughts and behaviours in adolescents. Data were pre-existing and came from Wave 1 of the N=1913 SIGMA project, a longitudinal study of adolescent mental health and development in Flanders, Belgium.

Adolescents were aged 12 – 16 years-old and recruited via schools. Lifetime history of self-harm thoughts and behaviours were assessed with an adapted Dutch version of the Child and Adolescent Self-Harm in Europe (CASE) questionnaire. To assess self-harm thoughts and behaviours and quality and quantity of social interaction in daily life, we used the experience sampling method (ESM) — a type of real-time monitoring technique — to collect data from adolescents via smartphone ten times per day for six days. Preregistration is in progress. To our knowledge, this is the first study to investigate the relationship between quality and quantity of daily-life social interaction and self-harm thoughts and behaviours in adolescents. As such, this study will contribute to ideation-to-action frameworks for understanding self-harm and advance our knowledge about short-term risk and protective factors for self-harm thoughts and behaviours.

Objective and subjective sleep problems as proximal risk factors for suicidal thoughts and behaviors in high-risk adolescents

Kelly L. **Zuromski**, Adam Bear, Alexander J. Millner, Rebecca G. Fortgang, Kate H. Bentley, Ralph Buonopane, Evan M. Kleiman, Matthew K. Nock

Background: To better predict and prevent suicidal thoughts and behaviors (STBs), identification of proximal, transdiagnostic risk factors that would serve as viable treatment targets is critically needed. In this study, we examined the association between one putative risk factor for STBs—sleep disturbances—using ambulatory data (i.e., accelerometer data collected via wearable sensor and smartphone ecological momentary assessment [EMA] data) from an intensive longitudinal study of suicidal adolescents.
Methods: Adolescent participants (N = 320) recruited from an adolescent inpatient psychiatric unit completed smartphone EMA surveys 6x/day for the first three months post-discharge, then 1x/day for the next three months. EMA survey items assessed for STBs, sleep quality, and other psychological covariates. Participants also wore a biosensor for the duration of the study.
Results: Data collection recently concluded. Preliminary fixed-effects regression analyses indicate that prior night's sleep quality was negatively associated with next day suicidal intent (i.e., worse sleep predicted worse suicidal intent; $b = .026$, $p < .001$). In additional analyses, we will further examine the day-to-day temporal dynamics between objective sleep data (e.g., sleep and wake times, sleep onset latency) collected via wearable sensor and STBs.
Conclusions: To our knowledge, this will be the most extensive examination to date of the time-lagged associations between sleep disturbances and STBs: (a) using objective wearable biosensors, (b) over a brief interval, and (c) within a recently hospitalized sample. Using ambulatory methods, this project will allow us to examine a putative risk factor for STBs in a way not previously possible.

Predicting suicidal ideation endorsement with text passively collected from screenshots

Ross **Jacobucci**, Meng Jiang, Brooke Ammerman

Until recently, suicide research had largely been approached by identifying who is at risk for suicide. The development of intensive time sampling designs has allowed for a shift in emphasis to identifying when individuals are at risk, offering promise in the advancement of suicide risk prediction. Studies utilizing ecological momentary assessment to collect data at several intervals per day have demonstrated that suicidal ideation can change rapidly across the course of the day; yet, there is a need to improve the granularity of assessment to improve identification of real-time risk elevation. To address this, we detail data collected using a novel form of digital phenotyping, termed Screenomics, that captures screenshots from participant's phones every five seconds. Using data from an in-progress study of participants that have endorsed suicidal ideation in the past month, we detail idiographic analyses on 25 individuals (> 2 million screenshots) that examine the relationship between text extracted from each screenshot with active assessments of suicidal ideation captured using EMA. Our analysis will focus on measuring the sentiment of the text, latent factors extracted from the text, and the context (app) with which the text is extracted from. We will identify if and which components are predictive of prospective suicidal ideation, and assess the degree to which these relationships differ across participants. In preliminary analyses of one individual, we found that increased phone use, viewing of illegally downloaded movies, and specific social media applications is related to higher prospective suicidal ideation.

12:00 Lunch break / Sponsor exhibition

Time: 12:00 - 13:00
Location: Sponsor stand / Foyer

13:00 Symposium 17: From naming to taming - Emotion labelling, differentiation, and regulation in daily life

Chair: Dominique F. Maciejewski

The ability to regulate one's emotions plays a central role in our well-being. Emotion regulation is a dynamic, multi-stage process, which involves adequately identifying emotions ("naming") and then responding to them ("taming"). The present symposium showcases how Experience Sampling Methods (ESM) provide a unique opportunity to study how emotion regulation (ER) unfolds in daily life, addressing emotion labelling and differentiation ("naming") and intrapersonal and interpersonal emotion regulation ("taming"). The presenters will discuss current challenges in studying emotional processes with ESM studies and provide suggestions on how researchers can conduct their own studies to better understand emotional processes.

The first talk (Hoemann) presents an innovative method of assessing emotions in ESM studies, involving freely labelling emotional experiences and demonstrates how this method can provide new insights into emotional experiences in daily life. The second talk (Erbaş) illustrates the utility of a novel momentary emotion differentiating index, underscoring the important role of emotion differentiation in emotion regulation. The third talk (Siegmeier) focuses on how ER goals and ER strategies are related in daily life and highlights the neglected role of positive ER. The fourth talk (Mosannenzadeh) stresses that much ER research has focused on ER as a solely intrapersonal process and emphasises the importance of interpersonal ER, presenting findings on ER between romantic partners in daily life. The fifth talk (Maciejewski) underscores the importance of incorporating emotional context into our understanding of ER variability and presents findings on context-sensitivity from an ESM study across 60 days.

Time: 13:00 - 14:30
Location: Grote Zaal (Main Theater)

Using freely generated words rather than rating scales to assess emotion in everyday life

Katie **Hoemann**, Evan Warfel, Jolie Wormwood, Peter Kuppens

Experience sampling studies often prompt participants to rate how intensely they are feeling a set of pre-specified emotions. This approach has supported key findings on within- and between-person differences in emotion yet may not represent how people typically describe their feelings. We used an alternative approach, in which participants (N = 50) labeled their emotion with at least one word of their choosing, in addition to providing ratings of valence (pleasantness) and arousal (activation). Participants also provided emotion intensity ratings for each prompt in an end-of-day diary and completed a questionnaire battery outside of experience sampling. We found that label positivity corresponded with valence ratings overall ($r = .64$, $p < .01$) and within participants ($.22 < r < .77$, all $ps < .05$). Participants who used more unique emotion words endorsed a more balanced spread of emotions in the ratings (i.e., had higher emodiversity; $r = .50$, $p < .01$); those who used a higher proportion of unique negative words reported fewer difficulties identifying and describing their emotions (i.e., had lower alexithymia; $r = -.33$, $p < .05$). The proportion of unique negative emotion words was, moreover, a stronger predictor of mental health symptoms ($r = -.48$, $p < .01$) than valence ($r = -.38$, $p < .01$). To enhance robustness, we used semantic space vectors to infer word properties. These findings suggest that a free-label approach is a viable means of sampling momentary experience and can provide new insights into everyday emotion and its association with adaptive outcomes.

Within-person emotion differentiation and emotion regulation

Yasemin **Erbas**, Dominique Maciejewski, Elise Kalokerinos

Experiencing and labelling emotions with a high level of differentiation has repeatedly been linked to higher well-being (Kashdan, Barrett, & McKnight, 2015). One possible pathway through which emotion differentiation could impact well-being, is by enhancing emotion regulation. Recently, several studies examined the relationship between emotion differentiation and emotion regulation. This research suggests that emotion differentiation is not related to the types of strategies used to regulate emotions (O'Toole et al., 2021), but it is related to successfully applying regulation strategies to downregulate negative emotions (Kalokerinos et al., 2019). However, previous studies have typically examined emotion differentiation as a trait measure, although emotion differentiation may change dynamically. The present study extends previous findings to the within-person level and showcases the use of a novel method to capture momentary emotion differentiation (Erbas et al., 2022). Specifically, we further examine the relationship between emotion differentiation and emotion regulation. Firstly, we replicate previous findings across four experience sampling datasets (total N = 520). Secondly, we expand our analyses by using a momentary measure of emotion differentiation to assess whether, at the within-person level, higher levels of differentiation are related to higher emotion regulation success. Finally, we assess whether emotion regulation success, both at the between-person and within-person level, can explain the relationship between emotion differentiation and several indicators of well-being. Our results contribute to a more nuanced understanding into how differentiating between different emotions can facilitate emotion regulation in daily life.

Back to the Basics of Positive and Negative Emotion Regulation

Viola Siegmeier, Eeske **van Roekel**

Emotion regulation (ER) is very prevalent in our daily lives. Accordingly, ER has become one of the most popular and fastest growing areas in psychology (Gross, 2014; Heiy & Cheavens, 2014). The curiosity stems from the fact that ER has been demonstrated to have a significant influence on life outcomes, such as well-being (Newman & Nezlek, 2022) and mental health (Hu et al., 2014). Although it has been shown that this applies to both negative and positive ER, most research has either solely focused on negative emotions or did not differentiated between the regulation of positive and negative emotions (Schunk et al., 2022). Furthermore, past research has mainly looked at how ER operates and its outcomes, rather understanding when and why it occurs (Tamir et al., 2019). To contribute to the literature, the aim of the present study is to investigate: 1) how often people regulate their positive and negative emotions, 2) in which contexts (i.e., considering social context and intensity of emotions) people have a pro- and contra-hedonic motivation to regulate their emotions, and 3) which positive and negative ER strategies people use to pursue their hedonic motivations. Using the Experience Sampling Method (ESM), first-year students (N = 159) in the Netherlands have filled out momentary questionnaires 5 times per day for 14-days. First results will be presented at the conference.

Interpersonal emotion regulation between romantic partners in daily life: The role of adult attachment insecurity

Farnaz **Mosannenzadeh**, Johan Karremans, Maartje Luijten, Dominique F. Maciejewski

Emotion regulation (ER) has been traditionally considered an individual/intrapersonal process. Recent views on ER, however, emphasize the adaptiveness of using interpersonal ER strategies (involving others, e.g., social disclosure; Barthel et al., 2018). Romantic relationships provide a source of interpersonal ER as romantic partners can help each other in dealing with life stressors (Butler & Randall, 2013). However, individuals with attachment insecurity seem to have difficulty optimally benefiting from interpersonal ER (Mikulincer & Shaver, 2019). We aim to investigate (1) if and to what extent interpersonal ER between romantic partners predicts better ER outcomes in response to daily life stressors, and (2) if and to what extent attachment insecurity predicts the extent to which adults use interpersonal ER in romantic relationships. Using an Experience sampling Method, adults in romantic relationships (N = 120), reported on their momentary emotions and interpersonal ER in response to daily life stressors, for seven consecutive days, eight times per day. The results of our between-subject analysis showed that only attachment avoidance (but not attachment anxiety) was associated with interpersonal ER; that is, higher attachment avoidance was associated with lower interpersonal ER. We will perform within-subject analyses to investigate whether higher momentary use of interpersonal ER was associated with better momentary ER outcomes. Our results contribute to a better understanding of interpersonal emotion regulation between romantic partners in daily life, and can provide insight into where to provide support for adults with attachment insecurity to improve their ER outcome.

Emotion regulation flexibility in changing emotional contexts in daily life

Dominique F. **Maciejewski**, Andrea Bunge, Eeske van Roekel, Tak Tsun Lo

Emotion regulation (ER) flexibility is defined as the flexible adjustment of ER strategies to the context and is a key indicator of well-being (Aldao et al., 2015; Bonanno & Burton, 2013). While there is some evidence from earlier Experience Sampling Methods (ESM) research that ER flexibility in daily life is related to well-being (e.g., Battaglini et al., 2022, Haines et al., 2016), previous studies are often limited by short data collection periods, assess only few ER strategies, seldom consider emotional contexts, and neglect more complex forms of covariation between context and ER strategies (e.g., non-linearity). In this presentation, we will present results from the “Track your Mood” Study, an ESM study that assessed different contextual features (intensity and controllability of emotions) and ER strategy use in daily life across 60 days (N=83). The study has been pre-registered (https://osf.io/fx3ay/) and analyses are currently being conducted.
Analyses will focus on the within-person covariation between emotional context (intensity and controllability) and six different ER strategies. We expect that ER strategies are differentially sensitive to different types of emotional contexts. Moreover, assuming that individuals may not regulate at all at low emotion

intensities, we will also explore non-linearity in these associations. Additionally, we will test whether between-person differences in psychopathology influence the within-person covariation between context and ER strategies. Based on previous research, we expect that individuals with higher levels of psychopathology will show context-insensitive regulatory patterns, whereas individuals with lower levels of psychopathology will show context-sensitive regulatory patterns.

13:00 Paper session 5: Eating behavior

Chair: Melanie Bamert

Time: 13:00 - 14:30
Location: IJ Zaal

Within-subject associations between negative affective states and appetite using ecological momentary assessment

Tyler B. **Mason**, Alex Smith, Kathryn E. Smith

Introduction: People with eating disorders and food addiction typically experience various non-physiological forms of appetite, such as subjective feelings of hunger or preoccupations with thoughts of food. These non-physiological forms of appetite may be triggered by affective experiences. However, more research is needed to understand which specific affective states are associated with momentary elevations in self-reported feelings of hunger and preoccupation with thoughts of food. As such, the purpose of this study was to examine within-subject associations between negative affective states (i.e., upset, hostile, nervous, afraid, guilty, stressed, bored, ashamed, and lonely) and self-reported hunger and preoccupation with thoughts of food using ecological momentary assessment (EMA). Method: Participants with binge-eating disorder and/or food addiction completed 14 days of EMA, in which they completed prompts asking about their current appetite and negative affect five times each day. Generalized estimating equations were used to elucidate associations between within-subject affective states and appetite. Results: During prompts in which participants reported greater than their own average levels of guilt (B=2.28, p=.02), stress (B=1.93, p=.01), and boredom (B=2.99, p=.005), they reported higher preoccupation with thoughts of food. There were no associations between affective states and self-reported hunger. Conclusions: Guilt, stress, and boredom may be key intervention points for reducing food-related cognitions in daily life. Ecological momentary interventions targeting these affective states may be efficacious in treating eating disorders and food addiction.

Examining Associations Between Momentary Self-Compassion and Binge Eating in Male Adults: An Ecological Momentary Assessment Study

Natalie M. **Papini**, Tyler B. Mason, Jason Yang, Laura Noll, Lynda Ransdell, Stephen D. Herrmann, Nanette V. Lopez

Self-compassion (SC) has been shown to be protective against disordered eating, although existing research is limited by studying mostly white female samples. Further, questions remain on how SC may vary throughout the day and if variations in self-compassion may predict binge eating behaviors in men with binge eating symptoms. Thus, the current Ecological Momentary Assessment (EMA) study explored associations between variability in momentary SC and binge eating in men. Men (n=85, Mage= 35.71 +- 10.71; MBingeEatingScale = 34.16 +- 9.93, range: 18-46; 43.5% White, 43.5% Black/African American) completed surveys on a smartphone across a 7-day period. SC and binge eating were assessed by 7 days of signal-contingent prompting through five semi-random signals evenly distributed between 8 AM and 10 PM. Generalized estimating equations (GEE) with a gamma function and an autoregressive serial autocorrelation correction assessed the prospective associations between SC and binge eating in the subsequent two hours, as well as trait drive for muscularity and adverse childhood experiences as potential moderators of this association. All GEE models controlled for momentary perceived stress and negative affect, ethnicity, race, socioeconomic status, and age. Analyses showed that one unit increase in SC was associated with a 0.9 decrease in binge eating in the subsequent 2 hours (p = .02). Neither drive for muscularity nor adverse childhood experiences moderated the relationship between SC and binge eating. Findings showed that momentary SC is a relevant within-day protective factor for binge eating in adult males. Adult males with binge eating symptoms can benefit from interventions designed to increase SC in daily life.

Interoception in daily life: Development and validation of Momentary Body Awareness Scale

Marta **Walentynowicz**, Yasemin Erbaş, Joran Jongerling, Leonie V.D.E. Vogelsmeier, Olivier Luminet

Background
Interoception is a multi-dimensional construct which refers to ability to perceive internal bodily signals. Recently, many novel tasks were developed to measure different dimensions of interoception. However, most available measures focus on assessing interoception in laboratory settings or as a trait measure. To understand interoceptive processes in real-life, it is critical to increase the ecological validity of assessment methods. To address this issue, the current study aimed to develop and validate a set of items to assess the moment-to-moment variability of self-reported interoception in daily life.
Methods
For 7 days, 150 healthy participants received 10 semi-random prompts per day to complete momentary interoception question asking about awareness of seven neutral bodily sensations in the last 5 minutes. Measurement invariance was assessed using latent Markov factor analysis (LMFA). Convergent validity was assessed by examining whether momentary interoception was predicted by recent physical activity and emotional arousal. Correlations with trait questionnaires were

explored.
Results
LMFA suggested a between-person and longitudinal measurement invariance of the one-factor model. All items demonstrated substantial within-person variance (ICCs between .14 and .39). Dynamical structural equation modeling results showed that recent physical activity resulted in higher momentary interoception ratings. Momentary nervousness showed small but positive relationship with interoception. The associations between person-level average interoception and trait questionnaires were significant but small (rs between .17 and .20).
Discussion
Preliminary psychometric properties suggest that the Momentary Body Awareness Scale may allow for the measurement of interoception in daily life. Further studies are needed to explore its predictive validity.

Intermittent fasting modulates cardiac interoception in everyday life: Further evidence for the validity of the Graz Ambulatory Interoception Task (GRAIT)

Andreas R. **Schwerdtfeger**, Julia Störmer, Christian Rominger

Cardiac interoception has been associated with various health benefits including self and emotion regulation. While previous research mainly focused on stable between-person differences in interoception (i.e., trait perspective), we suggested an intraindividual perspective of interoception and introduced an ambulatory assessment tool (GRAIT). Based on prior laboratory studies, we aimed to examine whether an intermittent fasting protocol for three consecutive days (8 hours normal eating followed by 16 hours fasting) lowers heart rate, increases HRV (i.e., root mean square of successive differences; RMSSD) and elevates cardiac interoception. Overall, 38 participants volunteered in a pre-registered within-subject ecological momentary assessment study recording data for three fasting days and three normal eating days (in randomized order). Cardiac interoception (interoceptive accuracy [IA] and interoceptive sensibility [IS]), perceived hunger and cardiac activity were monitored. IA and IS could be reliably assessed both within and between individuals. Importantly, during fasting days RMSSD was higher with a decreasing trend throughout the day and IS as well as IA were higher (with an increasing trend throughout the day) as compared to non-fasting days. However, both effects were independent of each other. The findings suggest that (short-term) fasting regimens seem to facilitate momentary attention to organismic cues and to stimulate vagal efference, thus having beneficial effects on health.

Temporal dynamics of stress and consumption of unhealthy snacks in daily life

Melanie **Bamert**, Jennifer Inauen

Stress has been shown to relate to unhealthy snacking such as the consumption of foods high in sugar or fat between main meals, which can have adverse health

effects. In daily life studies, participants with eating disorders report an increase in experienced stress and a decrease in heart rate variability (HRV) in the time before an eating episode. However, there have not been studies investigating if these HRV dynamics translate to healthy populations. We aim to examine how self-reported stress and HRV change in the time before an unhealthy snacking event in a healthy student population. Based on previous studies, we hypothesized that self-reported stress increases and HRV decreases in the minutes and hours before an unhealthy snacking event. In this 4-day ambulatory assessment study, 67 students wore an ecgMove 4 sensor to record accelerometry and electrocardiogram data used to calculate HRV. The participants also completed short bi-hourly e-diaries regarding their momentary stress experience and consumption of unhealthy snacks since the last diary. In line with the hypothesis, mixed effects models showed a decrease in HRV (B = -0.25, p = 0.03) in the minutes before consuming unhealthy snacks. Unexpectedly, self-reported stress did not change significantly (B = -0.05, p = 0.44). The results contribute to a better understanding of the micro-temporal dynamics of the stress-snacking relationship in daily life. Findings on this temporal relationship between stress and the consumption of unhealthy snacks in daily life can help inform future ecological momentary interventions targeting snacking behavior in daily life.

The potential of time for health behavior change: Collating real-life evidence for self-efficacy fluctuations across health behaviors

Anna **Vogelsang**, Claudio R. Nigg, Markus Reichert

Introduction
Protective health behaviors (i.e., healthy diet) reduce the risk of chronic illness. To attain significant health benefits, however, these behaviors must be performed consistently. To date, health behavior research has predominantly viewed behavior change as a product of stable interpersonal, time-invariant factors (between-person, e.g., traits). Time-varying, dynamic within-person effects, have been neglected thus far, despite prominent health behavior change theories (HBCT, e.g., social-cognitive theory, Bandura, 2005) offer brilliant frameworks for incorporating both time variant and invariant behavioral determinants. This scoping review presents an attempt to theorize about time for behavior change in order to adapt traditional HBCT by focusing on time-sensitive conceptualizations of social-cognitive constructs and reported variance components in ecological momentary assessment studies applying HBCT.
Methods
Using search terms related to ecological momentary assessment and HBCT, the data bases PsycInfo, PsycArticles and SPORTDiscus have been searched. From 191 identified publications, 25 publications were included in analyses.
Results
Most studies focused on smoking (n = 13) and self-efficacy (n = 25), with many ignoring the time-varying aspect in their operationalization (n = 11). Despite most studies reported associations (e.g., beta-coefficients), only a few studies (n = 8) provided multilevel variance estimates (i.e., intraclass-correlation coefficients) and thus daily variations in constructs.

Discussion
This scoping review gives an overview of the time-varying nature of social-cognitive constructs of traditional HBCT. Given that the origin of variance is crucial for understanding long-term clinical trends but also short-term fluctuations, variance estimates should standardly be reported for adequate reporting of tested models.

13:00 Paper session 6: Methods to study temporal dynamics

Chair: Emmeke Aarts

Time: 13:00 - 14:30
Location: Expo

Uncovering personalized latent dynamics in daily measurements utilizing the multilevel hidden Markov model: mHMMbayes

Emmeke **Aarts**, Sebastian Mildiner Moraga

When studying processes in daily life, frequently behavioral researchers are interested in the dynamics over time in a construct indirectly measured using various indicators. For example, switches in stress levels, mood, or nonverbal communication. When this latent construct can be represented by mutually exclusive categories, for example a not, mildly, and severely stressed state or a depressive vs non-depressive state, the hidden Markov model (HMM) is a promising vehicle to investigate latent dynamics over time. By extending the HMM to the multilevel (also known as mixed or random effects) framework, the model accommodates data of multiple individuals simultaneously - allowing for heterogeneity in model parameters - while estimating one overall group-level HMM. Hence, the multilevel HMM facilitates the study of personalized dynamics and the study of individual differences herein.
An open-source implementation of the multilevel HMM is provided by the R CRAN package mHMMbayes. The model can be fitted on multivariate data with categorical or normal distribution, and include individual level covariates (allowing for e.g., group comparisons on model parameters). The usefulness of the multilevel HMM in daily measurements using mHMMbayes is illustrated using two examples. In the first example, data on nonverbal communication between patient-therapist dyads show that interpersonal interaction dynamics uncovered by the multilevel HMM were predictive of patient depression improvement. In the second example, ESM data on five cognitive, affective, and behavioral (CAB) factors unveiled four distinctive transdiagnostic CAB crisis phases and patient individual trajectories herein. Lastly, empirically derived recommendations on required sample sizes are provided.

Continuous-Time Dynamic Systems for Formalizing Developmental Phenomena: Large-Scale Online Learning Data

Charles C **Driver**, Martin J Tomasik

I demonstrate how broad developmental theories may be instantiated as statistical models, using hierarchical continuous-time dynamic systems. This approach offers a flexible specification, and an often more direct link between theory and model parameters than common modelling frameworks. The developmental theories I focus on regard the relation between the academic competencies of mathematics and language, and I use data from the online learning system Mindsteps. Modelling approaches such as this offer the potential for substantial insights into the relations between ongoing processes, but at substantial peril of discovering false insights due to model and interpretation issues, which I also devote time to.

Skewness and staging: Does the floor effect induce bias in multilevel AR(1) models?

Mohammadhossein M. **Haqiqatkhah**, Oisín Ryan, Ellen L. Hamaker

Multilevel autoregressive models are popular choices for analyzing intensive longitudinal data in psychology. It has been suggested that elevated lagged relationships within and between affective measures and psychiatric symptoms over time can be indicative of an underlying mental health condition—that is, individuals with more severe stages of a mental disorder tend to have stronger autoregressions and cross-regressions among the measured symptoms. However, healthier individuals tend to show less variability in the symptoms and emotions related to psychopathology. More specifically, they tend to score very low at many time instances, leading to the floor effect—that is, a high percentage of the responses are equal, or very close, to the lowest value on the scale—which is accompanied by less variability and high skewness. It has been argued that the relatively low lagged relations among negative symptoms in healthier individuals is an artifact caused by the floor effect.
Using a large-scale simulation study, we investigated the effect of skewness on the estimated autoregressive parameter in the multilevel AR(1) model. We analyzed simulated time series of different lengths with varying degrees of skewness using the multilevel AR(1) model with fixed and random residual variance. We observed that only the model with random residual variance leads to positively-biased estimates of the autoregressive parameter, whereas the model with fixed residual variance leads to negative bias. We discuss the implications of our study for choosing modeling approaches and sample size planning and provide ways of detecting and characterizing the floor effect in empirical data.

A comprehensive comparison of measures for assessing profile similarity at specific time points

Chiara **Carlier**, Julian Karch, Peter Kuppens, Eva Ceulemans

Profile similarity measures are used to compare two constellations of variables to one another. Over half a century, computing profile similarity has increased in popularity to study for instance how two persons are similar in terms of their personality or profile of experienced emotions (over time). On the one hand, this popularity has brought many new measures into focus, yet on the other hand, many researchers stick to the known correlation and mean difference of scores. In this study, we have taken four steps to create a comprehensive list of measures that are useful to compare profiles and to identify meaningful groups of measures that produce similar values. During this presentation, we will focus on the last three steps. First, we have reviewed a large set of 87 similarity measures by applying them to both cross-sectional and ESM data sets and retained 43 useful profile similarity measures. Second, we have clustered these 43 measures into similarly behaving groups, and found one cluster with difference measures, one cluster with product measures and one residual cluster. Third, we have interpreted what unifies these groups and their subgroups based on theory and formulas, and linked them to concepts such as shape, scatter and elevation similarity. Last, based on these findings, we will give recommendations on how to choose a measure for a particular research question.

Unique Contributions of Dynamic Affect Indicators - Beyond Static Variability

Kenneth **Koslowski**, Jana Holtmann

Results of a growing body of ambulatory assessment (AA) studies corroborate the link between inter-individual differences in affect trajectories and psychological health outcomes. Nevertheless, the relevance of indicators of affect dynamics (IADs), such as autoregressive effects or mean-squared successive differences, was recently debated due to their low predictive utility beyond static intraindividual means and variances, when used as predictors of clinical and non-clinical outcomes. In this study, we argue that the role of IADs was potentially underestimated and investigate the factors that determine the power and accuracy with which relations between IADs and a time-invariant outcome variable are detected. In two simulation studies we compare two-step and one-step estimation approaches under different IAD-outcome constellations and AA conditions, taking into account sample size, time points, the presence of missing data, random innovation variances, and measurement error in the observed variables. Results suggest that approaches that disregard the reliability of individual IAD estimates, differences in individuals' innovation variances, as well as measurement error in the observed variables entail substantial negative bias and low coverage of the prediction parameters. We propose an alternative Bayesian one-step, latent variable approach which solves these issues. In a re-analysis of empirical data, we illustrate that the different approaches lead to different conclusions regarding the role of negative affect inertia for the prediction of depressive symptoms and life satisfaction.

Latent Markov factor analysis as a statistical tool to explore within-person variability in qualitative negative and positive emotional granularity

Marcel C. **Schmitt**, Leonie V. D. E. Vogelsmeier, Yasemin Erbas, Simon Stuber, Tanja Lischetzke

Emotional granularity (EG) is an individual's ability to describe their emotional experiences in a nuanced and specific way. In the present research, we present latent Markov factor analysis (LMFA) as a novel statistical tool to investigate within-person variability in qualitative EG (i.e., variability in distinct granularity patterns between specific emotions across time). LMFA clusters measurement occasions in ambulatory assessment data into latent states according to state-specific measurement models. We argue that state-specific measurement models of repeatedly assessed emotion items can provide information about qualitative EG at a given point in time. Applying LMFA to the area of EG for negative and positive emotions separately by using data from an ambulatory assessment study with 11,662 measurement occasions across 139 participants, we found three qualitatively distinct latent EG states for the negative emotions and three for the positive emotions. Momentary stress significantly predicted transitions between the EG states for both the negative and positive emotions. Extending the LMFA models to so-called mixture LMFA models, we identified two and three latent classes of individuals who differed in state trajectories for negative and positive emotions, respectively. Neuroticism and dispositional mood regulation predicted latent class membership for negative (but not for positive) emotions. We conclude that LMFA may enrich EG research by enabling more fine-grained insights into variability in qualitative EG patterns.

14:30 SAA General Assembly meeting

Chair: Thomas Kubiak

The president (dr Thomas Kubiak), secretary (dr Andreas Neubauer) and treasurer (de Eco de Geus) of SAA present their annual reports for discussion and amendments. Formal approval of the reports by the membership will be obtained by digital vote after the conference.

Time: 14:30 - 15:30
Location: Grote Zaal (Main Theater)

15:30 Tea break / Sponsor exhibition

Time: 15:30 - 16:00
Location: Sponsor stand / Foyer

16:00 Paper session 7: Association between physical activity behaviors and affective wellbeing in daily life

Chair: Marcus Reichert

Time: 16:00 - 17:30
Location: Grote Zaal (Main Theater)

How many roads must people walk down before they should solve a creativity task?

Christian **Rominger**, Andreas Fink, Bernhard Weber, Mathias Benedek, Corinna M-Perchtold-Stefan, and Andreas Schwerdtfeger

Physical activity enhances creative ideation performance. However, the dose-response relationship of this effect is unknown and methodological recommendations to study this association in an ambulatory context are largely missing. Therefore, this project targets to identify the intensity and the duration of physical activity necessary to increase creative ideation performance. To reach this aim, we make use of a data-driven bottom-up approach to calculate various prediction models of creative ideation performance by means of (different indices of) physical activity, all assessed in everyday life contexts. A total sample of 158 students, who participated for five days in a physiological ambulatory assessment, is available. We assessed physical activity via acceleration sensors and creative ideation performance in the verbal and figural domain via the novel Ambulatory Battery of Creativity. Based on power estimates and observed effect sizes, we present the most promising results and formulate recommendations for future research.

Within-person determinants of moderate-to-vigorous physical activity: Meta-analysis of Ecological Momentary Assessment studies

Jan **Keller**, Verena Schneider, Dominika Kwasnicka, Gill ten Hoor, Noemi Lorbeer, Dimitra Kale, Daniel Powell, Bernard Asare, Felix Naughton, Sally Di Maio, Paul Gellert, Peter Verboon, Olga Perski

Background: Moderate-to-vigorous physical activity (MVPA) is an everyday health behaviour which fluctuates within persons. Ecological Momentary Assessment (EMA) studies allow the examination of within-person associations between MVPA and corresponding psychological (e.g., social support) and contextual (e.g., precipitation) determinants. However, no study has yet pooled psychological and contextual determinants of MVPA at the within-person level. We conducted a

systematic review and meta-analysed such within-person associations from EMA studies.
Methods: We searched several databases up to December 2022. We included studies that reported ≥1 within-person association(s) of psychological or contextual EMA-measured predictor(s) with an EMA-measured continuous MVPA outcome (e.g., min/day) in adults from non-clinical populations. Predictors describing similar constructs were categorised into higher-order categories. Data were analysed with multilevel, random-effects meta-analyses.
Findings: Thirty EMA studies (reported across 29 articles; N=3,585 participants) reporting 94 within-person predictor-MVPA associations were included. The most frequently reported predictor category was negative affect (22 within-person associations), followed by cognitive determinants (e.g., intentions; 13x), positive affect (12x), and positive social influences (e.g., social support; 12x). For five contextual determinants, within-person MVPA associations were reported. Analyses revealed positive within-person associations between positive social influences and MVPA (b=2.16, 95% CI=0.12, 4.20, p=.038), whereas other associations were non-significant.
Discussion: Positive social influences were found to be key within-person determinants of MVPA. Although proposed by behaviour change theories and often found as significant between-person determinants, cognitive determinants did not show significant within-level MVPA associations.

Microtemporal associations between physical behavior and mood in daily life: Combining compositional data analyses and ecological momentary assessment.

Marco **Giurgiu**, Ulrich W. Ebner-Priemer

A growing body of studies focus on the relationship between physical behavior (PB) (i.e., physical activity (PA), sedentary behavior (SB)) and mental health. However, momentary mechanisms and interrelatedness between PA, SB, and mood in daily life are not well-known.
To examine whether the composition of light physical activity (LPA), moderate-to-vigorous physical activity (MVPA), and SB influences momentary mood, we conducted an Ecological Momentary Assessment (EMA) study in the everyday life of 103 university students over five days. We measured PB continuously via accelerometers and assessed mood up to six times each day on smartphone diaries. We integrated compositional data analyses (CoDA) with multilevel modeling to analyze within-person associations of the behavior composition with mood.
Higher ratio of LPA to SB and MVPA positively influenced energetic arousal ($p < 0.001$) and a higher ratio of MVPA to SB and LPA positively influenced valence ($p = 0.004$) and energetic arousal ($p = 0.022$). Furthermore, a higher ratio of SB to LPA and MVPA within the 60 minutes prior to a diary rating negatively influenced valence ($p = 0.006$) and energetic arousal ($p < 0.001$). Simulation analyses revealed that replacing 20 minutes of SB with PA can influence mood rating up to 3.39 units on a scale ranging from 0-100.
Findings suggest that minute replacements of SB with PA may lead to mood

enhancements. Applying CoDA to intensive longitudinal data can serve as a starting point to identify the optimal composition of SB, LPA, and MVPA for mood enhancements in everyday life.

The role of the context of physical activity for its association with affective well-being: An experience sampling study in young adults

Yu-Mei **Li**, Justin Hachenberger, Sakari Lemola

Physical activity and being outdoors both improve affective well-being. However, little is known about the synergistic effects between them and the influences of contextual factors such as the life domain of physical activity (work-, chores-, leisure, or sports-related) or the type of outdoor environment (green space, blue space, or city area) on mood. This study investigates the synergistic effects of physical activity and being outdoors as well as the potential role of contextual factors on mood. A total of 158 individuals aged 18-25 years (133 females) participated in a 14-day experience sampling study. Participants received seven prompts per day and answered questions about their physical activity, contextual factors, and affective well-being. Physical activity and being outdoors were associated with concurrent higher levels of positive and lower levels of negative affect compared to being physically inactive or being indoors, respectively. However, no synergistic effects were found. Being outdoors in a city area was associated with less positive and more negative affect than being in nature. Work- and chores-related physical activity was associated with less positive affect and more negative affect compared to sports- or leisure-related physical activity. To foster positive affect, people should schedule leisure-related physical activity in nature.

Physical activity, stress experience, and affective wellbeing during an examination period: An experience sampling and accelerometry study

Justin **Hachenberger**, Ziwen Teuber, Yu-Mei Li, Laura Abkai, Elke Wild, Sakari Lemola

Previous studies reported that physical activity could buffer the negative association of psychological stress with affective wellbeing. However, the studies that examined this relation in everyday life have assessed physical activity only by self-report but not with objective measures such as accelerometry. We therefore investigated the associations of both subjectively and objectively measured physical activity with stress experiences and affective wellbeing. A total of 90 university students participated in a 10-day experience sampling and diary study during their examination period and reported about stress experiences, physical activity, and affective states. Physical activity was additionally assessed using accelerometry in 50 of the participants. Subjectively assessed physical activity and objectively assessed light physical activity were associated with feeling less stressed in the evening. Also, light physical activity during the day was associated with a smaller increase/higher decrease in feeling stressed from morning to evening. The association of stress experience with negative affect was moderated by objective light physical activity. No interactive effects of stress intensity and physical activity on affective wellbeing were found. On stressful days, physical activity may buffer the

negative association between stress and affective wellbeing. Particularly light physical activity as assessed with accelerometry seems to play an important role. It may be beneficial for students' affective wellbeing to increase or at least maintain physical activity during examination periods.

Real-life physical activity and affective well-being in alcohol use disorder

Markus **Reichert**, Dominic Reichert, Friederike Deeken, Hilmar Zech, Michael A. Rapp, Andreas Heinz, Andreas Ströhle, Andreas Meyer-Lindenberg, Heike Tost, Ulrich W. Ebner-Priemer, and the ReCoDe-Consortium

Background: The association of physical activity (PA) with affective well-being (AWB) is of importance to human mental health. Ambulatory Assessment (AA) is a key method to study PA–AWB interactions in everyday-life, and this research area expands rapidly. However, thus far, studies focused on healthy populations, only little work has been done in patients, and barely anything is known about on PA–AWB associations in an alcohol use disorder (AUD) population.
Methods: In a large quantitative, intensive-longitudinal multicenter cohort study (German Collaborative-Research-Center TRR 265), we used Smartphone-ratings and -accelerometry to investigate PA–AWB associations across 1 year per participant (compliance > 88%). We applied multi-level modeling and controlled for weekdays vs. weekends and AUD criteria, sex, and age.
Results: 572 participants (average age: 36; 16 to 65 years; 38% female) showed significant positive day-level within-subject effects of steps walked on affective valence and calmness, respectively (ß = 0.039; p < .001; ß = 0.019; p < .001). Interestingly, PB–AWB associations were moderated by AUD severity, i.e., more severely affected patients showed a higher real-life affective gain from PA (p = .002; p = .016). Both PA and AWB were associated with daily alcohol consumption (p < .001).
Conclusions and Relevance: Our novel AA assessment across a 1-year period within a large AUD patient cohort provides novel and robust observational real-life evidence suggesting PA–AWB associations as a potential promising treatment target for AUD, especially benefitting the most vulnerable patients, a proposal which needs to be replicated in intervention studies.

16:00 Paper session 8: Employing feedback from and on ambulatory assessments

Chair: Lauren Bylsma

Time: 16:00 - 17:30
Location: IJ Zaal

Associations Over Time Between Fatigue, Stress, Pain, Sleep and Activities in Rheumatoid Arthritis: A Citizen Science and Experience Sampling study

Lieke **Heesink**, Ria Wolkorte, Monique Tabak, Hendrik Koffijberg, Michelle M.A. Kip, Christiane Grünloh

Introduction: People with rheumatoid arthritis (RA) are experts in terms of living with this condition on a daily basis. Using a citizen science approach, we collaborated with people with RA to ensure that the research question matches their interests, is scientifically relevant, and that data collection is feasible.
Methods: The research topic, question and protocol were developed together with people with RA, using a combination of interviews, a survey, and focus groups. Fatigue and its predictive factors were identified as research topic, given its huge impact on everyday life for people with RA. In the subsequent experience sampling study, people with RA reported data on fatigue, stress, and pain using a VAS-scale, as well as the number of hours sleep, rest, physical and cognitive activities on 21 consecutive days. Data was collected through an online platform and participants were able to see their own data in graphs. Multilevel linear regression modelling will be performed to explore associations between stress, pain, sleep, activities and fatigue on consecutive days, between and within individuals.
Results: 63 participants were included (5 drop-outs; adherence = 87.9% for the 58 remaining participants). Data analyses of the experience sampling study will be finished before June and included in the presentation.
Discussion: This citizen science study showed high adherence and low drop-out in a study that matches the interests of people with RA. Outcomes of the study will provide indications for predictive factors of symptoms of fatigue in RA, which are important for treatment plans and disease management.

Initial feasibility and validation of HRV-triggered EMA prompts to capture episodes of emotional arousal in daily life

Lauren M. **Bylsma**, David M. Fresco, Kristin Naragon-Gainey

There is increasing interest in leveraging ambulatory psychophysiology with ecological momentary assessment (EMA) methods to assess emotional processes in daily life. These methods include both random and physiologically-triggered prompts, though little is known about the validity of using physiological triggers. We collected data on N=286 participants (24% male, 65% White) aged 18-65 (M=36.2, SD=13.9) who completed a 10-day EMA protocol assessing momentary affect and continuous electrocardiogram (ECG) activity measured with a chest strap using the Movisens ECGMove4 sensor and MovisensXS Android app. Heart rate variability (root mean successive squared deviation of R-R intervals, RMSSD) was calculated minute-by-minute and used to determine physiological prompts based on overall activity level and significant drops in RMSSD (i.e., greater physiological arousal). Average sensor wear time was 9.3/10 days with overall 87% compliance for EMA report completion, with no difference in compliance for random vs. physiological-

triggered reports. At least 87% of the ECG data were determined to be useable (valid) for computational purposes. In terms of validity of the physiologically-triggered prompts, momentary affect for physiologically-triggered prompts was rated higher on upset (t=-3.49, p<.001) and lower on strong (t=3.66, p<.001), but did not differ on excited (t=-.033, p=.974) or active (t=-1.47, p=.142). Lower arousal affect ratings for sad, anxious, irritable and interested also did not significantly differ by prompt type (ps>.05). Results suggest feasibility and acceptability of physiologically-triggered EMA designs and the validity of using physiological triggers for assessing periods of emotional distress in daily life.

How convincing is Personalized Feedback about Positive Affect in Contexts to participants? A Pre-Post Design

IJsbrand **Leertouwer**, Jeroen K. Vermunt, Noémi K. Schuurman

In personalized feedback reports, Ecological Momentary Assessment (EMA) data about people's self-reported experiences are summarized and reported back to them. A popular form of personalized feedback concerns people's positive affect in different environments and activities. The goal of this type of feedback is to provide participants insight into contexts that are associated with particularly high or low positive affect. Then, they may seek these contexts out more or less often respectively. However, the extent to which participants gain insight from this type of personalized feedback has not yet been quantified. In the study that I will present on, we tested whether participants indeed gained insight from personalized feedback about their average positive affect in different contexts. We did this using a pre-post design, in which we compared estimates that participants made of their average positive affect in different contexts before and after receiving their personalized feedback to their respective personalized feedback (N = 133). For a subsample of participants (n = 77), we mistakenly provided feedback that was consistently higher than the actual average of their EMA data. We found that participants generally changed their estimates in the direction of both the 'correct' and 'incorrect' personalized feedback. These findings suggest that people may be inclined to adjust their perception towards their personalized feedback, even when the feedback is flawed.

Quitting smoking with the support of a buddy: Effects of the SmokeFree Buddy App on social support in everyday life

Corina **Berli**, Philipp Schwaninger, Urte Scholz, Janina Lüscher

Smartphone apps provide unique opportunities to improve smoking cessation in real time, for example by fostering social support from one's personal network. Identifying the mechanisms of such interventions is, however, important to understand what makes these tools effective. The present study examined the effects of the Smokefree Buddy app, a smoking cessation app involving a support buddy of choice, on the theoretically derived and pre-registered mechanism of social support on a daily basis around a self-set quit date. A total of 162 adults with the intention to quit smoking were randomized to an intervention (N = 81; Smokefree

Buddy app + assessments) or a control group (N = 81, assessments only) and completed end-of-day assessments from 7 days before (pre-quit) to 20 days after a self-set quit date (post-quit). Participants rated the amount of daily support received from the buddy and other network members. Multilevel analyses revealed that participants in the intervention group reported higher daily amount of support receipt from the self-set quit date on until 20 days after compared to participants of the control group. Thus, findings show that the app intervention effectively helped to maintain the amount of support from the social network during a quit attempt. This suggests that a theory-based app may be capable to foster the assumed psychosocial mechanisms in everyday life, but a differentiated view on support sources is needed.

Zooming in: Micro-level processes in a compassion-focused ecological momentary intervention

Jessica **Gugel**, Isabell Paetzold, Anita Schick, Christian Rauschenberg, Dusan Hirjak, Tobias Banaschewski, Andreas Meyer-Lindenberg, Jan R. Boehnke, Benjamin Boecking, Ulrich Reininghaus

Background: The compassion-focused ecological momentary intervention (EMI) “EMIcompass” was developed to target stress reactivity, i.e. a more pronounced reaction of negative affect to minor stressors, in daily life. This EMI offered various delivery schemes, such as on-demand training, daily tasks, and tasks provided in moments of high stress or negative affect. The combination of EMI tasks and ecological momentary assessment (EMA) in the EMIcompass trial allows putative therapeutic processes of change to be examined on the micro-level. Therefore, this study aims to examine whether completing tasks in moments of high stress or negative affect will lead to a more pronounced reduction of momentary stress, negative affect, and stress reactivity afterwards.
Method: In a randomized controlled trial evaluating the 6-week EMIcompass intervention, momentary stress, negative affect, and stress reactivity were measured using EMA in N=46 youth with early mental health problems aged 14-25 years. We are currently analyzing the data using multilevel analyses to examine changes in those momentary states depending on the predictor of whether or not an EMI task was completed.
Discussion: Results of this study will help us understand the effects of EMIcompass tasks on proximal EMA outcomes of negative affect, stress, and stress reactivity on the micro-level.

Exploring the impact of just-in-time intervention prompts using post-prompt Ecological Momentary Assessment

Tomas **Vetrovsky**, Jan Novak, Iris Maes, Michael Janek, Jitka Kuhnova, Andrea Jaklova, Anna Lojkaskova, Richard Cimler, Sofie Compernolle, Delfien Van Dyck, Steriani Elavsky

Background: Just-in-time adaptive interventions (JITAIs) can improve physical activity (PA) levels in patients with chronic diseases such as type 2 diabetes.

Understanding how the varying context of the just-in-time prompts affects their impact is critical for developing effective JITAIs. This study uses Ecological Momentary Assessment (EMA) to explore the moderating effect of prompts' context based on the Capability, Opportunity, Motivation, and Behaviour (COM-B) framework.
Methods: Type 2 diabetes patients from the intervention arm of the ongoing ENERGISED randomised controlled trial (ClinicalTrials.gov: NCT05351359), receiving regular just-in-time prompts to increase PA (4 to 6 prompts per week during 12 months), will participate in the study. Fifteen minutes after randomly selected prompts, the patients will receive an EMA survey assessing their fatigue, stress, pain, and social and environmental context using the HealthReact system. Patients' PA following the prompts will be measured using a wrist-worn Fitbit tracker.
Results: We assume that 80 patients will together answer 1200 surveys. The post-prompt PA levels will be modelled as a function of the survey answers using a series of multilevel models.
Discussion: The findings of this study will contribute to understanding how varying contexts of the just-in-time prompts affect the impact of these prompts on the physical behaviour of diabetes patients. For example, the prompts may be less effective when the patients feel tired, or their environment is not supportive of PA. These findings will enable the development of more effective JITAIs for patients with chronic conditions by triggering the right prompts in the right contexts.

16:00 Paper session 9: Methodological issues in daily diary methods (1)

Chair: Cornelia Wrzus

Time: 16:00 - 17:30
Location: Expo

The Acceptability and Utility of Ambulatory Assessment: Insights from 2792 Participants in A Large-Scale Daily Diary Study

Xinkai **Du**, Omid V. Ebrahimi, Marianne S. Birkeland, Robert Smith, Jens C. Skogen, Asle Hoffart, Sverre U. Johnson

Psychological processes are dynamical in nature and display strong individual differences. Yet, studies based on cross-sectional data only reveal group-level effects and lack the ability to capture the dynamic properties of human psychology. The investigation of psychological dynamics and heterogeneity requires the idiosyncratic modeling of intensive longitudinal data, which are often costly to collect with traditional methods. Therefore, ambulant assessment (AA) methods that permit researchers to collect such data with low cost and high ecological validity recently have attracted wide attention. Despite AA's popularity, few studies have investigated how participants experience and perceive their participation (i.e., whether it is useful for them or just extra burdens). This is important, as participants' experience in the measurement process can directly impact data quality. In a large-

scale daily diary study involving 2792 individuals, we asked participants to report their experience in the measurement process. We discovered that most participants found AA to be beneficial in general (74.6%) and specifically, for their self-understanding (59.9%) and self-reflection and experience sharing (68.5%). Furthermore, most participants expressed willingness to participate in AA-research again (83.9%). 21.7% participants reported that AA participation helped alleviate their mental health problems, and a smaller fraction of participants (11.7%) reported AA participation worsened their problems. This study reveals that adults predominantly find participation in AA research to be somewhat beneficial for their mental health, with the majority of adults expressing re-participation interest. A minority of individuals expressed mental deterioration, presenting a critical avenue for future research to identify the characteristics of these individuals.

The Effects of Questionnaire Length on Response Styles in Ambulatory Assessment

Kilian **Hasselhorn**, Charlotte Ottenstein, Thorsten Meiser, and Tanja Lischetzke

Parallel to the technical development of mobile devices and smartphones, interest in conducting ambulatory assessment (AA) studies has grown rapidly in recent decades. Knowledge about the effects that design choices, such as questionnaire length (i.e., number of items per measurement occasion), have on AA data quality is surprisingly restricted. Additionally, response styles (RS), which threaten data quality, have not yet been analyzed in the context of AA. The aim of the current research was to experimentally manipulate questionnaire length and investigate the association between questionnaire length and RS in an AA study. We expected that the group with the longer questionnaire would show a greater magnitude of RS than the group with the shorter questionnaire. Students (n = 284) received either a 33-item or an 82-item questionnaire three times a day for 14 days. To test our hypothesis, we used a multigroup two-dimensional item response tree model in a multilevel structural equation modeling framework to estimate midpoint and extreme RS in our AA study. We found that the group with the longer questionnaire showed a greater magnitude of RS than the group with the shorter questionnaire. Although further validation of our findings is necessary, we hope that researchers consider our findings when planning an AA study in the future.

The impact of incentivization on recruitment, retention, data quality, and participant characteristics in Ecological Momentary Assessment

Laura M. **König**, Helge Giese

Ecological Momentary Assessment (EMA) may advance the understanding of psychological phenomena in daily life. To draw meaningful conclusions from the data, large and compliant samples are required. Therefore, EMA study participation is usually incentivized using monetary (e.g., fixed or performance-contingent payment) or non-monetary (e.g., feedback) compensation. This experimental study investigates the impact of incentivization on recruitment, retention, data quality, and participant characteristics.

The study was pre-registered (https://osf.io/cwb3h) and used a 2 Payment (fixed/ performance-contingent) x 2 Feedback (yes/ no) between-subjects design. Participants were recruited from a university study pool with 707 members, who were randomly assigned to seeing one of four study advertisements. The final sample comprised 74 participants. Over 7 days, their mood states were assessed with 10 daily random prompts.
Feedback increased the likelihood of participation (OR = 1.62, 95%CI[0.99; 2.65]) and reduced the likelihood of participants receiving fixed payment to drop out (HR = 0.40, 95%CI[0.17; 0.95]). Feedback additionally improved data quality as indicated by higher internal consistencies ($F[1, 65] = 6.38$, $p = 0.014$, partial $\eta^2 = 0.09$). Furthermore, feedback attracted participants with higher interest in research and the study topic ($Fs[1, 65] \geq 5.70$, $ps \leq 0.011$, partial $\eta^2 s \geq 0.08$). Effects of fixed vs performance-contingent payments were largely negligible.
Offering feedback as compensation in EMA studies may facilitate recruitment and retention, and increase data quality; however, it may also risk higher selection bias.

Screenless One-Button Wearables for Self-Tracking: Results from Pilot Studies and a Large Field Experiment

Selina **Volsa**, Bernad Batinic, David Lewetz, Stefan Stieger

When using Ambulatory Assessment (AA) designs, it can be difficult for participants to reconcile their daily life with the frequent, and at times disruptive, assessments often used in this method. Measurement methods can try to mitigate this burden by minimizing their obtrusiveness. In a series of studies, we explored screenless one-button wearables as a measurement option for in-situ self-tracking with low obtrusiveness compared to common alternatives like smartphones. We introduce an open-source configuration application that enables researchers to easily use commercially available wearables by Mbientlab in AA designs. In addition to six pilot studies, we conducted a large, preregistered field experiment to test the technical viability as well as the produced data quality. The pilot studies showed that basic aspects of the devices like battery runtime, button press detection, and accuracy of angle measurements are suitable for employment in empirical scientific research. The angle measurement allows for the use of a Physical Analogue Scale, whereby participants can indicate a value with their lower arm angle. We further found high correlations between inputs made with wearables and smartphones when using a Likert scale as well as when using a Physical or Visual Analogue Scale respectively. Furthermore, we found that participants in the wearable group were more compliant to the event-contingent scheduling than participants in the smartphone group. We discuss the benefits and drawbacks emerging from the use of these wearables in AA designs.

Temporal and contextual predictors of careless responding in an ecological momentary assessment study

Shirlene D. **Wang**, Jixin Li, Stephen S. Intille, Genevieve F. Dunton

The use of ecological momentary assessment (EMA) studies allows for the study of processes that influence behavior in real-time and in the real world but may also lead to response fatigue. Despite the implications, there has been a lack of research on temporal and contextual predictors of response accuracy in EMA. To address this gap, we study predictors of careless responding including temporal factors (weekend, day in the study, hour of the day, part of the waking day), physical location, device use, and phone-detected activity.
Participants answered hourly surveys in four-day bursts every two weeks over one year. Twenty percent of surveys contained one of several validation questions with a verifiable answer (e.g., What color is the sky?) as an objective measure of careless responding. This analysis analyzed these prompts (N=4745) and only includes participants that answered at least one validation question incorrectly (N=43). Participants (Mean age 23.9, SD= 3.1, 58.1% male) answered 95.13% of prompts correctly; 86 (37%) of the incorrect responses were from one participant. Univariate logistic regressions showed there were no significant effects of the temporal factors. Validation questions were more likely to be answered incorrectly when participants were away from home (p=.029), when the phone screen was off at prompt delivery (p=.003), and when the phone was non-stationary upon prompt delivery (p>.001).
Our research contributes to the dearth of empirical evidence examining the accuracy of EMA responses and the detection of careless responding. Our results suggest the need for more context-informed scheduling of prompts.

Best Designs for Specific Samples in Ecological Momentary Assessment? A Meta-Analysis on Designs, Samples, and Compliance across Research Fields

Cornelia **Wrzus**, Andreas Neubauer

Ecological Momentary Assessments (i.e., EMA, repeated assessments in daily life) are widespread in many fields of psychology and related disciplines. Yet, little knowledge exists on how differences in study designs and samples predict study compliance and dropout—two central parameters of data quality in (micro-)longitudinal research. The current meta-analysis included k = 477 articles (496 samples, total N = 677,536). For each article, we coded the design, sample characteristics, compliance, and dropout rate. The results showed that on average EMA studies scheduled six assessments per day, lasted for seven days, and obtained a compliance of 79%. Studies with more assessments per day scheduled fewer assessment days, yet, the number of assessments did not predict compliance or dropout rates. Compliance was significantly higher in studies providing financial incentives. Otherwise, design or sample characteristics had little effects. We discuss the implications of the findings for planning, reporting, and reviewing EMA studies.

17:30 Poster session 2

Posters #34 to #62

Time: 17:30 - 18:30
Location: Foyer

Poster 34: Predicting Cognitive Behavior Therapy Outcomes from Smartphone-based Passive Sensing Features in Patients with Anxiety Disorders

Jacopo **Mocellin**, Dominique Recher, Christina Paersch, Ava Schulz, Miriam Müller-Bardorff, Aaron J. Fisher, Tobias Kowatsch, Isaac Galatzer- Levy, Birgit Kleim

Cognitive Behavioral Therapy (CBT) is amongst the first-line recommended treatments for anxiety disorders, but how treatment impacts behavioral patterns has not yet been fully characterized. Passive mobile sensing gives the opportunity to unobtrusively and precisely characterize behavior change and to forecast which patients will respond to treatment.
A randomized controlled trial was conducted on anxiety patients assigned to transdiagnostic CBT versus WAIT. Data collected for 14 days at week 0, at week 8 and at week 18 (pre, mid, post assessments) from a variety of sensor sources on the smartphones of 33 participants was employed. Behavioral features were derived and differences between groups of participants were then investigated. The time series data was then used to train and test an array of multivariate time series (MTS) classification and regression models for predicting anxiety symptom improvement. The best performing classifier (MUSE) achieved 60% accuracy in forecasting change in anxity severity. Significant behavioral differences were found among participants in the treatment group (minimum amount of luminance recorded) and between CBT and WAIT group (average speed of movement at post and two bluetooth-derived features at mid: number of unique devices scanned, standard deviation of of the scans per every sensed device).
Together, these results suggest that distinct biobehavioral patterns that may be meaningfully and noninvasively captured using passive sensing in patients. Although these are not yet fully developed and sufficient for clinical use, they hold promise to advance treatment allocation and personalization.

Poster 35: Towards Using Continuous Blood Pressure Recorded during Cognitive Testing for Detecting Cognitive Impairment

Shevaun D. **Neupert**, Thomas M. Hess, Alper Bozkurt, Edgar Lobaton

Engaging in cognitively demanding tasks is beneficial to preserve cognitive health. We examined continuous psychophysiological data during cognitive testing to detect differences between participants with Alzheimer's Disease or Related Dementias (ADRD) and healthy controls. 160 non-impaired and 28 ADRD participants completed a computerized memory-scan task in which they were presented with a string of consonants on the screen followed by a single consonant. The ADRD participants

completed two assessments, approximately 6 months apart. All participants were instructed to indicate whether or not the single consonant was presented in the string of consonants viewed immediately before by indicating “Yes” or “No” using a serial response box. The task had four levels of increasing difficulty. As participants are required to sustain engagement throughout each level of the task, task difficulty increases as a result of expended resources. While completing these tasks, cardiovascular responsivity was assessed using a continuous, noninvasive, cuff-based arterial blood pressure device. In line with past work, systolic blood pressure responsivity (SBP-R) was used to index cognitive engagement. Trends in SBP-R over time were analyzed by fitting a piecewise linear spline. We found evidence of a clear increase in SBP-R for non-impaired participants, indicating the expected increase in engagement as difficulty increased. In contrast, ADRD participants were starting to show patterns of disengagement at their first visit, but these patterns became even more pronounced at their second visit. These results suggest that changes in SBP-R during cognitive testing could be a useful tool to detect cognitive impairment and its progression.

Poster 36: Monitoring alcohol craving in daily life: Theories and methods for intensive longitudinal psycho-physiological studies

Matthijs M.L. **Noordzij**, Erika, H.G. Van Lier, Marcel M.E. Pieterse

This poster presents an overview on a PhD dissertation on psychophysiological studies related to alcohol craving in daily life. Since this was one of the first longitudinal single case designs for alcohol craving, multiple preliminary studies were carried out prior to designing the final monitoring study. This final study was a longitudinal Intensive Repeated and Continuous Measures in Naturalistic Settings Case-study design of physiology, craving and lapses. Ten clients with alcohol use disorder were followed for 100 days during outpatient treatment. The association between physiology, craving and lapses was explored, as well as the possibility of improving the understanding between physiology and craving by accounting for contextual and psychological variables. Key findings are that currently, multiple prerequisites to develop a longitudinal ambulatory monitoring system for craving in daily life are in place. Stress, Negative Affect and Positive Social situations are found evidence based context variable to increase the ecological validity of researching craving with an EMA design. Additionally, the E4 wearable is a valid device to measure heart rate and mean skin conductance level in stress events. The device is not perceived as a burden, was usable and compliance was acceptable. However, alarming a person on physiology as replacement for subjective craving seems not viable as an ecological momentary intervention, meaning outside the lab, since physiology and craving do not co-occur in high enough frequencies over time in daily life.

Poster 37: Comparing Accelerometer Metrics and Sensor Locations

Robin R.O. **Olfermann**, Eni E.H. Hysenllari, Jörg J.O. Ottenbacher, Ulrich U.E. Ebner-Priemer, Markus M.R. Reichert, Marco M.G. Giurgiu

Accurately assessing physical activity (PA) is a key factor in many Ambulatory Assessment (AA) studies. While a large proportion of studies measure PA via accelerometers, there is neither a standardized way of using these devices nor a uniform metric to report their data. This makes translation and comparability between studies difficult. Therefore, our aim is to provide an overview of the values from four common metrics (i.e., Euclidean Norm Minus One (ENMO), Mean Amplitude Deviation (MAD), Movement Acceleration (milli-g) and Counts per minutes (CPM)) across six different sensor locations (i.e., upper arm, wrist, hip, chest, thigh, ankle). We analyzed data from a laboratory validation study (N=20) with a semi-standardized protocol including 32 different activities of different categories such as lying, sitting, standing, activities of daily life, walking, or cycling. We first aggregated the data for each category and metric and compared between person differences. Moreover, we conducted equivalence testing between different sensor locations. Finally, we provide a converter between different metrics and locations.

Poster 38: Stress system dynamics in childhood trauma-related depression

Jasmin M. **Pasteuning**, Menno M. Schoonheim, Milou S.C. Sep, Christiaan H. Vinkers

Childhood trauma (CT) is associated with persistent vulnerability across the life span, including an increased risk of depression. While evidence demonstrates altered stress system functionality following exposure to CT in relation to depression, it is currently unknown which CT-related changes in development of the stress system explain why individuals with CT-related depression have poor outcomes. Dynamic functionality of the stress system may be key to an adequate and coordinated stress response, spanning across several modalities including endocrine responses, brain functions/networks, and behavioral responses. Therefore, the current randomized cross-over study aims to investigate stress system dynamics in three groups: CT-related depressed patients, non-CT-related depressed patients, and healthy controls. It will do so on a multilevel scale, including resting-state and task-based fMRI, endocrine responses, psychophysiology, and behavior, after a psychosocial stressor and placebo-condition. In addition, we will compare these lab-based findings to daily-life stress reactivity using experience sampling. We hypothesize that impaired dynamics in the stress response is central in the persistent vulnerability of these patients. Specifically, we hypothesize that patients with CT have a reduced proficiency for dynamic adaptation of brain function, which would result in an impaired response to stress compared to non-CT depressed patients and healthy controls, with lower stress-induced (de)activation and connectivity of stress-related brain networks. We expect that loss of normal stress-related functional network dynamics also relates to altered physiological and psychological responses to daily-life stress.

Poster 39: Combining Objective and Subjective Recovery Indicators: An Ambulatory Assessment Study on Daily Recovery from Job Stress after Work

Johanna **Perzl**, Verena C. Haun

Recovery from job stress is essential to sustain well-being and work performance. According to the Effort-Recovery Model, energetic and cognitive resources are depleted during work hours and can be restored during non-work time. Specific recovery experiences (e.g., psychological detachment, mastery, control during leisure time) facilitate the restoration of depleted resources. While previous research mostly used self-report measures to assess recovery which raises concerns about common method bias, we combine self-report measures with objective measures of daily recovery.
In this ambulatory assessment study over three workdays, 67 employees answered self-report items on recovery experiences, energetic activation, fatigue, and attention every hour after the end of the workday. Additionally, they responded to short versions of either the Symbol Digit Modalities Test (SDMT) or the Sustained Attention to Response Task (SART) after each survey to measure cognitive performance as objective recovery indicator.
Multilevel models revealed significant correlations among the subjective recovery indicators while correlations between subjective and objective recovery indicators were sparse. In line with our hypotheses, recovery experiences predicted both subjective and objective recovery indicators. While control during leisure time was positively associated with complex attention measured by the SDMT, psychological detachment and mastery were related to increased cognitive inhibition in the SART. Our results extend previous findings on recovery experiences by combining both objective and subjective recovery. The low correlation of subjective with objective recovery indicators emphasizes the added value that objective measures can provide. Overall, the study highlights the feasibility of using objective measures in ambulatory recovery research.

Poster 40: Adaptive Individualised Time Series Prediction from Digital Phenotyping Data: An Application of Ensemble Bayesian Model Averaging

Fridtjof **Petersen**, Laura Bringmann, Jorge Tendeiro, Jonas Haslbeck

The widespread adaption of smartphones allows for the quantification of behaviour in everyday life via the multitude of smartphone sensors. Sensor data has been linked to moment-to-moment psychological symptoms and mood of individuals and thus sensor datacould alleviate burden associated with the repeated measurement of symptoms. Additionally, psychological care could be improved by predicting moments of high psychopathology and immediately providing smartphone-based interventions. Current research assumes that the relationship between sensor data and psychological symptoms is constant over time - or changes with a constant rate. This is either done by training the model on all available past data or using past data of a fixed size. Yet fixing this window can undermine performance if the relationship changes faster as expected since the model is trained on old stale data. The aim of the study is to develop a methodology that can adapt to the correct underlying rate of change to improve prediction accuracy. The ensemble Bayesian model averaging technique (eBMA) is tested on extensive simulation data that is typical of digital

phenotyping data. We show that the eBMA method adapts to change appropriately by adaptively choosing the correct size of training data over time and outperforms models that are trained on a fixed amount of data. These results highlight the impact the underlying rate of change can have on predictive accuracy if ignored and how the proposed methodology is a potential solution to this problem.

Poster 41: Too many zeros in the field of Substance Use Disorder: Are two-part models a good choice for the analysis of EMA data in medical research?

Iris **Reinhard**, Sabine Hoffmann

In medical research, it is common to encounter data characterized by a peak at zero followed by a continuous distribution for the positive values. Examples include studies on alcohol use disorder (e.g. amount of alcohol or drinking days). Here the point mass at zero represents a population of 'non-drinkers' who consumed no alcohol, while the continuous distribution represents the level of the amount of alcohol for those people who drank alcohol.
For statistical analyses in order to understand the influence of therapies, demographic and disease-related variables, alternative approaches are needed to accommodate the discrete and continuous features of the data. For the identification of possibly influencing factors on semi-continuous EMA data, a two-part model is considered which is based on a two-stage design. The first stage involves modelling the risk for the occurrence of a positive outcome and the second stage models the intensity or the amount of nonzero outcomes. The multilevel structure of the data is accounted for by including random effects.
In a simulation study the performance of this model is evaluated in terms of type I error and the mean squared error (MSE) of the estimates, under different levels of sample size, correlation between covariates, and correlation between random effects. Finally, the results are compared to conventional linear mixed models. The proposed two-stage model performs well for the analysis of semi-continuous medical data. With increasing sample size the performance improves. The classical linear mixed model has to be discouraged because it produces inflated type I error and much higher MSEs than the two-part model.

Poster 42: Ambulatory monitoring and coaching for people with disabilities to support their vocational inclusion in the primary labor market

Regina Franziska **Schmid**, Regina Weißmann, Burcu Köse, Christiane Bartosch, Joachim Thomas

People with disabilities who are seeking employment on the primary labor market as an alternative to working in a sheltered workshop face major challenges. When leaving such protected institutions, services like on-the-job supervision are often omitted. However, ongoing social support is discussed as indispensable for sustainable inclusion in the world of work. The present study presents an innovative

method of smartphone-based ambulatory monitoring and coaching, which aims to provide social support for people with disabilities during their transition to the labor market. In the first four weeks after the transition, participants are asked to report in a daily diary on characteristics of their workday and well-being each day after work. The entries are monitored by personal job coaches and reviewed twice weekly for acute intervention needs. If the diary indicates that participants feel unwell, help in the form of a coaching is offered immediately. In addition, the diary data is discussed with the participants in regular coaching sessions held once a week. This allows individual strengths and weaknesses to be identified and addressed in a resource- and solution-oriented approach. Three people with disabilities have participated in the project so far. Data collection is currently ongoing and preliminary results on individual case studies will be available by June 2023. In addition to feasibility issues, relationships between well-being and beneficial as well as detrimental characteristics of the workday will be examined. Concluding, such digital tools have the potential to offer low-threshold, customized, and needs-based support and thus to advance vocational participation.

Poster 43: The APOS-project: Longitudinal assessment of acute risk factors for post-discharge suicidal thoughts and behavior using EMAs and wearables in a high-risk sample

Antje **Schönfelder**, Thomas Forkmann, Lena Plein, Luise Lucht, Nina Hallensleben, Heide Glaesmer, Lena Spangenberg

Background: The prediction of suicidal-related thoughts and behavior (STBs) remains unsatisfactory. Various studies emphasize the importance of high-resolution assessment of proximal risk factors. A particularly critical time window for suicide attempts is the transitional phase of discharge from inpatient treatment. The ongoing APOS project (https://osf.io/axnws) examines proximal psychological and physiological risk factors for STBs, using Ecological Momentary Assessment (EMA) after discharge from inpatient psychiatric treatment. The poster illustrates the current status of the project and the challenges of realizing a complex study design in a high-risk population.
Methods: N = 344 participants treated with severe suicidality/ after suicide attempt will be recruited at two sites in Germany. After a baseline assessment, EMA will start 1-3 days before discharge covering the following three weeks (EMA 1: 4 prompts daily) and the following 6-months (EMA 2: 4 prompts on 2 days per week). Recruitment will end in August 2024.The EMA survey is conducted using the Catalyst app (metricwire Inc.). Heartrate is assessed with the Polar Unite watch.
Results: At this time, 67 participants are enrolled in the study (response rate = 61%; 5 in EMA 1, 24 in EMA 2). The average compliance is 44% (range: 2.7% - 95%) and the dropout rate is 27 %.
Discussion: Various hurdles challenge implementing the study. 1) The nature of the sample, 2) technical challenges (compatibility and updates of used devices), 3) ethical and security aspects. High technical effort or a perceived increased burden due to the frequent surveys were named for dropping out.

Poster 44: A measurement burst approach to intraindividual variability and change in reactivity toward daily events in recurrent depression

Isabelle Florence **Schricker**, Sibel Nayman, Iris Reinhard, Christine Kuehner

In Major Depressive Disorder, first evidence shows heightened mood-reactivity toward daily events. Related longitudinal studies in recurrently depressed (rMDD) patients are lacking and it remains unclear to what extent prior major depressive episodes (MDEs) might increase vulnerability for heightend reactivity. Long-term changes in such short-term within-person associations can be analysed via measurement burst (MB-) designs. In the present study, we implemented two bursts, separated by approximately 4.4 years, which consisted of a laboratory session and an Ambulatory Assessment (burst-1: 3 days, burst-2: 5 days). Via smartphone, 54 rMDD patients indicated their negative (NA) and positive affect (PA), rumination, self-acceptance, and the occurrence of negative and positive daily events ten times per day and collected saliva cortisol samples five times per day. Within bursts, we found NA and RUM to increase following negative and PA and SA to increase following positive events. Affective and cognitive reactivity remained stable over time, except for an increase in PA-reactivity toward positive daily events over bursts. RMDD patients with a higher number of lifetime MDEs at T1 showed stronger NA-reactivity within bursts. Over bursts, lifetime MDEs at T1 moderated intrainidivdual change in reactivity toward positive – but not negative - events. We found no significant effects of daily events on cortisol in daily life. To conclude, MB-designs enable to examine intraindividual variability, change, and possibly related clinical moderators, thereby providing prognostic information for the course of rMDD.

Poster 45: "Does workplace telepressure get under the skin? An ambulatory assessment study of wellbeing and health-related concomitants of workplace telepressure among healthy workers"

Raphaël **Semaan**, Urs M. Nater, Raphaël Heinzer, José Haba-Rubio, Peter Vlerick, Ruben Cambier, Patrick Gomez

The working life of many employees requires the use of modern information and communication technology (ICT) devices (e.g., smartphone). The double-edged nature of digital work environments has been increasingly highlighted. One of the potential downsides is workplace telepressure, i.e., the experience of urge and preoccupation to quickly reply to work-related messages and demands using ICT. We hypothesize that workplace telepressure is significantly associated with more psychosomatic complaints, worse sleep quality, worse mood, lower cardiac vagal tone, lower anabolic balance (i.e., the ratio of salivary dehydroepiandrosterone to salivary cortisol), and higher salivary alpha-amylase. Additionally, we aim to investigate the hypothesis that connection to work, operationalized in terms of work-related workload and work-related perseverative cognition, plays a significant role in the mediation of these relationships.
To test our hypotheses, we are conducting an AA study with a sample of 120 healthy workers (50% female) regularly using ICT for job communication. During one week, participants will complete electronic diaries assessing their level of workplace

telepressure, psychosomatic complaints, sleep quality, mood, work-related workload, and work-related perseverative cognition. They will also continuously wear the Bittium Faros 180L ECG monitor and the wrist-worn actigraph MotionWatch 8, and perform saliva sampling five times per day. Analyses will focus on within-subject relationships between variables.
This comprehensive investigation constitutes an important step towards understanding how high levels of workplace telepressure may lead in the long term to secondary alterations (e.g., hypertension) and disease. Results are not yet available, but we will be able to present them at the conference.

Poster 46: Dynamic Networks to explore predictors of substance use among patients beginning treatment for Substance Use Disorders

Fuschia **Serre**, Christophe Gauld, Laura Lambert, Emmanuelle Baillet, Jean-Arthur Micoulaud-Franchi, Marc Auriacombe

Ecological Momentary Assessment (EMA) studies previously demonstrated a prospective association between increase in craving intensity and higher probability of substance use in the following hours, highlighting the major role of craving in relapse. Conceptualizing Substance Use Disorders (SUD) as dynamic systems of causal elements could provide valuable insights on the interaction of craving with other symptoms in the process of relapse.
Methods. A two-week EMA protocol assessed substance use and its potential precipitants four times per day among SUD patients beginning treatment. Multilevel vector auto-regression models were used to explore contemporaneous, temporal and between-subjects networks considering primary substance use, craving, cues, sadness, self-efficacy, and pharmacological treatment use. Especially, temporal model depicts the lagged associations of symptoms from one point of time to the next within patients.
Results. Among the 211 patients, a strong positive association was found between craving and use in the three models. In the temporal model, substance use at one time (T) was predicted by higher craving and low self-efficacy at T-1, but not by sadness. Craving presented a negative feedback loop with self-efficacy. Use of a pharmacological treatment at one time was predicted by higher self-efficacy at T-1, and associated with less craving and less substance use at T+1.
Conclusion. Dynamic network analyses replicate previous results suggesting the importance of craving in relapse process, and offer a better understanding of importance of other variables. Results confirm clinical interest of craving and self-efficacy to target interventions.

Poster 47: Bringing Psychophysiology to the Masses: Validating Low-Cost, Mobile PPG Wearable Devices

Mohammadamin, M, **Sinichi**; Martin, M, Gevonden; Lydia, L, Krabbendam

Heart rate variability (HRV) has rapidly gained traction as an index of autonomic nervous system activity and a marker of both physical and mental well-being. Traditional electrocardiography (ECG) method for HRV assessment is limited by

wired connections, wet electrodes, and thorax measurement, making it difficult for long-term or real-life monitoring outside the lab. This poses challenges for researchers studying non-lab settings, such as cost, ease of setup, and cultural sensitivity in places where removing clothing for ECG may be perceived negatively. Photoplethysmography (PPG) wearables, show promise as a user-friendly alternative, but this greater comfort comes at the expense of data quality, which may be acceptable for heart rate (HR) measurement but is detrimental to the validity of HRV measurement. Additional complications include greater motion artefact sensitivity, accuracy variability with skin tone, and limited validity due to the “black box” nature of many consumer devices. A few exceptions, like Schone Rhythm 24 (arm), Kyto2935 (ear), and Inner Balance Bluetooth Sensor (ear), transmit raw and unsmooth inter-beat intervals and offer versatility and convenience for real-world research. Our study will validate these three devices and compare them to the Vrije Universiteit Ambulatory Monitoring System (VU-AMS).
Our study will provide a unique contribution by evaluating the accuracy and validity of low-cost and mobile PPG devices for HR and HRV data collection in various conditions. We aim to make a significant contribution to the literature on psychophysiology outside of the laboratory setting and bring the benefits of this field to a wider audience.

Poster 48: Investigating antidepressant response: ambulatory assessment in patients undergoing Sleep Deprivation Therapy

Lea **Sirignano**, Steffen Tietz, Hiroki Takeuchi, Josef Frank, Stephanie H. Witt, Fabian Streit, Lea Zillich, Jinhyuk Kim, Lisa-Marie Wadle, Ulrich Ebner-Priemer, Yoshiharu Yamamoto, Maria Gilles, Marcella Rietschel, Jerome Clifford Foo

Depressive disorders are the leading cause of global disability with more than 300 million suffering from this condition worldwide. Changes in mood and physical activity are part of the symptomatology and their association with depression has been shown in previous studies. However, it is unclear if these changes in mood and physical activity can predict therapy response. Psychotherapeutic drugs and psychotherapy are the treatments of choice for depressive disorders, but response to is often delayed for weeks, during which symptoms can manifest. Sleep Deprivation Therapy (SD) is a fast-acting chronotherapeutic with a response rate of 50-70% with patients showing an antidepressant effect immediately after the SD night. The rapid action of SD makes it a candidate for an in-depth investigation of the course and factors associated with therapy response. In this study we used ambulatory assessment to assess mood (smartphone) and physical activity (actigraphy) in inpatients (n=30) diagnosed with a major depressive episode. We plan to investigate if patterns of mood and physical activity assessed before SD can predict therapy response and how these patterns change over the whole course of SD (three weeks) in the different groups (responders, non-responders). Results and their future implications will be discussed.

Poster 49: Relationships between food addiction and momentary eating patterns

Kathryn E. **Smith**, Alex Smith, Tyler B. Mason

Food addiction (FA) involves compulsive overeating of palatable, processed, energy-dense foods. While there are strong relationships between FA, binge eating, and obesity, no study has assessed real-life eating patterns associated with FA using ecological momentary assessment (EMA). This pilot study examined (1) the extent to which FA symptoms predicted EMA-measured binge eating and consumption of palatable food (sweets, fried food, sugary beverages), and (2) whether FA moderated the association between momentary contextual triggers (affect, craving, exposure to palatable food, impulsivity) and these eating behaviors.
Participants were 35 adults who endorsed varying degrees of FA and binge eating symptoms (83% female; BMI=34.1±8.3 kg/m2). Participants completed a FA assessment followed by a 10-day EMA protocol. Generalized linear mixed models showed higher FA symptoms predicted greater EMA-measured binge eating ($p<.001$) and consumption of palatable foods ($p<.001$).
There was a significant interaction between FA and within-person exposure to palatable food predicting subsequent binge eating ($p=.029$). There were also significant interactions between FA and within-person impulsivity predicting subsequent binge eating ($p=.008$) and palatable food consumption ($p=.041$). Momentary impulsivity and exposure to food cues had stronger effects on these eating behaviors for individuals with low versus high FA symptoms. No significant interactions emerged for affect or craving.
Results confirmed FA is related to dysregulated and obesogenic eating behavior in daily life. Consistent with the conceptualization of FA, the eating behaviors of individuals with greater FA severity may be highly compulsive and habitual in nature, and less influenced by momentary contextual variables. Future directions will be discussed.

Poster 50: Specific associations between passive/ active suicide ideation and affect: Idiographic analyses of EMA data assessed in inpatients with major depression

Lena **Spangenberg**, Nina Hallensleben, Thomas Forkmann, Heide Glaesmer

Background: Strong evidence for the predictive power of proximal risk factors for suicide ideation (SI) is still lacking. The reliance on nomothetic approaches alone might contribute to this. The present analysis employs an idiographic approach to unravel the individual relations between passive and active SI and affect in real-time.
Methods: 74 psychiatric inpatients rated their current passive and active SI and positive as well as negative affect (anxiety, hopelessness, depression) for six consecutive days (10 random prompts daily). Compliance with the sampling protocol was excellent (89.7%). Data were analyzed using group iterative multiple model estimation (R package GIMME). 16 Data sets were excluded from the analysis due to low variability in either active SI or positive affect. Personalized models as well as models on subgroup level were developed to gain insight in the

associations between passive and actice SI and affect (including autoregressive paths and detrending for time).
Results: Participants were grouped into three subgroup. On subgroup level, only significant contemporaneous paths emerged (with no direct paths from affect to active SI). In general, the personalized models revealed large heterogeneity. The number, direction and strengths of individual paths differed enormously (with fewer direct paths from affect to active SI than to passive SI overall). Passive and active SI were interrelated in the majority of individual models.
Discussion: The heterogeneous individual models potentially reflect structural and functional differences in the development and maintenance of SI. Interpreting these models might be beneficial in the context of individual interventions.

Poster 51: A quality assessment tool for ambulatory assessment studies on the physical behavior and affective well-being association

Irina **Timm**, Marco Giurgiu, Ulrich W. Ebner-Priemer, Markus Reichert

Introduction: There are different methodological approaches to assess physical behavior (PB) and affective well-being (AWB). Since there is currently no specific quality assessment (QA) tool for ambulatory assessment studies investigating the bidirectional PB-AWB association, we designed a QA tool to capture relevant aspects.
Methods: The QA tool was developed based on several existing checklists and guidelines (CREMAS; Liao et al., 2016; NIH 2020; Trull & Ebner-Priemer, 2020). Overall, a total score of 16 points can be achieved with every category (each containing subcategories) counting one or half a point. We applied three evaluation levels: strong (16 to 12), moderate (11 to 6), and weak (5 to 0) quality of reported methods. We rated 66 studies that met the inclusion criteria in our systematic literature review on PB-AWB associations.
Results: The interrater reliability was calculated with a single-rating, absolute agreement, 2-way mixed-effects model with two raters (Koo & Li, 2016). The interrater reliability was good (intraclass correlation coefficient = .777; confidence interval (CI): .52 to .88). The QA consisted of both neglected (i.e., latency) and well-documented (i.e., prompt frequency) categories. Across all studies (n = 66), n = 15 were ranked strong, n = 50 moderate, and n = 1 weak.
Conclusion: This QA may incite researchers to clarify all relevant methodological aspects in their ambulatory assessment studies, simplify replication and contribute to a better understanding of contradictory results. For example, we suggest future studies to thoroughly report accelerometer wear time, e-diary compliance, and other adherence measures such as latency.

Poster 52: The within-subject association of physical behavior and affective well-being in everyday life: a systematic literature review

Irina **Timm**, Marco Giurgiu, Ulrich W. Ebner-Priemer, Markus Reichert

Introduction: Several systematic reviews have confirmed the positive effects of physical activity (PA) on affective well-being (AWB). Unfortunately, there are barely

any reviews on the dynamic momentary interplay of physical behavior (PB), including both PA and sedentary behavior (SB), and AWB in everyday life.
Methods: We included studies using intensive longitudinal data, combined with a device-based measurement of PB and AWB assessment via electronic diaries, as we focused on within-subject associations. Literature was searched in three databases (Web of Science, PubMed, Scopus). A data extraction was developed to categorize included studies, and a quality assessment tool was adopted to illustrate the risk of bias for the included studies.
Results: There were 66 studies that met the inclusion criteria, with 19 different AWB components and 14 different PB assessment methods. There is consistent evidence that higher within-subject energy levels reliably predicted higher PA and vice versa. Findings from the studies on within-subject energy and SB confirm this evidence to the extent that less time spent in SB led to higher within-subject energy, and higher levels of energetic arousal led to reduced times in SB.
Conclusion: This review summarizes the current state of research, showing that PB and AWB are bidirectionally connected in everyday life. Further experimental or intervention studies are needed to fully understand the implications of PB and its relationship with AWB. Research should adhere to consistent guidelines in utilizing and reporting ambulatory assessment methods.

Poster 53: Development of a novel item set to assess aversive internal experiences in EMA studies

Brianna J. **Turner**, Andrew C. Switzer, Christina L. Robillard, Alice Shen

Aversive internal experiences are thought to be a common precipitant of self-damaging behaviours (e.g., non-suicidal self-injury, disordered eating), and are therefore commonly assessed in EMA studies that seek to predict their occurrence. Most studies use idiosyncratic item sets or scales that assess limited aspects of internal experience (e.g., the Positive and Negative Affect Schedule [PANAS], focused on emotional valence). Yet, theories posit that self-damaging behaviours function to regulate several aspects of internal experience, including (a) emotional Valence, (b) intensity of Arousal, (c) Energy, (d) Self-criticism, (e) sense of Connection to others, and (f) Future orientation. Building on the work of Wilhelm & Schoebi (2007), we developed a set of 12 bipolar items to assess these experiences, and present preliminary data from 40 young adults (aged 18–30) who participated in a 3-week EMA study with four surveys per day. We used multilevel SEM to simultaneously estimate within- and between-person covariances and effects. Intraclass correlation coefficients ranged from 0.26–0.41, indicating most variation was within-person. Within-person reliability ranged from a=0.65–0.82, and between-person reliability ranged from a=0.75–0.97. Supporting convergent validity, Valence had the strongest within-person association with PANAS-NA (Est=0.28, 95% CI=0.18 –0.38) while all other scales except Self-criticism had weaker associations to NA (95% CIs=0.024–0.205). All scales were weakly associated with PANAS-PA, ranging from small positive (Arousal, within-person est.=0.16) to modest negative associations (Self-criticism, within-person est.=-0.27).

Poster 54: Validation of Photoplethysmography Using a Mobile Phone Application for the Assessment of Heart Rate Variability in the Context of HRV-Biofeedback

Willeke W. **van Dijk**, Anja A.C Huizink, Mirjam M. Oosterman, Imke I.L.J. Lemmers-Jansen, Wieke W. de Vente,

Objective: Heart rate variability-biofeedback (HRV-BF) is an effective intervention to reduce stress and anxiety and requires accurate measures of real-time HRV. HRV can be measured through photoplethysmography (PPG) using the camera of a mobile phone. No studies have directly compared HRV-BF supported through PPG against classical electrocardiogram (ECG). The current study aimed to validate PPG HRV measurements during HRV-BF against ECG.
Methods: 57 healthy participants (70.69% women, age 17-60 years) received HRV-BF in the laboratory. Participants filled out questionnaires and performed five times a 5-min diaphragmatic breathing exercise at different paces (range: ~6.5 to ~4.5 breaths/min). Four HRV-indices obtained through PPG, using the Happitech software development kit, and ECG, using the validated NeXus apparatus, were calculated and compared: RMSSD, pNN50, LFpower, HFpower. Resonance frequency (i.e., optimal breathing pace) was also compared between methods.
Results: ICC values of the five different breathing paces were 'near perfect' (> .90) for all HRV indices: lnRMSSD, lnpNN50, lnLFpower, for lnHFpower. All Bland-Altman analyses (with just three incidental exceptions) showed good interchangeability of PPG- and ECG-derived HRV-indices. No systematic evidence for proportional bias was found for any of the HRV-indices. In addition, correspondence in resonance frequency detection was good with 76.6% agreement between PPG and ECG.
Conclusion: PPG is a highly appropriate method for the assessment of HRV indices relevant to perform HRV-BF. PPG is a promising replacement of ECG assessment to measure resonance frequency during HRV-BF.

Poster 55: Studying Adolescent-Parent Contact in the Context of Adolescent Depression using Ecological Momentary Assessment

Myrthe (M.) **Veenman**, Eiko (E. I.) Fried, Bernet (B. M.) Elzinga

Adolescence is a time period characterized by sudden affect changes and increasing prevalence of mental health problems. Although social connections with peers become more important, the family remains an important support factor. Prior studies suggest that so called positive parenting, for instance parental warmth, has a protective effect on the development of psychopathology in the adolescence. However, it remains unclear how parenting and adolescent-parent contact are perceived by the adolescent over time, and how they are related to the development of adolescent depression. Ambulatory Assessment provides us with the opportunity to get the adolescent perspective on conversations with their parents shortly after the conversations took place.
To provide insight into the relation between adolescent-parent contact and momentary affect states, we estimated network models using Ecological Momentary

Assessment (EMA) data from the RE-PAIR study (https://www.re-pair.org/). The data features four affect states (i.e., sad, irritated, happy, and relaxed) of 34 families with a depressed adolescent (92 individual family members) and 80 families with a non-depressed adolescent (231 individual family members), collected 4 times a day over 14 days. The data also contains information on the interaction between adolescents and their parents, specifically, the perception of the contact, and the affect states during the contact. We will present the results on the relations between perceived parenting and affect states of adolescents, and potential differences between families of depressed adolescents and non-depressed adolescents.

Poster 56: The Di-Eu-Stress State Short Scale (DESS-S): A Measure to Assess Di- and Eustress in Ecological Momentary Assessments

Thomas **Vikoler**, Dániel Kovács, Eva Traut-Mattausch

The concept of stress in a holistic way comprises both di- and eustress. Yet, research mostly utilized different negative and positive psychological states as proxy measures due to a lack of validated and reliable measures for di- and eustress (Edwards & Cooper, 1988; Simmons & Nelson, 2007). We developed and validated the nine-item Di-Eu-Stress State (DESS) Scale (Vikoler et al., 2023) as an economic measure of the positive and negative stress response. For the application in Ecological Momentary Assessments (EMAs), we aimed to further shorten the scale and present the revised Di-Eu-Stress-State Short Scale (DESS-S). The current study presents the item reduction procedure and empirical validation of the DESS-S.
Over a 14-day period, momentary di- and eustress were surveyed four times daily in an employee and an undergraduate sample. Additionally, we assessed antecedents of di- and eustress via the Demands Single Item and Resources Single Item (Kovács et al., 2023), respectively, as well as job/study satisfaction as subsequent constructs.
Using multilevel exploratory factor analysis in one sample, we tested for the best fitting shortened version of the DESS Scale. By applying multilevel confirmatory factor analysis in the remaining sample, we sought replication and confirmation of the resulting factorial structure. The DESS-S was then examined for its predictability by demands and resources as well as its predictive power in regard to job/study satisfaction using a multilevel modeling approach.
We discuss the key findings and limitations of the study. Suggestions for further validation of the DESS-S Scale are proposed.

Poster 57: Silder Scales or Radio Buttons? Comparing the Psychometric Properties of Slider Scales with Traditional Radio Button Scales in Ambulatory Assessment

D. **Vollbracht**, C. Ottenstein, S. Ecker, T. Lischetzke

Slider scales, a variant of visual analogue scales, are frequently used in (smartphone-based) ambulatory assessment, which might be due to several advantages of slider scales: They provide a metric scale instead of an ordinal scale (radio buttons), and it is very easy for participants to respond to a slider scale on

their smartphone touchscreen. However, to date, only a few studies have compared the psychometric properties of slider scales with those of classical radio button scales, and a limitation of existing studies is that they have (mainly) relied on cross-sectional data and used manifest variable models. In the present research, our goal was to scrutinize the psychometric properties of two response formats (slider scale vs. radio buttons) in ambulatory assessment using latent variable models. In an ongoing ambulatory assessment study (21 days, 4 measurement occasions per day, planned N of individuals = 320), we experimentally manipulate the response scale format between persons by presenting multiple items that measure different latent constructs using a slider scale in one group and a radio button scale in the other group. Using a Multigroup Multilevel Structural Equation Modeling framework, we will compare the experimental groups in terms of the measures' reliability (two-level omega), measurement invariance, within-person variability, and validity (using correlations with other constructs). In addition, we will examine measurement invariance across persons and across measurement occasions for both experimental groups using Dynamic Structural Equation Modeling. Data will be collected from February to April, and preliminary results will be presented and discussed.

Poster 58: "Afterwards, I always feel better…": a mixed-method observational N-of-1 study on the daily dynamics between leisure-time physical activity and positive affect

Lea O. **Wilhelm**, Nina Lederle, Lotte-Eleonora Diering, Lara Thiel, Antje Reschke, Sabine E. Hahn, Hendrik Schmidt, Lena Fleig

Positive affective states can be linked to physical activity (PA) and health outcomes. Different theories and research designs (with varying timeframes) have been proposed to study these dynamics. Traditional between-subject research has revealed inconsistent evidence on the affect-PA association. Ambulatory assessment provides a temporal dimension to monitoring of psychological constructs and behavior in real-life and N-of-1 studies enable us to examine person-specific processes. In this mixed-method N-of-1 study, we, therefore, explored the relationship between daily positive affect and leisure-time PA.
Four physiotherapists (50% women, named P1-P4) participated in a 68-day daily diary study with an observational, N-of-1 design and data-driven exit interviews. Participants wore accelerometers to capture moderate-to-vigorous PA (MVPA) and reported on positive affect and working hours via a smartphone-app. Data analysis was performed by vector autoregressive modelling.
Participants provided valid data on 31-59 days (observations: 60-97%). Qualitative data analysis is still ongoing. Preliminary quantitative results show that for P1, previous-day leisure-time MVPA was linked to more positive affect. For P2, lower previous-day positive affect was linked to more leisure-time MVPA and for P3, higher previous-day positive affect was linked to more leisure-time MVPA. No such links were found for P4.
Findings show that dynamics across days between leisure-time PA and positive affect differ between different participants. We were able to identify person-specific relationships between affect and PA, and show how these findings align with

qualitative data. Personalized affect-PA pathways could be used in future just-in-time adaptive interventions.

Poster 59: Social interactions and loneliness in daily life during a population-wide stressor: A COVID-19 coordinated analysis

Daisy V. **Zavala**, Shevaun D. Neupert, Stacey B. Scott, Eileen K. Graham, Jill Suitor, MacKenzie L. Hughes, Rita Xiaochen Hu, Sumbleen Ali, Megan Gilligan, Toni Antonucci, Reilly Kincaid, Destiny Ogle

Examining responses to population-wide stressors may shed light on age differences in loneliness and social isolation as well as how these may vary depending on the sample's region and the timing during which the observation was captured relative to the local conditions of the pandemic. This coordinated analysis of 2 intensive longitudinal datasets (DCF, EAS) examines social interactions, loneliness, and age during the COVID-19 pandemic. It is a component of a larger, pre-registered coordinated analysis involving traditional longitudinal and cross-sectional studies (https://osf.io/jt4wf). DCF was a diary study of 221 adults ages 21-78 years (M = 48.92, SD = 14.81) who completed online questionnaires every day for 21 consecutive days. DCF participants were drawn from across the USA via MTurk and Qualtrics. Data collection spanned 29-Oct-2020 to 18-Nov-2020. EAS is an ongoing ecological momentary assessment measurement burst study; data from 82 adults aged 73-96 years (M = 79, SD = 5.41) who completed a 2 week burst of 5 EMA per day between 1-Feb-2020 and 1-July-2020 were used in this analysis. EAS participants were recruited from registered voter lists in Bronx, NY USA. Separate multilevel models (DCF: 2 level, EAS: 3 level) were conducted with the same covariates and constraints. The majority of variance in loneliness was at the person-level (DCF: 76%; EAS: 77%). Between and within, social interactions did not predict loneliness in DCF; older age predicted lower loneliness. In EAS, individuals with more social interactions were less lonely and relatively younger individuals had lower loneliness following interactions.

Poster 60: Sample size planning for person-specific temporal network models in N=1 studies

Yong **Zhang**, Jordan Revol, Laura F. Bringmann, Eva Ceulemans, Anja F. Ernst, Ginette Lafit

Inspired by the network theory of psychopathology, many recent studies adopted ambulatory assessment to collect intensive longitudinal data (ILD) on psychopathological symptoms. To capture the within-person dynamics of these symptoms, the lag-1 vector autoregressive (VAR(1)) model is widely used and its results can be further visualized as a person-specific temporal network. Such person-specific networks are promising tools for clinical practice, generating personalized insight into the pathology and treatment of mental disorders. However, the promise is hampered by the risk of the VAR(1) estimates and the associated network being of low quality. An important determinant of the model quality is the

number of timepoints collected in ILD, in that this sample size determines the power of the significance tests performed on the edges of the network, as well as how well the network will generalize to unseen data from the same patient. In this study, we therefore propose two simulation-based sample size planning methods for such network models: power analysis and predictive accuracy analysis. We further demonstrate how both methods can be used to inform the design of future studies that estimated these kinds of network models. Results suggest that the commonly used sample sizes may not be large enough, leading to high risks of underpowered edges and unsatisfactory predictive accuracy of the network models. Further implications for future network studies in clinical research and practice will be discussed.

Poster 61: Daily patterns of smartphone use: an ESM study with Croatian children and youth

Ana **Žulec**, Marina Merkaš, Matea Bodrožić Selak, Vanesa Varga, Marina Kotrla Toipć, Katarina Perić Pavišić

Smartphone use is an inevitable activity among children and youth today. According to recent research, children spend approximately 3 hours per day on their smartphones, with high school and university students spending even more (Fook et al., 2021; Žulec et al., 2022). Children and youth use their smartphones mostly for fun and entertainment, mainly through social media (e.g., TikTok, Snapchat, and WhatsApp) and for playing games (Fischer-Grote et al., 2019; Varga et al., 2022). The aim of this study was to examine how daily activities on smartphones are related to the daily mood of children and youth. An ESM study with children and youth was conducted within the project "Digital technology in the family: patterns of behaviour and effects on child development". Children and youth (N = 95) answered short questions about their use of smartphones and mood in the SEMA3 application installed on their smartphones three times a day during a week. The results reveal children and youth use their smartphones usually for fun, entertainment, and communication on a daily basis and are generally in a positive mood. The findings point to a positive association between activities on smartphones and a positive daily mood in children and youth. The results are discussed in the context of using smartphones for mood regulation among children and youth and the assets and limitations of ESM studies with children and youth.

Poster 62: What type of Instagram content influences appearance satisfaction in adolescence? A pilot ESM study with Croatian adolescents

Ana **Žulec**, Marina Merkaš, Tamara Martinac Dorčić

With the rise and rapid development of different kinds of social media, it is perhaps more important than ever to examine their influence on the body image of individuals, especially adolescents. Previous research has shown, both in cross-sectional and ESM studies, that the (over)use of social media, like Facebook and Instagram, has negative effects on body and appearance satisfaction in young

people and adolescents (Fardouly et al., 2017; Fuller-Tyszkiewicz et al., 2019; Tiggemann et al., 2020). Although these findings are known, it is still quite unknown what type of content is responsible for lower appearance satisfaction at a particular moment. Thus, the aim of this study is to determine what type of content on Instagram is responsible for lower daily appearance satisfaction among adolescents in Croatia. This pilot study was conducted with the SEMA3 application with high school students in Croatia. Adolescents rated their experience with Instagram use several times a day during a week. The results are discussed considering the importance of body image for adolescents' well-being, everyday exposure to content on Instagram and its effects on adolescents' appearance satisfaction, and the usefulness of in-the-moment measurement for determining real short-term effects.

Wednesday June 7, 2023

08:00 - 18:00: Check-in for the conference is available all day.

9:00 Day opening

Household announcements by the SAA local organizing committee and introduction of the keynote speaker and SAA Early Career Award winner by dr Laura König.

Time: 09:00 - 09:15
Location: Grote Zaal (Main Theatre)

9:15 Keynote Lecture SAA Early Career Award winner

Can we use repeatedly assessed emotions to forecast worsening mental health?

Marieke Schreuder, KU Leuven

Vulnerability to mental disorders may manifest in people's day to day emotions. Specifically, complex systems approaches to psychopathology propose that worsening symptoms may be preceded by rising autocorrelations and variances in repeatedly assessed emotions. These changing emotion dynamics can thus be considered early warning signals (EWS) for mental disorders. If EWS would indeed be sensitive and specific markers for worsening mental health, they could aid the early detection (and eventually, prevention) of mental disorders. I therefore conducted a preregistered empirical study into the predictive utility of EWS. At-risk youth (N=122, mean age 23.6 ±0.7 years, 57% males) from the clinical cohort of Tracking Adolescents' Individual Lives Survey (TRAILS-CC) provided daily emotion assessments for six months. I analyzed whether EWS preceded transitions towards psychopathology. Across indicators and a range of analytical options, EWS had low sensitivity and moderate specificity. Thus, in the present sample, the proposed generic nature and clinical utility of EWS could not be substantiated. With this lecture, I hope to provide a more nuanced view on the application of complex systems principles to psychopathology. Additionally, I will discuss an alternative theoretical and methodological framework for monitoring vulnerability for mental ill-health in people's daily emotions.

Time: 09:15 - 10:15
Location: Grote Zaal (Main Theatre)

10:15 Coffee break / Sponsor exhibition

Time: 10:15 - 10:30:
Location: Sponsor stand / Foyer

10:30 Symposium 18: Integration of EMA and passive sensing

Chair: Zoe Hawks

Passive data collection via mobile sensors and wearable devices is extremely promising given that it requires low levels of participant effort and yields highly rich data that offer unique opportunities to inform clinical care. However, many of the constructs we study in psychology are inherently subjective or influenced by characteristics of the individual and their environment. As such, it is critical to analyze passive data in the context of real-time self-report, with an eye towards personalized intervention and clinical workflow integration. This symposium highlights research targeting both of these goals. Dr. Sarah Sperry, Dr. Zoe Hawks, Madelyn Frumkin, and Fleur Helmink present research describing relationships among passive (speech, continuous glucose monitoring, actigraphy, GPS) and EMA data in clinical populations with bipolar disorder, type 1 diabetes, and chronic pain. Across presentations, researchers discuss approaches for processing and analyzing high-dimensional, intensive longitudinal, multimodal data. Researchers also discuss clinical implications of using passive data for monitoring, diagnosing, and treating psychological and physical symptoms. Dr. Haijing Hallenbeck concludes the symposium by examining the acceptability and feasibility of incorporating passive data into clinical workflows in Department of Veterans Affairs (primary care or specialty mental health) settings. Collectively, this symposium spotlights diverse methodological and clinical perspectives, leveraging interdisciplinary expertise to advance translational research integrating passive and EMA data.

Time: 10:30 - 12:00
Location: Grote Zaal (Main Theatre)

Integrating Passive and Active Digital Phenotyping to Capture Emotion Instability in Bipolar Disorder

Sarah H. **Sperry**, Melvin G. McInnis, Emily Mower Provost

A critical challenge facing psychiatry is the lack of feasible longitudinal measurement tools that accurately and efficiently evaluate symptoms and functioning in the context of the daily lives of individuals with bipolar disorder (BD). We will present findings from a pilot study integrating ecological momentary assessment (EMA) and our smartphone application, PRIORI, that passively samples ambient audio and produces estimates of emotional valence and arousal based on speech to detect emotion instability in BD. Individuals with BD I (n = 10) enrolled into a 12 month study with continuous monitoring with PRIORI. PRIORI turns on every 15 minutes and collects 30 seconds of ambient audio which is then uploaded to a

cloud-based preprocessing pipeline that deletes raw audio and outputs four features: speaker verification (enrolled participant or someone else), signal to noise ratio (level of noise in the environment), and an emotional valence and arousal ratings for speech. In addition, participants complete a measurement-burst EMA protocol assessing emotional valence and arousal 5 times per day for 7 days each month . In addition, each week, participants complete an EMA mood assessment assessing mania and depression. To date, we have sampled 19,414 speech segments, 573 EMA mood assessments, 991 EMA emotion assessments, across 32 bursts with a compliance rating of 93% on the EMA protocol. We will present initial findings related to correspondence between instability in PRIORI emotion valence and arousal with EMA emotion and mood. Feasibility and validity of integrating passive and active data collection methods will be discussed.

Between- and within-person influences on momentary cognition in Type I Diabetes

Zoë W. **Hawks**, Emorie D. Beck, Laneé Jung, Luciana M. Fonseca, Martin Sliwinski, Ruth S. Weinstock, Elizabeth Grinspoon, Irene Xu, Roger Strong, Shifali Singh, Madelyn R. Frumkin, Naomi Chaytor, and Laura T. Germine

Cognitive variability is associated with fall risk, cardiovascular mortality, and cognitive decline. Clarifying influences on cognitive variability may inform evidence-based guidelines aimed at improving long-term cognitive and physical health. This goal is particularly salient in Type I Diabetes (T1D), a chronic autoimmune condition characterized by glucose dysregulation. In T1D, transitions to low and high glucose impair cognitive performance. It remains unclear how between- and within-person factors impact this relationship. Leveraging recent technological innovations, we obtained reliable, high-frequency, naturalistic measurements of cognitive performance (cognitive ecological momentary assessment) and glucose (continuous glucose monitoring) in N=200 adults with T1D. We (1) estimated multilevel (group-level/random, individual-level/fixed) associations between glucose and cognitive performance, (2) described between-person (clinical, demographic) predictors of individual-level associations, and (3) contextualized individual-level associations in relation to time-varying, within-person (environmental, affective) processes. At the group level, glucose exhibited quadratic associations with processing speed but not sustained attention. Specifically, slower processing speed was observed as glucose deviated from individuals' glucose means. At the individual level, the strength of quadratic associations between glucose and processing speed (hereafter, glucose acceleration) varied. Between individuals, greater glucose acceleration was associated with older age, greater glycemic variability, greater time in hypoglycemia, the presence of microvascular disease, and lifetime history of severe hypoglycemic events. Within individuals, glucose and processing speed were associated with sleep duration, assessment context, and stress. Results generate testable insights about shared (across individuals) clinical and demographic factors that impact cognitive variability. They also highlight opportunities to support personalized medicine by increasing understanding about unique (person-specific) influences on cognitive variability.

Individual Differences in Associations between Pain, Activity, and Psychological Symptoms among Patients with Chronic Back Pain: Implications for treatment personalization

Madelyn **Frumkin**

Chronic back pain (CBP) is an increasingly prevalent problem impacting approximately 20% of middle-aged and older adults worldwide. There is a plethora of treatment options for individuals with CBP, ranging from cognitive behavioral therapy to spine surgery. However, there is currently little understanding of which treatment options are most likely to maximize benefit and minimize risk for a given patient. We propose that multimodal ambulatory assessment data can be used to personalize treatment recommendations for CBP by elucidating person-specific drivers of pain. Specifically, ecological momentary assessment (EMA) and wearable sensor data can be integrated to understand associations among factors including pain, mood, and activity for a given individual. In this study, we examined within-person relationships between pain, activity, and psychological symptoms among individuals with CBP (N = 82) who were scheduled to receive spine surgery. Participants received 5 EMA surveys per day for approximately 3 weeks and were asked to wear a Fitbit for at least 12 hours per day prior to surgery. Participants completed an average of 57 EMAs (SD = 29) with Fitbit data available in the hour prior. We observed substantial variability in within-person associations between pain, mood, and activity. For example, the within-person association between pain and steps in the past hour ranged from r = -.39 to r = .75. We will discuss how within-person relationships derived from multimodal ambulatory assessment data relate to surgical outcomes, potentially leading to personalized treatment recommendations derived from the integration of EMA and passive data.

Emotion and behavior dynamics in adults at familial risk for bipolar disorder

Fleur G.L. **Helmink**, Sarah H. Sperry, Eeske van Roekel, Esther Mesman, Manon H.J. Hillegers

Disturbances in emotion dynamics have been linked to the development of psychopathology, including bipolar disorder (BD). However, it remains unclear how internal emotional processes translate to daily life behavior and whether interactions between emotions and behavior relate to psychiatric vulnerability in those at familial risk. We combined longitudinal data on psychopathology in offspring of parents with BD with moment-to-moment digital phenotyping to identify whether emotion and behavior dynamics differentiate offspring at familial risk and those who develop psychopathology themselves.
A total of 86 offspring of parents with BD participating at the fifth assessment of the 22-year follow-up of the Dutch Bipolar Offspring Study and 45 healthy controls participated in a two-week experience sampling method (ESM) study with simultaneous passive smartphone sensing. We used dynamic structural equation models (DSEM) to examine the cross-lagged relationships between emotions

(positive and negative affect) and behavior (mobility, steps, screen time).
We gathered 9.6 million GPS datapoints, 2.2 million observations for step data, and 400,000 screen time datapoints. Overall, 8886 ESM surveys were used to calculate positive (M=3.74; SD=0.99) and negative affect (M=0.70; SD=0.77). Time-dependent emotion-behavior connections will be presented and comparisons will be made regarding familial risk and lifetime psychopathology.
This is the first study to examine associations between moment-to-moment emotions and behavior in offspring of parents with BD. Our results could explain vulnerability patterns of familial risk for psychopathology. Moreover, understanding underlying mechanisms of strength differences regarding emotion-behavior links could give rise to new targets for preventative strategies.

Mobile Monitoring of PTSD and Depression Symptoms among Veterans in VA Mental Health Care: A Mixed Method Study of Provider Perspectives

Haijing **Hallenbeck**, Caroline Gray, Christina Armstrong, Jason Owen, Snezana Urosevic, Steven Woodward, Karen Seal, Marylene Cloitre, Eric Kuhn

As the largest integrated health care system in the United States, the Department of Veterans Affairs (VA) has invested in the infrastructure to incorporate data from everyday mobile devices (e.g., smartphones and fitness trackers) as part of clinical care. These data could be critical to better treating posttraumatic stress disorder (PTSD) and depression, the two most frequently seen mental health conditions among veterans in VA. Improvements in treatment may result from the remote monitoring of veterans' symptoms through these devices, in the service of early detection and intervention of problems. Veterans are generally supportive of this approach as part of their VA care, but it is unknown whether this is true of veterans specifically with PTSD and depression or their VA providers. As a first step, we are conducting a pilot study to understand the perspectives of VA providers who treat veterans with PTSD and depression in primary care or specialty mental health settings, through conducting qualitative interviews and quantitative ratings. Data collection is ongoing (4 of 10 providers interviewed) and expected to be completed by April 2023. Preliminary findings suggest that VA providers are interested in reviewing mobile device data from veterans and believed that the benefits (e.g., accuracy) outweighed the risks (e.g., privacy concerns). Providers expressed more comfort with ecological momentary assessment data compared to passive sensing data from smartphones and fitness trackers. Regardless of the data type, providers emphasized the need for a quick, streamlined data review process that is integrated into clinical workflows.

Featured session sponsor:

https://m-path.io/landing

10:30 Symposium 19: Emerging theories and methods for studying within-person processes related to psychopathology

Chair: Marilyn L. Piccirillo

Over the past decade, there has been a rapidly increasing interest in ecological momentary assessment (EMA) and digital phenotyping in psychopathology research. These rich and temporally granular data hold immense promise for advancing our understanding, prediction, and treatment of psychopathology. This symposium highlights several such emerging theories and methods for studying within-person (i.e., idiographic) processes related to psychopathology. The first presentation by Dr. Eiko Fried will focus on novel methods for idiographic psychopathology prediction. Specifically, Dr. Eiko Fried will discuss the WARN-D project, which leverages digital phenotyping and EMA data to build personalized early warning systems for depression. The next two presentations, by Julian Burger and Dr. Sacha Epskamp, describe innovative personalized network modeling methods. Julian Burger will introduce the Longitudinal Perceived Causal Relations (L-PCR) approach, which combines EMA data with patient beliefs about causal relationships between their symptoms. Dr. Sacha Epskamp will then present a recently developed R package psychonetrics, which implements graphical vector auto-regression (GVAR) network models to enable idiographic network modeling. The final talk by Dr. Marilyn Piccirillo will focus on clinical applications, and consider methods-related challenges to integrating EMA and digital phenotyping methods into direct clinical care to personalize treatment.

Time: 10:30 - 12:00
Location: IJ Zaal

WARN-D: Building a personalized early warning system for depression

Eiko I. **Fried**; Carlotta Rieble; Ricarda Proppert

Depression is common, debilitating, often chronic, and affects young people disproportionately. Given that only 50% of patients improve under initial treatment, prevention is the most effective way to change depression's global disease burden. The biggest barrier to successful prevention is to identify those at risk for depression in the near future. To close this gap, we are developing WARN-D, a personalized early warning system for depression. We follow ~2000 students for 2 years. Stage 1 comprises an extensive baseline assessment of predictors for depression. Stage 2 lasts 3 months and zooms into participants' daily experiences that may predict depression; we use smartwatches to collect digital phenotype data (e.g. sleep and activity), and use ecological momentary assessment (EMA) to query participants about their experiences 4 times a day and once every Sunday (~360 measurement points). In Stage 3, we follow participants for 21 months, assessing transdiagnostic outcomes. This talk zooms into Stage 2 of WARN-D, introducing rationale, data, measurements, validation of measurements, methods, and first findings.

A Novel Approach for Constructing Personalized Networks from Longitudinal Perceived Causal Relations

Julian **Burger**, Vida Andikkhash, Nelly Jäger, Therese Anderbro, Tessa Fee Blanken, Lars Klintwall

Personalized networks of psychological symptoms aim to advance psychiatric precision medicine. Statistical relations in such networks can be estimated from ambulatory assessment data, but their causal interpretation is limited by strong statistical assumptions. An alternative is to create networks from patient perceptions, which comes with other limitations such as retrospective bias. As a synthesis, we introduce the Longitudinal Perceived Causal Relations (L-PCR) approach, which combines ambulatory assessment with the perceived causal relation approach. 20 participants screening positive for depression completed up to four weeks of brief daily assessments of experienced symptoms and perceived symptom-symptom influences. Quality criteria of this new method are introduced via a bootstrapping algorithm, answering questions such as "Which symptoms should be included in networks?", "How many data points need to be collected to achieve stable networks?", and "Does the network change over time?". Accordingly, about 40% of respondents achieved stable networks and only a few respondents exhibited changes in network structure across time. The method was time-efficient (7.4 minutes per day) and well-received. Future directions of L-PCR include individualized core symptoms in a controlled clinical population and additional assessment types such as counterfactual questions. Overall, L-PCR addresses several of the prevailing issues found in statistical networks and therefore provides a clinically-meaningful method for personalization.

Advances in Ideographic Psychometric Network Modeling of Ecological Momentary Assessment Data

Sacha **Epskamp**

Ideographic network models for ecological momentary assessment (EMA) data offer a powerful way to understand item-level interactions, capturing predictive effects across consecutive windows of measurement through a temporal network and predictive effects within a given window of measurement through a contemporaneous network. The estimation of graphical vector auto-regression (GVAR) models, which model contemporaneous effects using a Gaussian graphical model of partial correlations, is a widely used framework in this field. The recently developed R package psychonetrics, which implements GVAR models in a way that is consistent with structural equation modeling, enables novel extensions to ideographic network modeling. This talk will highlight how psychonetrics allows for: (1) modeling measurement error through latent variable modeling, (2) handling missing data with full-information maximum likelihood estimation, and (3) testing for network structure homogeneity across multiple participants with multi-group modeling. The talk will provide an overview of these advances and discuss future directions and challenges in ideographic psychometric network modeling of EMA data.

Examining the potential of digital phenotyping to strengthen the design and direction of clinical care

Marilyn L. **Piccirillo**, Abigail Jackson, Katherine T. Foster

Experience sampling methods are increasingly integrated into clinical assessment and treatment, advancing upon existing measurement-based care practices that assess symptoms with lower frequently (e.g., weekly or monthly). Digital phenotyping - an extension of experience sampling - may offer additional advantages for clinical practice through the integration of self-report with passively collected indicators of health and behavior. Digital phenotyping data offer an array of possibilities for enhancing clinical assessment and treatment, including the ability to model symptom fluctuations, identify clinically meaningful interactions between symptom fluctuations and salient locations, and provide context for health-related changes through the measurement of complementary psychosocial constructs (e.g., social interaction or smartphone usage metrics).
This talk will present an overview of the innovations, methods-related challenges, and limitations of using digital phenotyping towards the design and direction of clinical care. Illustrative person-specific models constructed from digital phenotyping data will demonstrate how integrating self-report of mental health, substance use, and related clinical constructs (e.g., communication and coping skills) with location history, phone use data, and health data from personal wearable and smartphone tracking applications offers an advantage beyond existing measurement-based care approaches. Discussion will focus on the strengths and limitations of digital phenotyping data towards the goal of improving measurement-based care and personalizing treatment.

Assessing Timing of Microrandomized Trials Using Intensive Longitudinal Data and Differential Time-Varying Effect Models

Nicolas C. **Jacobson**

In the behavioral sciences, methods for delivering interventions within the context of daily life are developing rapidly, fueled by the development of microrandomized controlled trials and experience sampling. Although intensive longitudinal data are often collected to evaluate the immediate effects of these interventions, the timing of these interventions on behavior has been given limited attention. Given this, the field could benefit from a tool to detect and estimate the time in which interventions have an impact on their respective outcomes. Nevertheless, existing tools have difficulty in estimating the timing of interventions. Consequently, in this paper, we propose an extension of the Differential Time-Varying Effect Model (DTVEM) which attempts to detect the timing of interventions on outcomes by trying to detect the lag intervals between exogenous variables (i.e. intervention delivery) and outcomes. Within this paper, we extend the DTVEM by pairing generalized additive mixed models with linear mixed models to identify optimal time lags and intervention effects. By intensive simulations based on, the efficiency of the DTVEM with additional stage is tested, and the results showed promising power and point estimates, and low type I error. Consequently, the extended DTVEM allows researchers to perform power analyses regarding timing of intervention effects and detect timing of intervention effects using intensive longitudinal data and microrandomized controlled trials.

10:30 Symposium 20: Stress and affect in everyday life: Correlates and methodological considerations across different contexts

Chair: Lisanne S. Pauw

Intensive longitudinal designs are fundamental to unravel the more complex causes and consequences of people's affective responding to daily life stressors. The present symposium brings together four talks that capture dynamic affective processes as they unfold in daily life, shedding light on potential protective and risk factors for wellbeing. By adopting a multi-method, ecological momentary assessment approach, the present studies examine the measurement of affective reactivity, as well as its relationship to daily life stressors across a wide range of ecologically-valid contexts and samples. In the first talk, Lilly Buhr will present a study among preschool teachers and their affective fluctuations during the COVID-19 pandemic, examining risk (perceived stress) and protective (self-efficacy) factors as predictors of mood and emotional exhaustion. Second, Anna Lücke will present a

study conducted among older adults, examining whether daily sleep quality is directly associated with negative affect or more indirectly via affective reactivity to stressors. Finally, Oliver Schilling will present data speaking to the methodological considerations involved in repeated daily assessment of self-reported emotional experiences, which may compromise measurement invariance. Together, these four talks contribute to a better understanding of affective functioning in daily life, bearing methodological, theoretical, and practical implications for the study of stress and affective dynamics.

Time: 10:30 - 12:00
Location: Expo

Daily mood, stress, and self-efficacy in German preschool teachers during the COVID-19 pandemic

Lilly **Buhr**, Julia Steigleder, Antje von Suchodoletz, Caterina Gawrilow

Preschool teachers have a high vulnerability to experience emotional exhaustion with low energy and chronic fatigue, in the literature often defined as symptoms of burnout. During the COVID-19 pandemic, additional health and work stressors, like risk of infection and low predictability of workflow were assumed to enhance this vulnerability. Studies increasingly explore risk (e.g., high stress levels) as well as protective factors (e.g., self-efficacy) influencing mood. However, most research has investigated these associations on the between-person level, lacking empirical evidence for within-person associations of mood, stress, and self-efficacy. In an ambulatory assessment study with measurement burst design, we assessed 69 preschool teachers (age 18 – 63 years) on four bursts for 10 working days each (40 measurement days in total) between December 2020 and June 2022 with regard to their mood, perceived stress level, and current perception of self-efficacy. Multilevel models revealed a significant negative between- and within-person effect of perceived stress on mood. No between-person effect, but a positive within-person effect of self-efficacy on mood was found. Time was not significantly related to mood, neither for the four bursts nor for the days within the bursts. The findings indicate that feelings of stress in general and on a daily level as well as self-efficacy beliefs on a daily level were associated with mood of preschool teachers. Future research building on these findings might investigate whether interventions to reduce stress and enhance self-efficacy might lead to better mood.

Sleep Quality, Stress, and Affect – Bidirectional Associations in Older Adults' Daily Lives

Anna Jori **Lücke**, Cornelia Wrzus, Denis Gerstorf, Ute Kunzmann, Martin Katzorreck, Karolina Kolodziejczak, Nilam Ram, Christiane Hoppmann, Oliver Schilling

Sleep quality is associated with emotional experience in daily life, but these associations are complex and not yet well understood. For example, previous research rarely considered the role of stressors. We thus examined if daily sleep

quality is directly associated with negative affect or more indirectly via affective reactivity to stressors. Specifically, we analyzed whether and how older adults' sleep quality predicts negative affect and affective reactivity to stress on the following day, and vice versa. In this study, 325 older adults (61-90 years, 49% women) rated their sleep quality each morning and reported momentary affect and stressful events multiple times a day across one week. Results from multilevel structural equation models showed that after nights of lower than usual sleep quality, older adults reported more negative affect, but not higher affective reactivity to stressors – in contrast to our hypotheses. In turn, after days with stronger than usual affective reactivity but not with more negative affect per se, participants reported lower sleep quality. We discuss what these results imply for potential interventions aiming to improve older adults' daily well-being.

Approximate measurement invariance of multi-item self-reports of negative affect across ambulatory assessments from old adults

Oliver K. **Schilling**, Anna J. Lücke, Ute Kunzmann, Martin Katzorreck, Denis Gerstorf

Investigation into emotional stressor reactivity has become a prominent domain of intensive longitudinal stress research, focused on the within-person coupling of self-reported stressors with momentary affect (mostly negative affect, NA), the latter typically measured by composite scores of the participants' endorsements of several emotion items. Considering that frequent self-reports on emotion items within a short observation period could impact alertness towards and perception of one's emotional experiences, this might change item discrimination between levels of affectivity and item severity (difficulty), hence compromising measurement invariance (MI) across repeated measurements. However, conventional factor analytic approaches to longitudinal MI become virtually infeasible for ambulatory assessments with large numbers of measurement occasions. Thus, we utilized and extended recent proposals to model approximate MI of intensive longitudinal measures, to examine ambulatory assessments of NA from the EMIL study, obtained over seven consecutive days at six occasions per day from 170 old adults (aged 66-69 and 86-89) who self-reported on 12 negative emotion items. We ran dynamic structural equation models with Bayes estimation to analyze variability of NA factor loadings and item intercepts across repeated measures, thus checking for metric and scalar factorial invariance. The findings do not strongly support MI, showing in particular some pronounced non-invariance of factor loadings, but do also point at partial MI for item subsets. Our conclusions focus on acceptable degrees of non-invariance of item functioning to meet pragmatic MI requirements for reliable analyses of intraindividual short-term variability in NA.

10:30 Symposium 21: Innovative Measurement and Modeling Techniques for Intensive Longitudinal Data

Chair: Leonie Cloos

Innovative intensive longitudinal data (ILD) methods are needed to improve the assessment of real-life contexts, behaviors and affective states. Here, we present five novel approaches to understanding, measuring, and modeling ILD.
Pia Andresen will present a thematic analysis of personality trait inventories demonstrating that common-practice ILD procedures for measuring personality only present a very limited picture. She will argue that a more innovative use of ILD methods contributes to conceptual clarification of personality-theory.
Sophie Berkhout proposes a dynamic modeling approach that allows variables to differ in timescales, which the commonly used vector autoregressive model cannot handle elegantly. For example, researchers may be interested in lagged relations between daily sleep quality and momentary stress levels.
Leonie Cloos introduces an innovative way to measure affect dynamics on a continuous timescale. She will present a pilot study in which participants themselves provide intensity profile drawings of their experienced affect trajectories in between two measurement occasions. The validity and feasibility of this novel approach will be discussed and evaluated. Koen Niemeijer will discuss mobile sensing for capturing contextual cues and predicting moment-to-moment affect and depression. He will present data from a pilot study of 104 participants, which showed promise for capturing emotional context, but also highlighted challenges such as data accuracy and reliability. Daan de Jong will present a time series model to study the hysteresis effect with intense longitudinal data. The presentation includes results from a simulation study and empirical examples.

Time: 10:30 - 12:00
Location: Studio

What to assess within-person(-ality)? A thematic analysis of ILD procedures implied by personality inventory items

Pia K. **Andresen**, Noémi K. Schuurman, Ellen L. Hamaker

In psychology, intensive longitudinal data (ILD) is often used to study within-person patterns that are theoretically implied by, but not inferable from, individual-differences constructs. For example, personality traits imply individual differences in patterns of individual behavior but only allow for inferences about the former. ILD research on trait manifestation—how traits are visible in individual behavior over time—studies within-person fluctuations of personality states with assessment prompts like: "How angry have you been since the last prompt?“ However, such assessment procedures only allow for inferences about general and unconditional central tendencies. This is noticeably in contrast to the high variety of daily behaviors (e.g., "I pick fights“) and patterns therein (e.g., "I easily get angry," "I have difficulty controlling my emotions"), which are assessed in personality trait questionnaires.
In our current research, we therefore aim to determine how various statistics and model features for ILD could be optimally used to express these subtle nuances in personality-indicating behavior. In this talk, I will present a thematic analysis of 300

questionnaire items coded according to which statistic could best quantify the described behaviors. I will discuss the qualitative analysis procedure as well as three main conclusions: 1) Items often imply behaviors conditional on specific situations, such that complex esm-designs are required; 2) items imply various behavioral dynamics, but also trait-like tendencies such as beliefs and attitudes and 3) individual differences theory lacks specifics such as time sales or temporal order which is crucial for the study within-person patterns.

Modeling Lagged Relations among Intensive Longitudinal Data with Different Timescales

Sophie W. **Berkhout**, Noémi K. Schuurman, Ellen L. Hamaker

Ambulatory assessment has gained widespread popularity among researchers to study the dynamics of human behavior such as sleep patterns or emotional states. An important consideration for researchers interested in studying behavior over time is the timescale of a measurement, which refers to the frequency of repeated measures (e.g., momentary, daily, weekly, etc.). There are several challenges associated with determining the appropriate timescale for a measurement, such as capturing relevant fluctuations and minimizing the burden on participants. In this talk, I focus on the challenge that arises when analyzing the relations between variables measured at differing timescales. For example, researchers may be interested in (lagged) relations between sleep quality measured every morning, and stress level measured every couple of hours during the day. A commonly used dynamic model to analyze multivariate intensive longitudinal data is the vector autoregressive (VAR) model, however, this model requires that the variables are measured at the same timescale. As a remedy, researchers sometimes aggregate the momentary measurements (e.g., stress level) into daily averages to use in their analysis. Unfortunately, this approach loses valuable information on the momentary dynamics at play. I propose an alternative approach that is similar to the VAR model but can include variables measured at differing timescales, and I demonstrate this technique using an empirical example. This approach allows researchers to study dynamic relations in their data with different timescales more thoroughly and elegantly.

Measuring Affect Changes with Intensity Profile Drawings

Leonie **Cloos**, Merijn Mestdagh, Eva Ceulemans, Peter Kuppens

Ambulatory assessment has become a popular tool to study dynamic processes of affect. Participants can be assessed at any time and place via self-report measures of subjectively experienced affect they receive on their smartphones. Yet, the number of measurements is limited to specific moments and will often not occur or be answered when an affective event happens. Our current data may be missing information on affect changes and will provide limited insight into appraisal and regulation processes. We propose a novel measure of affect that aims to capture continuous affect change with a lower risk of missing affective episodes. A novel

response format in m-Path.io makes it possible to recover affect episodes that happen in between measurement occasions. It allows us to obtain time-continuous data, by letting participants draw their affect intensity between two measurement occasions. We conducted an empirical study in which we obtained intensity profile drawings of positive and negative affect that capture a complete day of affect changes. Additionally, we assessed the intensity and timing of possible positive and negative events between two measurements and programmed one measurement burst (i.e., multiple repeated measurements over a short time period) per day between two random measurement occasions. We validate this method by investigating the correspondence of data from these continuous intensity profile drawings to momentary ratings from the measurement bursts and the intensity and timing of affective events. Our goal is to make continuous affect measures feasible, effortless, and interesting to the users and participants.

Quantifying the Robustness of Mobile Sensing for Predicting Moment-to-Moment Affect: A Multiverse Study

Koen **Niemeijer**, Merijn Mestdagh, Peter Kuppens

In recent years, there has been growing interest in mobile sensing as a promising tool for measuring emotions and mental health because it allows for the collection of continuous and ecologically valid data in real-world settings. In this talk, we will discuss a study that used mobile sensing to capture the dynamics of moment-to-moment affect and their relationship with emotional well-being and severity of depression symptoms. Using a multiverse analysis approach, we systematically examined the extent to which mobile sensing data can be used to accurately predict these variables in a sample with normal variation in terms of risk for emotion disorders. To address this question, we collected mobile sensing data via m-Path Sense – an app that was installed on participants' smartphones – as well as self-reported data on participants' affective state via the Experience Sampling Method (ESM).

We will discuss the multiverse approach that we used to address the challenges associated with predicting emotional states using mobile sensing data, including issues related to data accuracy and reliability. Specifically, we will demonstrate how the extracted mobile sensing features (e.g., number of steps, location variance, and social media usage) from the data applied to the mixed-effects and machine learning models behaved under various multiverse parameters. Our findings add to the growing body of research on the use of mobile sensing in mental health research and have implications for the development of more accurate and reliable mobile sensing studies.

Analyzing the hysteresis effect in psychological processes with the hysteretic threshold autoregressive (HysTAR) model

Daan **de Jong**, Ellen L. Hamaker, Oisín Ryan, Han L. J. van der Maas

Many psychological phenomena are understood as consisting of distinct states, also called regimes. Regimes are considered to be qualitatively distinct periods of relatively stable behaviour. Of primary interest is how and when individuals transition between these states.
The current study introduces the hysteretic threshold autoregressive (HysTAR) model. This model was first proposed to account for hysteresis in economic regime switches. Hysteresis implies that the threshold value that triggers a transition depends on the direction of change. Transitions of this kind might be present in a range of psychological dynamics, such as switches between depressed and non-depressed states, relapse and recovery states in addiction, problem-solving strategies and perceptual states.
We argue that compared to the standard way of modeling hysteresis, that is, fitting data to the cusp catastrophe model, the parameters of the HysTAR model are more straightforward to estimate and to interpret.
We conduct a simulation study that demonstrates conditional least squares estimation of the HysTAR parameteres under different conditions. We also show that the HysTAR model can detect the hysteresis effect in data simulated from an empirical network model of major depression. Additionally, we provide an analysis of time series data from a speed-accuracy trade-off experiment. All analyses are performed with the novel R-package hystar.

12:00 Lunch break / Sponsor exhibition

Time: 12:00 - 13:00
Location: Sponsor stand / Foyer

13:00 Symposium 22: Investigating ESM measures of daily-life stress using a multi-method approach

Chairs: Marlies Houben & Thomas Vaessen

Although experience sampling (ESM) measures of daily-life stress have shown high clinical relevance, they present several important limitations. First, ESM assessments are not continuous and measuring at the most relevant moment can be challenging, given that measurement occurs outside a controlled lab environment. Second, although passive tracking of physiological and other data is made possible through developments in wearable technology, it is still unclear how these data associate with ESM stress measures. Third, despite these advances in wearable technology, there are yet several highly relevant (biological) processes that cannot be investigated remotely.
In this symposium, we address these challenges using multi-method studies i) in designs where we combine ESM studies with lab studies, and ii) by augmenting ESM measures of daily-life stress with neurological and physiological data. First, Rayyan Toutounji will discuss how we can associate ESM measures of stress with brain activity in a combined fMRI-ESM study. Second, Thomas Vaessen will show how lab studies can be used to further investigate ESM and physiological measures of daily-life stress. Third, Aleksandra Lachowicz will present her findings on affective and physiological measures of recovery from daily stressors and their clinical relevance. Fourth, Marlies Houben will directly compare ESM and physiological measures of daily-life stress on their associations with clinical depression. Finally, Florian Krause will show how we can combine ESM and physiological data in individual prediction models for markers of mental health.

Time: 13:00 - 14:30
Location: Grote Zaal (Main Theatre)

Connecting neural measures of stress reactivity to real-life affective reactivity to stress

Rayyan **Toutounji**

A focus on human stress research conducted in controlled laboratory environments has led to a gap in understanding the implications of neural stress dynamics for reactivity to stress in real life. Bridging this gap is a necessary to understand how altered stress reactivity in daily life can contribute to the onset of mental disorders involving the brain. In this talk, I will discuss current work on making connections between the lab and real life. By focusing on three core large-scale neural networks (salience, executive control, and default mode networks), I will show how task-driven neural activity under task load can be used as a marker for stress reactivity in real life. This is done using a combined within-subject functional MRI laboratory stress and ecological momentary assessment stress paradigm, exploring the links between dynamic shifts in large-scale neural network configurations under stress affective reactivity to stress in daily life.

Is daily-life stress reactivity a measure of stress recovery? An investigation of laboratory and daily-life stress

Joana De Calheiros Velozo, Thomas **Vaessen**, Ginette Lafit, Stephan Claes, Inez Myin-Germeys

Increased affective reactivity to daily stressors, as measured with experience sampling methodology (ESM) is a robust indicator if (risk for) mental illness. However, there is no clear association between affective reactivity to daily stressors and reactivity to experimental stress tasks. One possibility is that assessment of ESM measures of stress reactivity often occur minutes to hours after stress onset, and therefore may not capture the initial reaction to the stressor at all, but instead captures the recovery process. In our study, typical measures of laboratory reactivity and recovery were compared with a conventional measure of daily-life stress reactivity. Fifty-three healthy individuals between 19 and 35 years of age took part in a laboratory session where stress was induced using the repeated Montreal Imaging Stress Task and 8 days of experience sampling method. Measures of negative affect, heart rate, heart rate variability, and skin conductance level were collected. In line with our expectations, daily-life affective reactivity was stronger associated with laboratory affective recovery than with laboratory affective reactivity to stress. For the physiological measures, no associations between laboratory and daily life measures were found. These results show that affective reactivity to daily stressors may indeed reflect the recovery process, rather than reactivity.

Delayed affective recovery from stress is linked to current but not future subclinical anxiety symptoms in youth: an experience sampling study

Aleksandra M. **Lachowicz**, Marlies Houben, Thomas Vaessen, Ginette Lafit, Robin Achterhof, Olivia Kirtley, Zeynep Akcaoglu, Eva Bamps, Noëmi Hagemann, Karlijn S.F.M. Hermans, Julie J. Janssens, Aleksandra Lecei, Inez Myin-Germeys

Key symptoms of anxiety include experiencing unpleasant emotions and hyperarousal. Growing evidence suggests the role of delayed affective recovery from stress (DAR) in their maintenance and development on a day-to-day basis. We investigated whether DAR is linked to current and future anxiety symptoms, independently of depressive symptoms. Self-reported anxiety and depressive symptoms were assessed twice: at T0 (N=1031) and 2-3 years later at T1 (N=171) in a community sample of adolescents. Additionally, at T0 participants used ESM to report their momentary affect and stressful occurrences 10 times a day, for 6 days. Using ESM data and a subtraction method, we construed two variables, i.e., affective valence and arousal reflecting the (un)pleasantness and (hyper)arousal associated with emotions. Moreover, for 6 days, participants wore a smartwatch measuring their heart rate. The affective recovery interval was estimated using survival analysis. Prospective associations were tested with multiple regression. Slower valence recovery was associated with higher concurrent anxiety symptoms and this association remained present when controlling for depressive symptoms. The same association was present for the arousal recovery, however only when depressive

symptoms were included in the model. We found no prospective association between DAR and anxiety symptoms at T1. Exploratory analysis showed that heart rate recovery operationalized using the autocorrelation of 5-min heart rate intervals was not associated with current or future anxiety symptoms. Our findings suggest that DAR may contribute to the maintenance but not development of key anxiety symptoms, and help identify the moments in the daily-life where interventions could be implemented.

Stress as a predictor of clinical course in patients with major depressive disorder in the RADAR-CNS study

Marlies **Houben**, Faith Matcham, Nick Cummins, Sara Siddi, Femke Lamers, Gloria Dalla Costa, Matthew Hotopf , Christian Brasen, Inez Germeys, RADAR-CNS consortium

Major depressive disorder (MDD) is a severe and debilitating disorder, associated with very high relapse rates. Therefore, prospectively predicting upcoming changes in clinical symptoms is crucial, as it would allow for relapse prevention. In this study, we explored the predictive ability of different aspects of daily life stress on (subsequent) depressive symptoms in the longitudinal RADAR-CNS MDD study. More specifically, we used data from 400 patients with MDD that participated in one or more waves of experience sampling, during which measures of self-reported subjective stress, social stress, activity stress and event stress were assessed, while also continuously wearing a Fitbit wrist-worn device, allowing for passive assessments of physiological stress (i.e. heart rate (variation)). Results revealed several significant day-level associations between the self-reported and physiological aspects of stress, but in unexpected directions. When taking into account all measures of stress, only the self-reported aspects of stress were uniquely related to day-level depression levels, and only the subjective experience of stress was related to subsequent depression levels on ESM-wave level. This suggests that mainly self-reported aspects, rather than physiological stress markers, might be most predictive of current and subsequent depression, at least on the day-level and ESM-wave level.

Predicting resilience from psychological and physiological daily life measures

Florian **Krause**

Monitoring well-being with mobile/wearable devices is important for the development of preventive interventions for stress-related psychopathology. Ecological momentary assessment (EMA) and ecological physiological assessment (EPA) are techniques to monitor mood and physiological variations throughout the day. These measures have previously been shown to be indicators of stressful encounters and resilience in daily life. It is, however, not known which combination of these measures most accurately predicts a change in resilience. Moreover, previous prediction models were based on associations across participants which do not take into account between-participant heterogeneity in predictor-resilience

associations. Therefore, individual predictions may perform better if they're based on individual distributions compared to models that are based on group distributions. In this talk, I will compare the performance of (i) models based on both mood and physiology data to models based on mood or physiology exclusively, and (ii) models based on group data (between-subject model) to models based on individual data (within-subject model), on a comprehensive real-world EMA/EPA dataset (6 weeks of measurements in 250 participants) from the European DynaMORE project. I will discuss the results in light of working towards dynamic mHealth solutions that can provide mobile/wearable-based markers to predict changes in resilience, and thus identify time windows during which resilience-enhancing interventions would be most beneficial.

13:00 Symposium 23: The Mix Makes the Difference: Combining Mobile Sensing & Experience Sampling Methods to Study Daily Life

Chair: Ramona Schoedel

While its history in psychological research is still short, mobile sensing holds the potential to bring researchers closer to an important goal in the field: Obtaining information about people's everyday lives. Mobile sensing methods allow for the passive collection of a wide range of different types of data on a moment-to-moment and longitudinal basis. However, we argue that mobile sensing reaches its full potential primarily when combined with experience sampling. In this combination, we can study people's subjective experiences AND objective behaviors in a variety of situations in daily life.
To illustrate this powerful mixture of methods, our first three talks present empirical implementations using the example of studying daily stress-related states and a range of associated behaviors: Talk 1 focuses on smartphone use, talk 2 on language use, and talk 3 on social behaviors. Our final three talks take a critical perspective and reflect on the unique challenges and benefits of combining mobile sensing and experience sampling: Talk 4 addresses the degree of agreement between the different approaches, talk 5 discusses the challenges posed by the different sampling rates of the two methods, and talk 6 addresses participant non-compliance with these intensive data collection tools. Our talks aim to demonstrate that mobile sensing methods combined with experience sampling deliver what they promise: getting closer to people's everyday lives.

13:00 - 14:30
Location: IJ Zaal

Stressed Out by Your Smartphone? Using Mobile Sensing Data and Experience Sampling to Investigate How Smartphone Usage Behaviors Are Related to Well-Being in Daily Life

Fenne **große Deters**, Ramona Schoedel

Smartphones are an integral part of daily life for many people worldwide. However, many researchers as well as lay people are concerned that long usage times and the fragmentation of daily life through smartphone usage are detrimental to well-being. This preregistered study combines objectively-measured smartphone usage with self-reports of mood in a 14-day experience sampling period (N = 378, n = 5,775 datapoints) to assess whether differences in smartphone usage behaviors between situations predict whether an individual is feeling better or worse. In addition to total smartphone usage time, we developed several indicators to capture fragmentation of usage and nonusage time providing first empirical evidence for this understudied aspect. To ensure the robustness of the results, we replicated our analyses in a second measurement period (N = 534, n = 7,287 datapoints) and considered the pattern of effects across different operational definitions of smartphone usage behaviors instead of drawing conclusions based on single p-values. Results show that – across our two measurement periods - no robust association between smartphone usage behaviors and mood emerged. In conclusion, our study helps to alleviate some concerns regarding smartphone usage.

Predicting Individuals Momentary Stress and Affective Well-Being by Applying Natural Language Processing to Daily Diaries

Johannes L. **Klinz**, Julian Scharbert, Mitja D. Back

Language is key to expressing our thoughts and feelings, cooperating with others, and forming relationships. It can also be an important indicator of our mental health and affective well-being. However, quantifying language to better understand psychological states and processes often requires time- and resource-intensive manual coding. Recent advances in Natural Language Processing (NLP) allow automatizing this process to derive novel insights into our emotional and social lives. Based on experience-sampled data (N > 350, > 35.000 individual measurements), we investigate the extent to which language can predict individuals' momentary stress and affective well-being in everyday life. Over a period of four weeks, participants indicated their momentary stress and affective well-being in multiple short surveys at random time points throughout the day. In addition, we collected daily diaries in which participants freely reported how they experienced their respective day by answering an open-ended prompt. Using various NLP techniques to extract language cues and integrating them into multilevel machine learning models, we investigate two research questions: (1) How predictive are language cues derived from the participants' daily diaries for aggregate measures of their momentary stress and affective well-being? (2) Which specific language cues drive this prediction? We discuss implications of our findings for research on

momentary stress and affective well-being, as well as the application of NLP to study psychological states.

Social Rhythms on a Micro-Level: Using Mobile Sensing Data to Investigate Diurnal Patterns in Social Behaviors and Affect

Ramona **Schoedel**, Michael D. Krämer, David Richter, Yannick Roos, Cornelia Wrzus

Our social behavior associated with positive affect and positive affect itself follow diurnal patterns. When this social rhythm does not match our circadian rhythm, we experience stress that accumulates in everyday life and thus becomes a risk factor for the development of physical and mental problems. However, empirical studies that examine these social rhythms in more detail are scarce. One reason for this is certainly that past research methodology has been dominated by questionnaires, which inherently limits the number of available data points to study intra-daily patterns.
In this talk, we present an approach that addresses this problem. In our preregistered study (N = 306, 51% women, mean age 39 years), we examine interindividual differences in daily social rhythms by using mobile sensing to continuously capture social behaviors such as communication and social media app use, calls, or conversations over two days. We complemented this passive sensing approach with an intensive experience sampling schedule where we asked participants about their affective experiences and quality of social interactions approximately every 80 minutes. In our talk, we will present preliminary results of a multilevel modeling approach to examine 24-hour daily rhythms in within-person patterns of social behaviors and positive affect, as well as interindividual differences in these patterns. We will conclude with a summary of the benefits and challenges of combining the different ambulatory assessment approaches we have used in our study to research social rhythms in daily life.

Comparing Day Reconstruction, Experience Sampling, and Mobile Sensing measurements of social interactions in daily life

Yannick **Roos**, Michael D. Krämer, David Richter, Ramona Schoedel, Cornelia Wrzus

In daily life, social relationships can be both a potential source of stress and a protective factor against stress. However, filling out multiple questionnaires about their social interactions can be burdensome for participants, limiting the breadth of assessments and the study duration. Combining questionnaires with smartphone sensing promises to alleviate participant burden and therefore allows for more comprehensive assessments. Yet, it is still unknown to which extent smartphone sensing can capture people's daily social interactions. We expected that data on daily social interactions (i.e., face-to-face interaction, calls and text messages) obtained from day reconstruction, experience sampling and smartphone sensing would show substantial agreement, but that each method has unique access to certain aspects of social interactions. Over two days, 320 smartphone users (51% female, age M = 39.53) answered up to 20 scheduled experience sampling questionnaires and two daily diaries about their social behavior. During the same

time, their smartphone usage was assessed with smartphone sensing. Results showed some agreement between measurements of face-to-face interactions and high agreement between measurements of smartphone-mediated interactions. Still, a large number of social interactions was captured by only one of the methods. We discuss limitations and the unique benefits of day reconstruction, experience sampling, and mobile sensing for assessing social interactions in daily life.

Challenges in and Approaches to the Integration of Experience Sampling and Mobile Sensing

Larissa **Sust**, Ramona Schoedel

In the past decade, digital methodologies have started to facilitate the ambulatory collection of various psychological data on a daily basis. While ambulatory assessment has become a popular tool, most studies still employ either active (i.e., experience sampling) OR passive approaches (i.e., mobile sensing). However, only the combination of both approaches holds the great potential to collect multimethod data at a fine-grained level. In this talk, we illustrate how active and passive ambulatory assessment tools can be combined to study objective behavioral correlates of subjective experiences such as stress. We briefly present two longitudinal studies that integrated active experience samplings and passive smartphone sensing into a custom smartphone application. In both studies, the app continuously logged smartphone usage behaviors (e.g., music listening, phone usage) in the background and applied experience samplings to measure participants' current affective states. Using these two studies as examples, we consider two practical issues when combining continuously logged behavioral data with sporadically sampled self-reported experiences. First, we discuss how (pseudo-)randomized sampling schedules impact the timely contingency between experience sampling instances and different types of target behaviors and how event-triggered schedules may maximize it. Second, we elaborate on the extraction of behavioral variables in timely correspondence to experience sampling instances. We present different variable extraction modes (e.g., based on time windows) and discuss their applicability to different types of behavioral data. Throughout this talk, we highlight the potential and critically reflect on the challenges of integrating active and passive ambulatory assessments.

Never Miss a Beep: Using Mobile Sensing Data to Predict and Better Understand (Non-)Compliance in Experience Sampling Studies

Thomas **Reiter**, Ramona Schoedel

Experience Sampling is among the most common methods to collect in situ measures of participants' current feelings, thoughts, or behaviors. However, compliance to answer the short questionnaires (historically also referred to as beeps) often strongly differs between and even within participants (e.g., with respect to time of the day). This study therefore aims to generate new insights into participants' compliance patterns using more than 400 different person-, context-, or and behavior-related features. Data was gathered combining information from

traditional questionnaires (e.g., traits), previous experience sampling questionnaires (e.g., mood), and mobile sensing data (e.g., smartphone usage, GPS).
Using a predictive modeling approach, we benchmarked different classification algorithms using 10-fold cross-validation and applied methods from interpretable machine learning to better understand the importance of single features and entire feature groups. Implications for applied researchers (e.g., concerning experimental design) and methodological researchers of Experience Sampling studies are drawn.

13:00 Symposium 24: Wearables in Practice: Biocueing and self management in mental healthcare

Chair: Matthijs Noordzij & Peter de Looff

Wearables in Practice is a network of academics, health professionals and entrepreneurs that regularly meet to explore the current opportunities and challenges of connecting healthcare practice and science. In this SAA symposium, we present perspectives on the integration of wearables for biocueing and self-management into mental healthcare. The focus will be on the latest research and practical applications in this field, and the speakers will address the challenges and opportunities for creating valuable insights for patient that come with the use of wearable technology.
The symposium will provide an overview of biocueing, including the types of physiological signals that can be monitored, and how they can be used to aid in (mental) healthcare. We will discuss the use of wearables to support self-management in health and wellbeing, including the use of apps and other tools to track symptoms and moods, and the benefits of using this technology to support patients.
We will also delve into the ethical and societal considerations of using wearables in mental healthcare, including privacy, security, and the potential for misuse. Here we will offer inspiration from related field where wearable technology has already been adopted widely for self tracking (i.e. sports and lifestyle).
Finally, case studies will be presented, highlighting the success stories and the lessons learned. In conclusion, this symposium will provide an in-depth look at the current state of the field of wearables in practice, and will offer insights into future directions.

Time: 13:00 - 14:30
Location: Expo

Can Biocueing aid Aggression Regulation in Forensic Psychiatric Patients? Exploring Feasibility and Clinical Potential

Matthijs **Noordzij**

Difficulties in emotion processing are common among forensic psychiatric patients, often leading to aggressive or self-harming behavior. Biocueing, the use of wearable technology to monitor and provide feedback on bodily changes, may help improve emotion processing and reduce aggression in this population. Here we will present findings from three studies exploring the feasibility and clinical potential of the Sense-it biocueing (cueing unexpected heart rate changes in low intensity movement situations) app in forensic psychiatric outpatients.
Study 1 examined acceptance and potential clinical added value of biocueing in forensic psychiatric patients with ASD and/or ID. Results indicated that participants experienced the biocueing application positively and were willing to use it. Study 2 was a design and evaluation study of an updated version of the Sense-it app, suitable for forensic outpatients with aggressive behavior. Results showed moderate acceptability and adequate usability, with a significant decrease in trait aggression post-intervention. Study 3 used a pretest-posttest design to assess the effects of the Sense-it app as an addition to aggression regulation therapy on interoceptive awareness, emotion regulation, and aggressive behavior. Results showed a significant improvement in emotion regulation and interoceptive awareness, but also highlight several challenges and development directions for the technology.
These studies highlight the potential of biocueing as an adjunct to aggression regulation therapy in forensic psychiatric patients. By improving emotion processing, biocueing may help reduce aggressive behavior, which is of great importance to both individuals and society.

E4 dashboard

Kirsten **Smeets**, Kees de Schepper

Several studies are currently conducted in the Netherlands on (forensic) psychiatric wards that investigate the usefulness of wearable technology for the monitoring an prediction of aggressive and violent behaviour. Both heart and skin conductance seem promising physiological signals to predict aggressive and violent behaviour. Besides aggressive behaviour, clinicians are also interested in the day-to-day and moment-to-moment physiological reactivity to stressors and daily events in the patients' lives.
The use of wearable technology in (forensic) treatment is problematic, especially with commercial wearables. Commercial devices provide little flexibility to visualize and integrate neuro-physiological with psychosocial information. Algorithms of digital biomarkers are often proprietary, and information on reliability and data quality is often lacking.
To address these issues, an open source software application (i.e., E4 dashboard) has been created for the Empatica E4 wearable. The dashboard allows clinicians to visualize physiological reactivity and synchronize with real-life events using a calendar, creating a personalized profile of the patient's responses to stressors, events, and situations. Useful physiological features and specific periods can be selected to assess progress on patient-relevant outcomes.
The E4 dashboard provides a solution for non-expert users who struggle with signal processing, as they can download a report that provides information on artifacts and features. Additional features and batch file analysis are available for expert users

with programming knowledge. The E4 dashboard is freely available and the code can be modified for additional signal processing functionality.

NeuraWear

Peter **de Looff**

E4 dashboard is an open-source application for the Empatica E4 that allows clinicians to visualize physiological reactivity and synchronize with real-life events using a calendar. However, the dashboard currently only implements algorithms for signal pre-processing, artifact detection, and feature extraction, but does not implement composite scores on sleep, stress, and physical activity, which could provide valuable insights.
The Healthy Brain Study (HBS) is a prospective longitudinal cohort study that utilizes careful digital phenotyping in 1000 healthy participants. HBS combines bio-sampling, neuro-imaging, and ecological momentary assessments to carefully assess several physiological, cognitive, affective, and behavioural outcomes in both the laboratory and in real life with wearables. Several composite scores of particular interest to the current proposal (i.e., stress, sleep, physical activity) are collected with ground truth reference devices and can be integrated into the existing E4 dashboard application. We want to develop validated, reliable, open-source sleep, stress, and physical activity algorithms that serve the international healthcare community. These algorithms will be integrated into the existing dashboard that will provide tailored, personalized insights and can be implemented in treatment settings. The NeuraWear study will also carefully design 30 rigorous single case experiments to assess the efficacy and value of E4 dashboard in (forensic) psychiatric treatment.
Integration of biomarkers into treatment is still in pioneering phases, and the current study has the potential to create value for healthcare (research) globally. Overall, the proposed study could provide ample opportunities to improve forensic psychiatric interventions by integrating wearable technology with traditional psychosocial and cognitive-behavioural treatment interventions.

The Use of Biofeedback with Aggressive Behavior

Pim **Oomen**

Aggressive behavior has been associated with low levels of self-control in subjects (Finkel et al., 2009; Denson et al., 2011; Finkel et al., 2012). Accordingly, a key intervention in CBT for aggressive behavior is to teach self-control (Hofmann, Asnaani, Vonk, Sawyer & Fang, 2012, 2012; Landenberger & Lipsey, 2005). Such interventions are aimed at increasing self-observation (Nelson, 2016), which purports learning to be aware of internal and external stimuli that precede aggressive behavior. Increasing the awareness of these warning signals can contribute to alternate – more prosocial - behavioral responses.
In response to treatment difficulties related to self-observation, motivation and generalization, we developed a smartphone application called ‘GRIP app’, which stands for Good Reaction Is Prevention. The purpose of the GRIP-app is to support self-observation and the practicing of self-control skills by providing biofeedback on autonomic state by measuring heart rate variability and voice volume. The

smartphone will signal a notification when a preset threshold is surpassed. We presume that by providing biofeedback and supporting self-observation, perpetrators can practice self-control before arousal becomes too high, thus preventing violence. This presumption is built on research in other fields that shows that using wearable technology contributes to achieving health-related goals by increasing self-regulative abilities as well as increasing commitment to these goals.
The presentation focuses on the theoretical background underlying the GRIP-app, the different features of the app and how they are used in the clinical practice, and finally some preliminary findings of an RCT-study with the GRIP-app among IPV-offenders will be presented.

User Perspectives in Sensemaking of Stress Data

Armağan **Karahanoğlu**

Stress-tracking tools enable individuals to collect stress-related data and transform it into actionable insights. The prevalence of these tools is facilitated by the availability of affordable sensing and networking technologies, enable the tracking of diverse data stress indicators (e.g. heart rate variability). However, there is growing interest in comprehending the sensemaking processes that users engage in when collecting, analysing, and reflecting on their data.
Data sensemaking presents several challenges for individuals, as it requires their cognitive involvement and engagement with data. The data-derived metrics (e.g., stress score) may confuse users, leading to misinterpretations or frustration. These misinterpretations may negatively affect their comprehension of stress indicators and can prevent them from taking timely actions.
Recently, a novel perspective has emerged in the field of self-tracking of health that emphasizes the qualitative, subjective, and social aspects of learning about the self. This view suggests that data should not merely represent health indicators in numerical forms but should also enable individuals to gather meaningful insights from the data, facilitating a more holistic understanding of the self and informing actionable behavioural decisions. Relatedly, this presentation will delve into the sensemaking processes involved in stress self-tracking based on the “data sensemaking in the self-tracking framework” (see below figure). In the end, we will discuss how stress measurement studies can benefit from a human-centred approach to stress-data sensemaking.

13:00 Symposium 25: It takes two to Tango: Dyadic Ambulatory Assessment and Interventions in romantic relationships

Chair: Andrea B. Horn

We are social animals and consequently relational processes in everyday life are fundamental for health and well-being. In adulthood, the closest social relationship is with the romantic partner. For a better understanding of these processes, it is central to expand the unit of investigation to a dyadic perspective and the “dance” of the related changes in relevant processes across everyday situations. In this international symposium, current contributions to ambulatory assessment of couple processes in everyday life will be presented and discussed.
In the first contribution by Versyp et al. (KU Leuven, Belgium) will present a study on the role of a culturally defined pressure not to feel bad as perceived in romantic relationships on daily affect and relational outcome. This will be followed by a study by Horn et al. (University of Zurich, Switzerland) investigating the connections of self-reported psychological availability with everyday affective co-regulation in young and old couples. Subsequently, Milek et al. (University of Witten/Herdecke, Germany) will present their novel contribution to situational actor and partner effects of smart phone phubbing and relational outcomes in couples´ daily life. Hereafter, Höhener et al. (University of Zurich, Switzerland) will present investigations on a dyadic just-in-time adaptive intervention (JITAI) to improve the couple’s social exchange processes fostering the target partner’s engagement in physical activity. The symposium will be concluded by a discussion and a broader reflection of the presented studies by Matthias Mehl (University of Arizona, USA).

Time: 13:00 - 14:30
Location: Studio

Pressure to not feel bad among (heterosexual) romantic partners: prevalence, and correlates.

Otto **Versyp**, Ginette Lafit, Laura Sels, Lesley Verhofstadt, Eva Ceulemans, Peter Kuppens

Western society generally highly values happiness. As a result, people sometimes experience pressure not to feel negative emotions. While it has repeatedly been shown that this pressure not to feel bad can be detrimental to our wellbeing, most previous research has focused on the degree to which people experience pressure not to feel bad from society but not within specific relationships. In this study we examined when, how often and how intensely people experience pressure not to feel bad from their romantic (heterosexual) partners, using experience sampling methodology data (collected in 2016-2017), and how this pressure is related to context (presence of, contact and or conflict with a partner), experienced sadness and anxiety, perceived experienced emotions by their partner, and relationship well-being (relationship quality and satisfaction). Findings reveal that although people generally do not experience strong pressure from their partner not to feel sad or anxious, they experience some pressure for about 50% of the time. Furthermore, we find that predictors associated with negative affect (i.e. negative emotions, conflict, perceived negative emotions by partner) are related to both the frequency and intensity of perceived pressure not to feel sad or anxious.

Correlates of momentary psychological availability in daily life of young and old couples

Andrea B. **Horn**, Tabea Meier, Zilla Huber, Mike Martin

The romantic relationship serves as resource in the daily adjustment to daily environmental demands. However, some co-regulation attempts are not successful and relational tensions represent a prominent source of stress. One candidate for situational factors predicting successful co-regulation is psychological availability, the perception of having resources to be open and attentive to the partner's needs. The current study investigates the role of psychological availability for daily affective regulation in couples.
N=62 younger (18-33 years) and N=56 older (57-87 years) different-sex couples were beeped 3 times a day over three weeks and reported momentary perceived psychological availability, affect, psychological intimacy, and interpersonal emotion regulation strategies. Furthermore, audio and proximity sensing (bluetooth) were conducted.
Results of dyadic multilevel analyses revealed that in everyday situations when psychological availability was reported, romantic partners reported more adaptive interpersonal strategies like responsive touch, positive humor, and less maladaptive strategies like ruminative co-brooding. Furthermore, individuals reported higher intimacy, more positive affect and perceived themselves as more authentic in

moments when they reported more availability, perceived stress did not show associations. Female participants in the older group did report less psychological availability, no further gender differences were observed.
The results open the door for further investigations for a better understanding of situational predictors of successful co-regulation in couples which may inform future just in time-interventions for the improvement of relational functioning.

Phubbing Behavior and Relationship Functioning in Romantic Couples: A Daily Diary Study

Anne **Milek**, Vica Tomberge, Lisanne S Pauw

Interacting with smartphones has become an integral part of people's everyday life permeating the time people spent together with their romantic partners. The use of the smartphone in the presence of a significant other (pphubbing) has been associated with negative effects on the perceived quality of romantic relationships and a lack of intimacy between partners. However, the effect of pphubbing behaviour in romantic relationships has primarily been studied by comparing couples who engage in phubbing compared to couples who do so less intensively (interindividual perspective). Little is known how pphubbing experiences relate to relational outcomes on an intraindividual perspective. The present study used 7 consecutive days of smartphone-based diary data from a total of 71 heterosexual couples (n= 142 individuals) to investigate intra- and interindividual associations between pphubbing behavior and relational outcomes (psychological and physical intimacy, partner conflicts, satisfaction with shared time, perceived responsiveness). Results of dyadic data analysis using multilevel models revealed differential gender-specific actor and partner effects of pphubbing on the relational outcomes for the intra- and interindividual level. Overall, more pphubbing behavior was most consistently associated with less physiological intimacy for actors and partners on both levels. These results shed light on the role of the smartphone in modern romantic relationships and suggest that not all but some dimensions of relationship functioning may be impaired if partners interact with their smartphones instead of one another.

Effectiveness of dyadic just-in-time adaptive interventions to increase physical activity in romantic couples

Patrick S. **Höhener**, Robert Tobias, James M. Allen, Pascal Küng, Urte Scholz

Background: Social relationships play a crucial role during health behaviour change. Social exchange processes such as social support and social control can foster as well as inhibit health behaviour change. However, such processes are often neglected when investigating health behaviour change.
Aim: The aim of this study was to investigate the effects of dyadic just-in-time adaptive interventions (JITAIs) to increase the physical activity of romantic couples.
Method: We conducted a micro-randomised trial over 55 days, including 38 couples (Mage = 34.01; SDage = 11.03). We implemented dyadic just-in-time adaptive interventions (JITAIs) to improve the couple's social exchange processes that were

hypothesised to foster engagement in physical activity. Psychological variables and social exchange processes were assessed through daily diaries. Moderate-to-vigorous physical activity was measured through daily diaries and wrist-worn accelerometers. We used the weighting and centering estimation method for micro-randomised trials to estimate the treatment effects of the dyadic JITAIs.
Results: The dyadic JITAIs effectively increased the targeted partner's self-reported and device-based physical activity. However, when controlling for covariates, the dyadic JITAIs only increased the self-reported physical activity of the other partner.
Discussion: This study is one of the first to examine dyadic JITAIs. Specific benefits, but also challenges of dyadic JITAIs, will be discussed. Further research should investigate the mechanisms of action that explain the effects of the dyadic JITAIS on health behaviours such as physical activity.

14:30 Paper session 10: Applications in research on psychiatric disorders

Chair: Mildiner Moraga

Time: 14:30 - 16:00
Location: Grote Zaal (Main Theatre)

The Temporal Association Between Social Isolation, Distress and Psychotic Experiences in Individuals at Clinical High-Risk for Psychosis

Zeynep ZA **Akcaoglu**, Thomas TV Vaessen, Eva EV Velthorst, Ginette GL Lafit, Robin RA Achterhof, Barnaby BN Nelson, Patrick PM McGorry, Frederike FS Schirmbeck, Craig CM Morgan, Jessica JM Hartmann, Mark MvdG van der Gaag, Lieuwe LdH de Haan, Lucia LV Valmaggia, Philip PM McGuire, Matthew MK Kempton, Henrietta HS Steinhart, Annelie AK Klippel, Wolfgang WV Viechtbauer, Tim TB Batink, Ruud RvW van Winkel, Thérèse TvA van Amelsvoort, Machteld MM Marcelis, Evelyne EvA van Aubel, Ulrich UR Reininghaus, Inez IMG Myin-Germeys

Psychotic experiences (PEs) and social isolation (SI) seem related during early stages of psychosis, but the temporal dynamics between the two are not clear. Literature so far suggests a self-perpetuating cycle wherein momentary increases in PEs lead to social withdrawal, which, subsequently, triggers PEs at a next point in time, especially when SI is associated with increased distress. The current study investigated the daily-life temporal associations between SI and PEs, as well as the role of SI-related and general affective distress in individuals at Clinical High Risk for psychosis (CHR). We used Experience Sampling Methodology (ESM) in a sample of 137 CHR participants. We analyzed the association between SI, PEs and distress using time-lagged linear mixed-effects models. Results indicated that SI did not predict next-moment fluctuations in PEs, or vice versa. Furthermore, although SI-related distress was not predictive of subsequent PEs, general affective distress during SI was a robust predictor of next-moment PEs. These findings suggest that SI and PEs are not directly related on a moment-to-moment level, but a negative

emotional state when alone does contribute to the risk of PEs. These findings highlight the role of affective wellbeing during early-stage psychosis development.

The effect of daily social support on the association between daily negative events and daily paranoia across at-risk stages for psychosis

Larisa **Morosan**, Sanne H. Booij , Sara van der Tuin , Esdras Raposo de Almeida , David van den Berg , Johanna T.W. Wigman

Psychosis manifests across subsequent at-risk stages from mild to more severe psychotic experiences. There has been an increased focus on the risk factors associated with psychotic experiences, but little is known about the protective factors and how they manifest across the at-risk stages. We aim to address two research questions: Is the unpleasantness of daily negative events associated with daily paranoia? Does the effect of daily social support on the association between daily negative events and daily paranoia differ across the at-risk subgroups for psychosis?
Data from the Mapping Individual Routes of Risk and Resilience study were used (N = 96, 76% females, aged 18-35 years old). Participants were assigned into four subgroups representing different risk stages for psychosis (from low risk group to ultra-high risk-UHR). Participants reported each day, for 90 consecutive days, the level of the unpleasantness of daily negative events, the perceived social support and the level of suspiciousness experienced.
The results indicate that: i) on days when participants reported more unpleasant negative events than usual they also reported higher paranoia than on average and ii) on days when the social support was perceived higher than usual, the association between the unpleasantness of negative events and daily paranoia was weaker than during the days when the social support was lower than usually, but only in the group of participants presenting prodromal symptoms without being UHR. These results might improve the theoretical understanding of psychotic experiences and the development of stage-specific interventions.

Anti-androgenic oral contraceptive users show lower mood and higher levels of momentary worry and depression

Melanie **Kowalczyk**, Monika Kornacka, Izabela Krejtz

Background: Women are twice as likely as men to suffer from mood disorders. The literature suggests that gonadal hormones and types of oral contraceptives (OC) should be taken into account when exploring those disorders in women but the precise mechanism of this link remains understudied. The goal of our study was to test whether the type of OC is related to differences in levels of anxiety, depression and their risk factors.
Methods: 88 participants; 41 naturally cycling (NC) and 48 taking OC (16 androgenic and 31 anti-androgenic); were given questionnaires online. We then performed an intensive repeated measures study using ecological momentary assessment (EMA). Each participant was provided with her own individual menstrual cycle calendar divided into 3 phases: menstrual, follicular and luteal. In each phase, participants

answered a series of questions about their momentary anxiety, depression and related risk factors for 5 consecutive days (15 days in total). The EMA was carried out on the MovisensXS phone application, 3 times a day.
Results: The data represent a three-level structure. Level 1 variables (data collected through EMA) were nested in days (Level 2) and participants (Level 3). We did not find differences between groups in levels of momentary anxiety, ruminations or self-compassion. However, anti-androgenic OC users showed overall lower levels of mood than NC women. They also had higher levels of worry and depression than NC women in the menses phase.
Conclusions: The anti-androgenic OC users showed lower mood and higher levels of worry and depression than the NC women.

Comparing the concurrent and predictive validity of single- and double-item measures in ecological momentary assessment

Kirsten **Christensen**, Sarah E. Victor

Ecological momentary assessment (EMA) studies often use brief (e.g., one- or two-item) measures to reduce participant burden, and traditional psychometric evaluation of such measures is limited. Evidence supports the validity of single-item measures of certain constructs, and little research (e.g., Song et al., 2022) has tested whether multiple-item EMA measures perform better than single-item measures. Using data from 93 young adults with recent non-suicidal self-injury (NSSI) urges/behaviors who completed a 1- or 2-week signal-contingent EMA protocol, we tested whether double-item measures of positive affect, negative affect, and self-criticism showed better concurrent and predictive validity for suicide ideation and NSSI urges than their component single items. Using two-level DSEM models, the outcome variable from time T2 was regressed on the cross-lagged single- or multiple-item predictor at T1, the single- or multiple-item predictor at T2, the autocorrelated outcome variable at T1, and linear time. A predictor with a larger effect size was determined to exhibit greater predictive validity. A subset of results is shown in Table 1. Results were mixed, with multiple-item measures showing greater concurrent or predictive validity for some constructs, with similar performance across single- and multiple-item measures for other constructs. Analyses will be replicated in two additional samples with data collection or processing to be completed prior to SAA (suicidal transgender/nonbinary adults; suicidal adults recently discharged from inpatient psychiatric care). Results will be compared across samples and discussed in the context of prior work examining the validity of single-item measures. Implications for EMA measures will be discussed.

Table 1. Concurrent and predictive validity of single- and multiple-item EMA measures predicting suicide ideation (SI) and NSSI urges.

Model	Concurrent *B*	95% CI	Lagged *B*	95% CI
Positive affect → SI				
Aggregate	-0.489	-0.525, -0.453	0.202	0.155, 0.248
Cheerful	-0.429	-0.461, -0.396	0.143	0.100, 0.185
Happy	-0.425	-0.457, -0.392	0.130	0.087, 0.171
Positive affect → NSSI urges				
Aggregate	-0.388	-0.426, -0.350	0.165	0.120, 0.211
Cheerful	-0.338	-0.373, -0.303	0.114	0.071, 0.156
Happy	-0.339	-0.373, -0.305	0.116	0.074, 0.157
Sadness → SI				
Aggregate	0.613	0.558, 0.673	-0.305	-0.377, -0.237
Sad	0.412	0.378, 0.445	-0.100	-0.144, -0.055
Blue	0.407	0.372, 0.443	-0.107	-0.152, -0.062
Sadness → NSSI urges				
Aggregate	0.513	0.458, 0.570	-0.238	-0.305, -0.174
Sad	0.363	0.328, 0.398	-0.087	-0.131, -0.043
Blue	0.337	0.300, 0.374	-0.073	-0.118, -0.028
Self-criticism → SI				
Aggregate	0.445	0.402, 0.489	-0.209	-0.261, -0.156
Hard to accept weaknesses	0.346	0.310, 0.381	-0.114	-0.159, -0.070
Self-critical	0.372	0.336, 0.408	-0.143	-0.187, -0.099
Self-criticism → NSSI urges				
Aggregate	0.434	0.390, 0.477	-0.183	-0.237, -0.130
Hard to accept weaknesses	0.333	0.297, 0.368	-0.087	-0.132, -0.043
Self-critical	0.368	0.331, 0.404	-0.127	-0.173, -0.082

Note. CI = credibility interval

Interpreting ambiguity in depression: Novel daily life measures of interpretation bias and inflexible updating of interpretations

Jonas **Everaert**, Lisa Vos, Tom Smeets, Peter Kuppens

Depression features a tendency to infer more negative and fewer positive interpretations of ambiguous situations (i.e., interpretation bias) as well as a tendency to inadequately update initial negative interpretations based on new

experiences (i.e., negative interpretation inflexibility). These effects have been established in lab-based experiments, however, making it unclear how distorted interpretations manifest within naturally occurring social situations. This study tested an ecological momentary assessment of biased and inflexible interpretations in depression.
Participants (N = 40) completed the Beck Depression Inventory-II (BDI-II) and then enrolled in a 14-day experience sampling phase with 6 prompts per day. At different prompts, participants completed parallel versions of a 10-item Scrambled Sentences Test (SST) to measure positive and negative interpretations.
Results showed that the BDI-II was positively related to the percentage of negative interpretations that have revised based on positive experiences since the last prompt (negative interpretation inflexibility; $r = .44$, $p = .002$) as well as the proportion of negative interpretations (interpretation bias; $r = .59$, $p < .001$). Inflexibility and bias measures were also positively correlated ($r = .43$, $p = .003$).
These findings are consistent with prior lab research and support for the utility of the SST as a tool to capture distorted interpretations in real-world contexts. The new method enables future research to unravel complex interactions between cognitive and other processes in depression in everyday life.

Evidence for severe mood instability in patients with bipolar disorder: Applying multilevel hidden Markov modelling to intensive longitudinal ecological momentary assessment data

Sebastian **Mildiner Moraga**, Fionneke M. Bos, Bennard Doornbos, Richard Bruggeman, Lian van der Krieke, Evelien Snippe, Emmeke Aarts

Bipolar disorder (BD) is a chronic psychiatric condition characterized by large episodic changes in mood, energy, and cognitive functioning. Recently, BD has been proposed to be conceptualized as chronic cyclical mood instability, as opposed to the traditional view of alternating discrete episodes with relatively stable periods in-between. Recognizing and quantifying this mood instability may improve clinical care and calls for high-frequency measures coupled with advanced statistical models. To uncover empirically derived mood states, a multilevel hidden Markov model (HMM) was applied to 4-month ecological momentary assessment (EMA) data in twenty patients with BD, yielding ~9.820 assessments in total. EMA data comprised 12-item self-reported questionnaires (5 per day) measuring manic and depressive constructs. Manic and depressive symptoms were further assessed by weekly self-reported questionnaires (i.e., Altman Self-Rating Mania Scale and Quick Inventory for Depressive Symptomatology Self-Report). HMM uncovered four mood states (euthymic, manic, mixed, and depressive) which aligned with weekly symptom scores, as assessed with a multilevel linear model. Mood states switched more frequently than weekly data suggested. The average state duration was 17.1h (SD=78.0) for euthymic, 16.3h (SD=70.8) for depressive, 9.1h (SD=11.6) for manic, and 8.8h (SD=10.9) for mixed. In almost half of the patients, significant mood instability was observed. Large individual differences were observed in state duration and switching. The results indicate that chronic mood instability is a key

feature of BD, even in euthymic periods. This should be considered in theoretical and clinical conceptualizations of the disorder.

14:30 Paper session 11: Passive sensing

Chair: Lianne de Vries

Time: 14:30 - 16:00
Location: IJ Zaal

A Novel Deep Learning Approach Using Time Series Actigraphy for MDD Ambulatory Detection in a Large Nationally Representative Sample

Michael V. **Heinz**, George D. Price, Amanda C. Collins, Nicholas C. Jacobson

Background: Major Depressive Disorder (MDD) is a highly prevalent, debilitating, and heterogenous mental disorder with varying symptom profiles, making early detection difficult. Actigraphic data can improve MDD detection when combined with deep learning approaches due to the disorder's association with sleep and physical activity. Deep learning approaches automatically encode relevant features from raw time series data, unlike traditional machine learning methods that rely on domain knowledge for feature engineering.
Methods: Participants with both PHQ-9 scores and actigraphy (N=8,378) were drawn from the National Health and Nutrition Examination Survey (NHANES), 2011-2014. Actigraphy was collected via the Actigraph GT3X+ for 7 days; the minute-level triaxial monitor independent movement summary (MIMS) sum values were used for modeling. We converted actigraphic time series to images using gramian angular field transformations. We employed a Convolutional Neural Network using 10-fold cross-validation, with a held-out test set. We used SHAP (SHapley Additive exPlanations) to causally uncover actigraphic features driving the model’s predictions.
Results: We found a moderate MDD-detection test performance (AUC = 0.68, Sens=0.45, Spec = 0.82). Temporal SHAP analysis (Figure-1) revealed patterns in the mid-afternoon are of high importance in detecting MDD (1-A), while morning movement has importance in detecting controls (1-B).
Conclusions: Our work demonstrates that using passively-collected actigraphic data with deep learning could improve MDD ambulatory assessment. This approach is less obtrusive and more accessible, and our novel deep learning pipeline automatically encodes features. Our work contributes to a growing body of research using data-driven approaches to improve MDD detection.

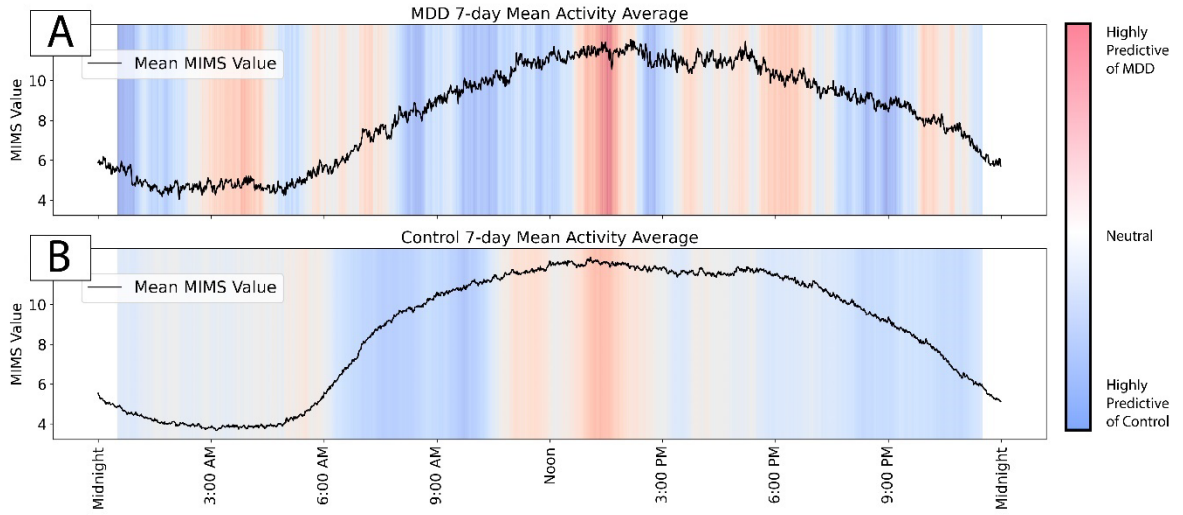


Figure-1. Activity magnitude for participants in the MDD group and control group (A, B, respectively) averaged across persons, across days for 1 week. These curves were plotted against red-blue shading, representing high-low SHAP values, respectively. Higher SHAP values (darker red) suggest time points influential in detecting depression. Lower SHAP values (darker blue) suggest time points influential in detecting controls.

Speech features and their association to momentary depression severity and affect in patients with an acute depressive episode undergoing sleep deprivation therapy: A pilot study

Lisa-Marie **Wadle**, Jerome C. Foo, Fabian Streit, Stephanie H. Witt, Josef Frank, Lea Zillich, Matthias F. Limberger, Ayimnisagul Ablimit, Tanja Schultz, Ulrich W. Ebner-Priemer, Marcella Rietschel, Maria Gilles, Lea Sirignano

Continuous mobile monitoring of depressive symptomatology is seen as a corner stone to prevent upcoming episodes. Speech features have been suggested as potential candidates in this context. Although associations between speech features and depression have been shown in research before, most studies focus on a between-person perspective or incorporate only a few within-person measurement points, e.g. pre-post treatment. To the best of our knowledge, there is no study using a series of measurement points within patients with depression in the sense of intensive longitudinal data. We analyzed speech features extracted from voice samples and concomitant self-report momentary affect assessments captured in a sample of 30 patients with an acute depressive episode. Patient underwent sleep deprivation therapy which ensured within-person variability of depressive and affective momentary states and recorded voice samples over the course of up to three weeks (on average 31 assessments per patient). Based on previous research, we focused on three specific speech features, namely speech pauses, speaking rate and pitch variability which we extracted through openSMILE and calculated based on a transcript respectively. Analyses revealed that speech pauses and speaking rate were related to positive affect, valence and energetic arousal. In addition, speech pauses were related to depression severity and negative affect. Contradicting previous research, pitch variability was not linked to depressive and affective momentary states. Our research suggests that speech pauses and speaking rate are

promising parameters for future mobile technologies that try to predict upcoming depressive episodes on an individual level.

Continuous examination of real-world stress and response using deep, dynamic phenotyping

Constanza M. **Vidal Bustamante**, Isabelle Jacques, Habiballah Rahimi-Eichi, Garth Coombs 3rd, Jukka-Pekka Onnela, Justin T. Baker, Katie A. McLaughlin, Leah H. Somerville, and Randy L. Buckner

Stress is a well-established contributor to the onset and progression of psychopathology. Yet little is known about the real-time impact of diverse stressful events on affect and behaviors like sleep and socializing, and how this might shape longer-term clinical outcomes. Our work is leveraging mobile and wearable technology to examine real-world stress and response in a sample of 49 freshman students naturally exposed to diverse stressors as they transitioned to college life. For a full academic year (~10,000 total daily observations), participants wore an actigraphy wristband and completed daily phone surveys of affect and behavior, daily voice diaries, and periodic assessments of clinical symptoms. Voice diaries were processed to identify the source and intensity of daily stressors. Linear models and multivariate hidden Markov models assessed whether stressful events related to academics and interpersonal relationships are associated with different patterns of affect, social activity, and actigraphy-derived sleep patterns in the days surrounding the event. Preliminary results from a pilot dataset showed that interpersonal stressors are associated with greater negative affect than academic stressors for most participants. Stress-related changes in sleep and social behavior had greater inter-individual variability, highlighting the importance of individualized analytical approaches. Subsequent analyses will assess whether the stressors encountered by participants, and their affective and behavioral correlates, are predictive of longer-term clinical outcomes.
This work is providing valuable insights into the dynamic effects of real-world stress on emotions, behavior, and mental health, with important implications for the development of personalized and timely approaches to care.

An Ambulatory Assessment Study on the Association Between Daily Stress and Heart Rate Variability During Sleep

Katharina I. **Salo**, Lisanne S. Pauw, Ricarda I. Schubotz, Anne Milek

Stress represents a significant risk factor for cardiovascular disease. One mechanism that may contribute to this detrimental association is impaired autonomic recovery during sleep as a consequence of stress. However, to date, no study has evaluated how stress in daily life affects nocturnal autonomic recovery on a day-to-day basis. Therefore, this preregistered 10 day-ambulatory assessment study investigates whether daily stress decreases autonomic recovery during sleep. Since, in real-life settings, individuals' wellbeing is dependent on close others, such as the romantic partner, we further explore whether the partner's stress might affect own autonomic recovery beyond one's own stress experiences. We hypothesize that

daily stress (own and partner stress) is negatively associated with autonomic recovery during sleep. Participants and their partners answer a short questionnaire (5 items) assessing their stress level each evening. Further, participants wear an ECG sensor each night. Autonomic recovery is operationalized as the average HF-HRV (high frequency power of heart rate variability) during the first four hours of sleep. The hypotheses are tested using multilevel modelling (to differentiate between-person from within-person effects) controlling for daily caffeine/alcohol consumption and sports. The study is pre-registered at OSF (https://osf.io/63eut/?view_only=6d2aab50c4054201be2956d487f351af) and the current sample includes 60 participants and their partners. As data collection will continue until 1st of March 2023, we did not yet analyze the data. The study may contribute to the understanding of pathways within couples via which stress in daily life may negatively influence health.

Multiverse of datasets regarding indirectly measured emotional clarity

Charlotte **Ottenstein**, Sabrina Ecker, Dominik Vollbracht, Tanja Lischetzke

Emotional clarity is one facet of emotional awareness and represents the extent to which individuals can unambiguously identify and label their emotional experience. As an alternative to global self-reports, a response time (RT)-based measure has been proposed as a proxy for emotional clarity. The rationale is that at moments when individuals are rather clear about their affective state, they should be able to rate their affective state comparatively quickly. When preprocessing RT data for the analyses, researchers must make several decisions that result in a large number of researcher degrees of freedom. These decisions include identification of RT outliers, treatment of RT outliers, transformation of RT data to reduce skewness, aggregation across single RTs, and handling of the first item. However, selecting one of many alternatives is sometimes arbitrary. The goal of the present research was to apply a multiverse analysis approach to the RT-based assessment of momentary emotional clarity and incorporate all reasonable alternative decisions. With each of the resulting datasets, we will analyze the within-person association between indirectly measured (RT-based) momentary emotional clarity and self-reported momentary emotional clarity. Longer RT to emotion items should be related to lower self-reported emotional clarity. The ambulatory assessment study is ongoing (three weeks with four measurement occasions per day). We aim at a sample size of 320 individuals. Data will be collected between February and April. The results of the multiverse analysis will be presented and discussed in terms of the impact of data management decisions on the substantive results.

The Ecological Momentary Assessment of Wellbeing: a genetically informative study

Lianne P. **de Vries**, Meike Bartels

Feelings of wellbeing tend to fluctuate over days or weeks and across contexts. There are individual differences in these fluctuations, some people show relatively stable levels of wellbeing, while others fluctuate substantially over time and

contexts. Whereas it is known that general (survey-based) wellbeing is heritable (around 40% of the differences between people are explained by genetic differences), less is known about causes of individual differences in momentary wellbeing and wellbeing dynamics. In this study, we investigate the heritability of these aspects of wellbeing using Ecological Momentary Assessment (EMA) data in twins.
We invited a large sample of adult monozygotic (MZ) and dizygotic (DZ) twin pairs (currently n=938 participants, ongoing) to participate in an EMA study for a week. The smartphone-based EMA approach includes eight assessments of positive and negative affect, whereabouts, activities, and social interactions per day via questionnaires. Additionally, we continuously collect passive smartphone data on the (social) environment, phone use and physical activity.
This genetically informative design can lead to new insights about individual differences in wellbeing and wellbeing dynamics. In twin models, we investigate the genetic and environmental influences on momentary positive and negative affect and affect dynamics (i.e., variance, stability, and inertia) using the difference in genetic overlap of MZ twins and DZ twins. Compared to general wellbeing, we expect less genetic and more environmental influences on momentary wellbeing. In addition, we expect genetic effects on wellbeing dynamics. Note: We almost finished data collection and aim to have results soon.

14:30 Paper session 12: Methodological issues in daily diary methods (2)

Chair: Andreas Neubauer

Time: 14:30 - 16:00
Location: Expo

Self-compassion: one construct or two? Facing the construct dimensionality debate with Ecological Momentary Assessment

Ilaria **Colpizzi**

A growing body of research has questioned the nature of Self-Compassion (SC) as operationalized by the Self-Compassion Scale (SCS; Neff, 2003). The debate revolves around whether SC should be understood as a unitary construct or as a two-factor structure corresponding to the positive and the negative components of the SCS. The debate has clinical implications. According with the unitary view, treatments should be aimed at increasing positive SC, because the negative SC should decrease consequently. However, based on the two-factor view, focusing on positive SC alone, would not be sufficient. A promising method to clarify the issue, is to investigate how the 2-components evolve over time (are they autonomous or always increase/decrease inversely?). Using Ecological Momentary Assessment (EMA), the present study aimed to determine how positive and negative self-

compassion change over time related to pleasant/unpleasant events and affectivity. Over a two-months period, we gathered data from 325 participants every Saturday, 5-times a day. Our findings showed that positive and negative SC varied in response to daily life events and affectivity. Specifically, the 2-components of SC changed together in response to the events pleasantness when individuals experienced low negative affect. However, when negative affect was high, the negative component of SC remained consistently high, irrespective of context, while the positive component changed depending on the events pleasantness. Results suggest that positive and negative SC components can vary independently, depending on the circumstances. This finding contradicts the unitary view that suggests the 2-components should vary in tandem (Neff, 2022).

Daily affect as predictor of change in trait affect: Exploring the links among experiences, memories, and self-beliefs

Andreas B. **Neubauer**, Stacey B. Scott, Joshua M. Smyth

Ambulatory assessment methods have become the gold standard to capture thoughts, feelings, and experiences in individuals' daily lives. It seems reasonable to expect that everyday experiences cumulate into developmental change across the life span, yet it is still somewhat unclear, how these experiences are translated into trait-like self-beliefs. The present study tested the prediction that momentary affective experiences (assessed using experience sampling) predict changes in trait-affect across three months– but that this effect disappears once retrospective memories of these experiences are controlled for.
A sample of 206 University students completed experience sampling questionnaires (5 per day for up to 14 days) inquiring about momentary positive affect and momentary negative affect. At the end of the same days, participants reported on their retrospective positive and negative affect of the past day. Additionally, at the end of the week, retrospective assessments of positive and negative affect of the whole week were collected. Before and after the experience sampling phase, participants also reported on their trait affect.
In line with our expectations, end-of-day ratings (but not momentary affect ratings) predicted end-of-week retrospective affect. When predicting change in trait ratings, momentary affect and end-of-day affect provided highly similar information. Contrary to expectations, momentary affect was uniquely related to changes in trait affect above and beyond retrospective (end-of-week) affect. The relative importance of the different rating types (momentary, daily, weekly) was slightly different for positive and negative affect. Results suggest that momentary experiences provide meaningful information for predicting trait change – above and beyond retrospective evaluations.

Measuring Affect in Experience Sampling Studies: Implications of Measurement (Non-)Equivalence Across Time and Persons

Lisa **Peuckmann**, Malte Friese, Dorota Reis

Measuring affect is hard. We typically use only a few items per construct to reduce participant burden and aggregate them for subsequent analyses. However, a prerequisite for evaluating substantive research questions is determining whether and to what extent data aggregation is appropriate by setting up and testing the underlying measurement model. Measurement non-equivalence (MNE) over time is commonly investigated in panel data but is rarely considered in intensive longitudinal data where even two potential sources of MNE are relevant: Time and persons.
To this end, we analyzed data of the control group (n = 130 employees; MAge = 39.9; 77% female) from a large-scale measurement burst intervention study (up to 72 measurement occasions per person across 8 weeks). Negative activation (NA)–highly activated negative affective states such as anger or agitation–was assessed up to 4 times/day. We applied dynamic structural equation modeling to the data nested in time points and persons.
Notably, the between-time variance of the item intercepts and factor loadings for all items was negligible, demonstrating measurement equivalence across time. By contrast, there was substantial between-person variance of the item intercepts and factor loadings, indicating MNE across persons. Additionally, we explored potential explanatory variables for the between-person MNE.
Overall, the measure of NA used in our study was unbiased when looking at within-person processes over time. However, MNE across persons limits the meaningful interpretation of between-person comparisons. These findings underline the importance of examining MNE both over time and between persons before substantively interpreting empirical differences.

How to evaluate causal dominance hypotheses in lagged effects models

Chuenjai **Sukpan**, Rebecca M. Kuiper

The (Random Intercept) Cross-Lagged Panel Model ((RI-)CLPM) is increasingly used in psychology and related fields to assess the longitudinal relationship of two or more variables on each other. Researchers are interested in estimating the lagged effects of these variables. In addition, the question which of the lagged effects is stronger (i.e., which of the lagged effects is causally dominant) receives considerable attention as well. However, currently used methods do not allow for the evaluation of causal dominance hypotheses. This paper will show how the Generalized Order-Restricted Information Criterion Approximation (GORICA), an extension of Akaike's Information Criterion (AIC), can be used to evaluate causal dominance hypotheses. Additionally, the paper will show the performance of the GORICA in the context of causal dominance hypotheses using a simulation study. The GORICA generally has a good performance, and proofs to be an adequate method to evaluate causal dominance in lagged effects models.

The Within/Between Problem of Academia

Noémi K. **Schuurman**

When we collect data on multiple persons, we typically capture both stable differences between them, resulting in ``between-person variance'', and fluctuations within them over time, resulting in ``within-person variance''. Failing to distinguishing between the two can quickly result in drawing wrong conclusions. This “within/between problem” is an essential caveat for studies that involve multiple subjects - cross-sectional and (intensive) longitudinal.
SAA researchers are relatively often aware of this problem, and perhaps in part even started collecting intensive longitudinal data to tackle it. However, for many the problem remains obscure - or they have difficulties convincing colleagues of its importance. For example, many researchers do not realize it is problematic for studying between-person associations as well as for within-person associations; and that it is potentially possible to counter the problem with cross-sectional data.
To elucidate the problem, I have written a primer where I explain the problem and related jargon, and practical solutions to it for cross-sectional and longitudinal data. I summarize this in this presentation, and demonstrate an online application that illustrates the consequences of the problem. In the app you can play with different settings to see how it affects a) the descriptives of a single variable; b) the pairwise correlation between two variables, or c) the cross-sectional network of multiple variables that in affect each other over time. Finally, I illustrate the potential impact of the problem, by tying it to well-known issues we have with incentives & pressures in academia.

14:30 Paper session 13: Applications in emotion regulation and sleep quality research

Chair: Karen Fingerman

Time: 14:30 - 16:00
Location: Studio

Stress Related Negative Affect in Older Adults: The Role of Trait Neuroticism

Samantha S. **Corley**, Giselle Ferguson, Daisy Zavala, Stacey B. Scott

Older adults are proposed to use emotion regulation skills to respond with less negative affect (NA) after stressors. Individuals high in neuroticism, however, experience sharper increases in NA. Prior work on neuroticism and stress has used single bursts and not focused on older adults. Thus, we leveraged a measurement burst study to examine whether the relationship between stressor occurrence and NA was moderated by neuroticism among older adults. This pre-registered secondary analysis draws from a three-burst ecological momentary assessment study collected from 2017-2020 in Bronx, NY. Participants (N=305; Mage=76.98) completed trait neuroticism questionnaires. Five times daily for each 14-day burst, they reported current NA and whether a stressor had occurred since the last

assessment. Using four-level multilevel models, we found significant positive within- (momentary: B=7.09, SE=.42; day: B=5.78, SE=.37) and between-person effects of stressors (B=22.89, SE=3.36); within-persons, the burst-level effect of stressors was not significant. Reliability of the within-person coupling of momentary NA with stressor occurrence was high (=.90). Additionally, greater neuroticism was associated with significantly greater average NA on non-stressor observations (B=3.99, SE=1.04). However, neuroticism did not moderate the momentary stressor effect. Results show that individuals with greater neuroticism were not more emotionally impacted by stressors in daily life. With highly reliable estimates produced from 3 bursts in a sample of older adults, these results suggest further work is needed to examine how neuroticism interacts with stress and NA in older adults.

The Art of Savoring to Buffer against Daily Stress: Insights from an Ecological Momentary Assessment Study

Desirée Colombo, Rosa María Baños, Annet **Kleiboer**, Juana María Bretón López

Savoring entails the ability to use different emotion regulation strategies in order to "attend to, appreciate and enhance the positive experiences in one's life" (Bryant & Veroff, 2017, p. XI). Besides its positive association with happiness and well-being, the use of savoring strategies has been suggested as a powerful tool to buffer against the negative consequences of daily stress. Although there is evidence showing its beneficial effects on stress, the unique impact of different savoring strategies has not been explored so far. Furthermore, whether momentary stress influences the subsequent adoption of savoring strategies is still an open question. In the present study, a sample of 85 individuals completed a smartphone-based ecological momentary assessment to record momentary savoring and stress levels over 14 days. According to the results, the more individuals experienced momentary stress, the more they tended to enhance the use of attentional ($b=0.06$, $SE=0.02$, $p<0.01$), cognitive ($b=0.07$, $SE=0.02$, $p<0.01$) and behavioral strategies ($b=0.05$, $SE=0.02$, $p<0.05$) from this time to the next. However, only an increase in the use of attentional ($b=-0.17$, $SE=0.03$, $p<0.001$) and cognitive strategies ($b=-0.14$, $SE=0.03$, $p<0.001$) significantly decreased stress levels at the subsequent assessment. Overall, we suggest that people are likely to engage in savoring when experiencing high versus low stress as a way to decrease its negative impact, even though not all the strategies seem to be equally effective.

Optimism and emotion-regulation in daily life

Charlotte **Vrijen**, Eeske van Roekel

There is ample evidence that optimists lead happier and healthier lives than pessimists. The link between optimism and better functioning in life has often been attributed to the more adaptive coping strategies optimists use. Meta-analytic evidence suggests that optimists use more active problem-focused coping and emotion regulation strategies, less avoidance coping, and are more flexible in adjusting their coping strategies to meet contextual demands. Research so far has

focused mainly on the regulation of negative emotions and only few studies investigated whether optimism is associated with specific strategies to regulate positive emotions. The present study uses ecological momentary assessments (EMA) to examine whether, compared to less optimistic individuals, more optimistic individuals (1) use different emotion-regulation strategies to regulate their negative and positive emotions in daily life; (2) are more flexible in the emotion-regulation strategies they use in daily life; (3) are more effective in using emotion-regulation strategies in the sense that their attempts indeed result in increases of positive and decreases of negative affect and stress in daily life. Baseline data on trait optimism and EMA data on emotion-regulation, positive and negative affect, and stress will be used from an existing Dutch sample of 185 participants between 18 and 61 years old, with in total 9,263 completed momentary assessments (14 days, 5 times per day). Dynamic Structural Equation Modeling (DSEM) in Mplus 8 is used to analyse the data. Results will be discussed during my presentation.

Daily Worry, Rumination, and Sleep in Late Life

Karen **Fingerman**

Perseverative thinking, including worry and rumination, is a common response induced by stress, and can be detrimental to well-being and health especially for older adults. Sleep may represent an important mechanism by which preservative thoughts affect health. Yet, limited research has investigated links between worry and rumination and their implications for sleep in late life. This study examines the associations between older adults' everyday worry, rumination, and sleep. We leveraged the daily diary data over 5 to 6 days from the *Daily Experiences and Well-being Study* (N = 271, Mage = 73.62). Every evening, older adults reported worry and rumination they experienced that day. Every morning, they indicated how worried they were about something that might happen that day, and sleep the prior night (e.g., duration, quality, disturbances). Multilevel models showed that greater evening rumination was associated with fewer sleep disturbances. More hours of sleep, higher sleep quality, and fewer sleep disturbances were associated with less worry the next morning. Greater evening worry and rumination were both associated with greater next morning's worry, but more hours of sleep buffered the lingering of worry over the night. These results suggest that worry and rumination may tend to persist in older adults' daily life, and highlight the protective role that better sleep may play in reducing older adults' everyday perseverative thinking.

Sleep Duration and Affect in Adolescence: Ambulatory Assessment

Lucija **Šutić**, Miranda Novak

Sleep deprivation and poor sleep quality are considered transdiagnostic symptoms for various mental health problems. Studies conducted using ambulatory assessment and experience sampling method suggest that poor sleep quality predicts higher negative affect (NA) and lower positive affect (PA), while shorter sleep duration predicts inattention in adolescents. Since these research methods have rarely been used in Croatia, we aimed to investigate whether objectively

measured sleep duration predicts positive and negative affect in Croatian high school students.
In our study, 87 adolescents (63% female) with a mean age of 15 years (SD = .426) indicated how confident, optimistic, happy (measures of PA), tired, stressed, distracted, worried, and ashamed (measures of NA) they felt at the moment. They rated their affect once a day, every morning for eight consecutive days. We used the mobile app EARS, to send participants questions, but also to measure their sleep duration. More specifically, the app EARS uses data normally collected by sensors in smartphones, so wearing electronic devices for ambulatory assessment is not necessary.
The results of multilevel modeling suggest that sleep duration does not predict NA, either within or between levels. The same was found for stress and PA on the between level; however, at the within level, longer sleep duration predicts lower PA. These results suggest that sleep duration itself may not be as important for affect as sleep quality. Thus, for the promotion of mental health, it is important to further investigate the relationship between daily sleep quality and affect.

The relationship between heart rate variability, electrodermal activity and perceived stress in the context of students' daily stress events

Regina Franziska **Schmid**

Biological stress measures are often investigated in the laboratory under controlled standardized conditions with experimentally induced stress. The few ambulatory studies that include biomarkers in real-life settings are often limited to single parameters. Combined assessments with multiple physiological and psychological stress indices are rare. Therefore, the aim of the present study is to analyze naturalistic stress reactions occurring in everyday life and to examine the relationships between subjectively perceived stress, heart rate variability (HRV) and electrodermal activity (EDA). Based on psychophysiological theories, similarities are expected with respect to the coherence of the different response systems, but also differences with respect to their sensitivity and reactivity to stress events. We conducted a three-day ambulatory assessment study with 71 university students. First, students completed a general questionnaire on demographic variables and personal characteristics. On the following three days, students answered five questionnaires about the current situation (e.g., demands, resources) as well as momentary indicators of strain each day between 11 am and 6 pm. In addition, the subjects indicated by clicking on a smartphone button whenever they were confronted with a stressful situation. During the same period, subjects wore continuously recording electrocardiogram and electrodermal activity sensors. Data collection will be completed in February 2023 and data analysis in May 2023. Multilevel models will be calculated on the interrelationships of the stress indicators and on relationships with situational characteristics. The findings will provide insights into intra- and interindividual stress and regulation patterns and contribute to fundamental psychophysiological ambulatory research.

16:00 Tea break / Sponsor exhibition

Time: 16:00 - 16:15
Location: Sponsor stand / Foyer

16:15 Symposium 26: The power of ESM to support healthcare

Chair: Simone J.W. Verhagen

The Experience Sampling Method (ESM) is increasingly being used as an mHealth tool to support patients' mental wellbeing and facilitate healthcare processes. This symposium aims to inspire academics and care professionals to use ESM in their work by giving an insight in ongoing efforts to leverage its potential. ESM in healthcare is presented from different angles, showcasing its promises to support health and wellbeing:
We are now able to provide individuals with feedback on daily life functioning. The first presentation by Dr Bartels will provide an overview of current research with a focus on the Belgium-Dutch Experience Sampling network, and ESM experts reflecting on their experiences. Then, Dr Verhagen will present a practical guide for clinicians on how to implement ESM in day-to-day care. To illustrate its applicability further, results from a single-case time series study are presented by Dr Simons, in which ESM is used to facilitate personalized doze reduction of antipsychotic medication. This talk is followed by insights from a blended care intervention for people suffering from fatigue after acquired brain injury, presented by Dr Lenaert. Cognition is another aspect that is often impacted in patients with acquired brain injury. Last, the utility of ESM in healthcare is discussed through a study about the wellbeing of professional caregivers (Prof Delespaul), ultimately impacting the wellbeing of patients as well.

Time: 16:15 - 17:15
Location: Grote Zaal (Main Theatre)

Feedback based on experience sampling data: Examples of current research approaches and considerations for future studies

Sara Laureen **Bartels**, Catherine van Zelst, Bernardo Moura, Naomi E.M. Daniëls, Claudia J.P. Simons, Machteld Marcelis, Fionneke M. Bos, & Michelle Servaas

Methodologies such as the Experience Sampling Method (ESM) or Ecological Momentary Assessment allow to gather fine-graded, dynamic, personal data within a patient's everyday life. It is currently studied whether feedback based on experience sampling data (ESM-based feedback) can be used as a clinical tool to inform shared decision-making in clinical practice. Although the potential of feedback is recognized, little is known on how to generate, use, and implement it. This article (i)

presents n=15 ongoing ESM projects within the Belgian-Dutch network for ESM research wherein ESM-based feedback is provided to various patient populations, and (ii) summarizes experiences with ESM-based feedback of researchers (n=8, qualitative data) with extensive expertise using the ESM (average of 10 years) involved in these ongoing studies. The following aspects appear to be of relevance when providing ESM-based feedback: training for healthcare professionals and researchers, the use of online interfaces and graphical visualizations to present data, and interacting with patients in a face-to-face setting when discussing the contextual relevance and potential implications. Prospectively, research may build on these aspects and create coherent guidelines for the use of ESM-based feedback.

How to use experience-sampling technology to understand daily functioning: A practical guide for mental health professionals

Simone J.W. **Verhagen**, Naomi E.M. Daniëls, Marloes van Bokhoven, Anna J. Beurskens, Philippe A.E.G. Delespaul

Satisfying daily life functioning is essential in mental healthcare. Standard assessments focus on symptoms and are designed to detect underlying vulnerabilities. However, they offer insufficient insight into patterns of contextual variability and resilience. Consequently, interventions are planned using incomplete information. The experience-sampling method (ESM) is a structured moment-to-moment diary assessing the individual's affect, thoughts, perception and behaviour in the daily life context. ESM helps to understand variation in mental states (e.g., anxiety or sleeping problems) as adaptational processes in relation to contextual challenges (functional analysis). Although ESM has been extensively studied across psychological disorders, the adoption by mental health professionals and their patients remains limited because the ‘how to’ is unclear. This paper presents a practical guide for ESM application in routine clinical care. It integrates empirical knowledge with expert experiences and provides real-world examples and recommendations for successful implementation. The guide comprises how to engage and motivate patients and how to customize assessments to the patient's needs. It also includes instructions to interpret results and create an atmosphere of shared decision-making. Experience-sampling technology has merits for patients with various mental health complaints and across healthcare settings, although the exact use and implementation may vary depending on the individual case.

Single-case time series studies on changes after antipsychotic dose reduction: facilitating personalized dose optimization

Claudia **Simons**, Priscilla Oomen, Machteld Marcelis

Personalized dose-optimisation is predicated on the assumption that the average appropriate dose is not necessarily the optimal dose for the individual. Therefore, n=1 trials to self-manage functional outcome by titrating dose changes are necessary. Based on multiple N=1 trials, we will investigate whether intensive longitudinal monitoring based on the experience sampling method (ESM) can be used to evaluate the consequences of dose reduction of antipsychotics by detecting

meaningful within-subject changes in daily life mental states that occur during and after dose reduction. The study consists of single-case trials in participants with a psychotic disorder, aged 16-65, who are in stable remission and who have an indication to reduce the dose of or discontinue their antipsychotic medication. Patients undergo a gradual dose reduction under a longitudinal self-monitoring paradigm, including a two-week baseline and two-week post-dose reduction period, accompanied by regular clinical monitoring. Patients use an ESM app to monitor changes in momentary psychotic experiences, subjective wellbeing, social functioning, cognition, sleep, dopamine super-sensitivity, and negative symptoms. Every (other) week, researcher and patient discuss the visual depiction of the ESM data via an online portal. The present study investigates the data on symptoms, well-being (including affective experiences), and social functioning by plotting the data over time and running time-series linear regression models to detect a change in overall level from one phase to the next.

Moe-i-teloos (Tied by tiredness): a blended care intervention for fatigue after acquired brain injury

Tom Smejka, Bert **Lenaert**

Fatigue is one of the most common symptoms after acquired brain injury - including traumatic brain injury and stroke - and has been associated with lower quality of life and poorer neurological recovery. Although transient in nature for some, fatigue becomes a chronic health complaint for many individuals with brain injury. Despite its high prevalence and impact, effective evidence-based interventions for fatigue in this population are scarce. We recently developed the blended care intervention 'Moe-i-teloos' (Tied by Tiredeness) aimed at reducing fatigue after mild to moderate brain injury. Moe-i-teloos consists of a six-week protocol combining mHealth technology with face-to-face feedback sessions with a therapist. Our intervention is based on the Experience Sampling Method, which consists of repeatedly measuring experiences, behavior and contextual information in the flow of daily life. Using a smartphone app, participants keep track of their fatigue, mood and behavior (e.g., physical and mental effort) during three days each week of the intervention. At the end of every week, participants receive personalized and visually intuitive feedback on their own data from their treating therapist. The resulting insights in individual fatigue patterns and related factors are then used to make personalized treatment choices, which are implemented and evaluated on a weekly basis. We will present data from a recent pilot study of this intervention and describe the design of our upcoming controlled trial.

Sustainable Care and the use of ESM

Philippe **Delespaul**, Koen Westen
In the literature on care evaluation and sustainability the tripe, quadruple, and quintuple aim (Itchhaporia, 2021) models are important references. Original criteria aimed to improve patient experience, care outcome and lower costs. In 2014 clinician well-being was introduced for sustainable care. In times professional

scarcity, better understanding the stress and workload of professionals, might help us to minimize the brain drain that threatens the future of care.
We used ESM to study the professional routines, work satisfaction and work-related stress in ambulatory care for people with severe mental illness (Westen e.a., 2022). Direct face-to-face contact with patients was limited and support of peers and the patient's network even more problematic. Activity related stress is high for administrative tasks.
Csikszentmihalyi's pioneering work on flow (1991) showed that optimal experiences (and health) are achieved with the right balance of challenge in work, when this is matched with adequate skill levels. More studies are needed to better understand work satisfaction and to optimize routines within the natural flow and routines of care professionals.

- Csikszentmihalyi, M. (1991). Flow. The Psychology of Optimal Experience. Steps Toward Enhancing the Quality of Life. Harper Perennial.
- Itchhaporia, D. (2021). The Evolution of the Quintuple Aim: Health Equity, Health Outcomes, and the Economy. J Am Coll Cardiol, 78(22), 2262-2264.
- Westen, K. H., Peeters, P., Landers, S., Kroon, H., & Delespaul, P. (2022). [Daily practice of a FACT-team: results of an experience sampling study]. Tijdschr Psychiatr, 64(6), 348-352.

16:15 Symposium 27: Operationalizing resilience to daily-life stressors using experience sampling methodology

Chair: Thomas Vaessen

Time: 16:15 - 17:15
Location: IJ Zaal

Delayed affective recovery to daily-life stressors signals a risk for depression

Joana De Calheiros Velozo, Ginette Lafit, Wolfgang Viechtbauer, Therese van Amelsvoort, Koen Schruers, Machteld Marcelis, Liesbeth Goossens, Claudia Simons, Philippe Delespaul, Stephan Claes, Inez Myin-Germeys, Thomas **Vaessen**

The aim of this study was to investigate the time to affective recovery from daily-life stressors between healthy controls and two groups with an increased risk for developing depression. The experience sampling method (ESM) was used to measure affective recovery to daily-life stressors. Affective recovery was defined as the moment that negative affect (NA) returned to baseline level following the first stressful event of the day. We assessed two different operationalizations of the baseline: NA at the moment before the stressful event (t-1), and mean-person NA. The effect of stress intensity, and cumulative stress were also assessed. Survival analyses showed significantly longer recovery times for the at-risk groups in comparison to healthy individuals, with no significant difference between the two at risk groups. There was also an effect of cumulative stress, but not stress intensity

on time to recovery in that cumulative stress resulted in significantly longer recovery times for all three groups. Individuals at risk for depression display a delayed recovery to daily-life stressors when compared to healthy controls, which is not explained by differences in stress intensity or cumulative stress. Understanding what is driving this delay may help understand the development of depression.

Individual bidirectional associations between stressfulness of events and negative affect in daily life as indicators of mental health: an experience sampling study

Jannis **Kraiss**, Thomas Vaessen, Peter M. ten Klooster

There is growing evidence that micro-dynamics occurring in daily life underlie the development of psychopathology. Previous studies examined such dynamics in the context of stressful events and affect, but little is known about the bidirectional association of stressful events and affect, if there are individual differences in these associations and if this idiographic information is a valid indicator for mental health and resilience. Based on a bivariate cross-lagged vector autoregressive model including perceived stressfulness of events and negative affect (NA), this study therefore aimed to model individual cross-lagged and autoregressive association and show that they are indicative for mental health and resilience. We used experience sampling to assess stressfulness of events and NA four times per day for two weeks in a convenience sample (N=70). Dynamic structural equation modeling was applied to model individual autoregressive and cross-lagged slopes. Individual associations showed substantial variability and were significantly related with trait measures of depression, anxiety, well-being, perceived stress, emotion regulation, and resilience. Interestingly, more positive cross-lagged associations from stressfulness to NA were related with favorable mental health. These findings increase our understanding of complex individual processes underlying mental health, highlight the importance of idiographic research, and indicate that stressfulness and NA should be studied bidirectionally.

Dynamic indicators of physical resilience in vital signs of patients with COVID-19

A.**Kuranova**, J.L.Rector, Sanne H. Booi, S.J.H.Bredie, A. J. Oldehinkel, G.Peeters, B. F. Jeronimus, J. T.W. Wigman, R. J. F. Melis

In complex systems theory, resilience refers to the ability of the system to maintain the current state and recover quickly after perturbations. Lately, the complex systems understanding of resilience has been widely embraced in healthcare research, with the resilience of the "healthy" state indicating the organism's ability to maintain health or current level of symptoms and recover from adversities. Measuring such resilience is highly relevant, as the level of resilience reflects the system and may offer predictions above and beyond measurements based on the symptoms' quantity and severity.
However, despite the popularity of resilience research, there has yet to be a

consensus on operationalization and indicators of health resilience. Moreover, based on the similar theoretical background, these indicators vary greatly between medical fields.
Here, we used the complex systems understanding of resilience applied to the mental health resilience of patients with psychotic experiences and the physical resilience of older patients with COVID-19. We will highlight the differences and similarities between approaches based on the nature of disorders, available data, and signals. We will discuss our methods and results in light of the potential benefits and limitations of using such measures of resilience in research and, in the future, in clinical practice.

Investigating convergent and construct validity of operationalizations of momentary resilience using Ecological Momentary Assessment in a transdiagnostic sample of youth with early mental health problems

Emma Wilson, Isabell Paetzold, Christian Rauschenberg, Dusan Hirjak, Tobias Banaschewski, Andreas Meyer-Lindenberg, Jan R. Boehnke, Benjamin Boecking, Ulrich Reininghaus, Anita **Schick**

As psychological distress is currently increasing, it is essential to investigate transdiagnostic mechanisms that may be targeted by digital interventions to promote public mental health. Momentary resilience may be such a mechanism, however different operationalisations exist. This study aimed to explore the convergent and concurrent validity of three measures of momentary resilience in a transdiagnostic sample.
Using Ecological Momentary Assessment (EMA), event-related stress, recovery from stress as well as positive and negative affect were assessed 8 times a day over a 6-day period. Resilience, psychopathology and quality of life were assessed in 92 youths aged 14-25 years at three clinical stages of early mental health problems. Multilevel analyses were used to investigate associations between momentary measures (i.e., resilience item, positive and negative affective recovery) and i) questionnaire measures of resilience, psychopathology and quality of life, and ii) the magnitude of affective recovery across stages.
Results suggest promise for an operationalisation of momentary resilience, which may better capture the dynamic nature of resilience over time.

17:15 Thank you and Farewell

Time 17:15 - 17:30
Location: Grote Zaal (Main Theatre)

Thursday June 8, 2023

Post-conference SAA WORKSHOPS

On the Thursday after the conference, three state-of-the-art workshops on central SAA topics are organized at the **Vrije University Campus**, located next to the vibrant South-axis district. The workshops take place in the NU building of the Vrije University, rooms NU-3A65 and NU-3A67.

The focus of these workshops will center around the more practical side of ambulatory assessment research. The workshops cover a broad range of topics, including Open Science Framework conform preregistration, a primer on advanced statistical power analysis for EMA studies, and hands-on experience in prolonged (multi-day, multi-week) wearable recording and signal processing of the combined Impedance CardioGram (ICG) and ElectroCardioGram(ECG).

We will break for tea and coffee. Lunch can be enjoyed at the nearby student refectory at your own costs.

9:00 Sample size planning for intensive longitudinal studies

Ginette Lafit, Jordan Revol, Mihai A. Constantin, Eva Ceulemans

In recent years the popularity of procedures to collect intensive longitudinal data such as the Experience Sampling Method has increased immensely. The data collected using such designs allow researchers to study the dynamics of psychological processes, and how these dynamics differ across individuals. A fundamental question when designing a study is how to determine the sample size, which is closely related to the replicability and generalizability of empirical findings. Even though multiple statistical guidelines are available for sample size planning, it still remains a demanding enterprise in complex designs. The goal of this workshop is to address this crucial question by presenting methodological advances for sample size planning for intensive longitudinal designs. First, we provide an overview of methods for sample size planning with special emphasis on a priori power analysis. Second, we focus on how to conduct power analysis in the N=1 case when the goal is to model within-person processes using VAR(1) models. Subsequently, we consider the extension to multilevel data in which multiple individuals are measured over time. We introduce an approach for conducting power analysis for multilevel models that explicitly accounts for the temporal dependencies that characterize the data collected in intensive longitudinal studies. In addition, we showcase how to perform power analysis for these models using a user-friendly and open-source application. Finally, we consider an alternative criterion for conducting sample size planning that targets the predictive

accuracy of a model for unseen data. Focusing on VAR(1) models in an N=1 context, we introduce a novel approach, called predictive accuracy analysis, to assess how many measurement occasions are required in order to optimise predictive accuracy.

Time: 09:00 – 12:30 (midway break for coffee and tea)
Location: NU-3A65

9:00 Ambulatory recording of the impedance cardiogram to index autonomic activity in daily life

Martin Gevonden, Sjors van de Ven, Nicole Huizinga

Impedance cardiography (ICG) is a non-invasive measurement technique that can be used to record respiration, and the pumping action and blood flow from the heart. These signals, combined with the electrocardiogram (ECG), allow for separate and simultaneous indexing of the sympathetic (SNS) and parasympathetic (PNS) branches of the autonomic nervous system. The pre-ejection period (PEP) and peak-valley Respiratory Sinus Arrhythmia (RSA), both ICG+ECG derived measures, are the cleanest non-invasive measures of SNS and PNS activity available, and allow for more detailed study of the physiological stress response than measuring only heart rate with ECG or pulse plethysmography. Additional ICG-derived parameters of interest relevant to ambulatory studies include respiratory frequency and cardiac output.
Two well-validated and widely used wearable impedance cardiography systems are currently on the market and accessible for ambulatory research, the Mindware Mobile (MWM) and the VU-Ambulatory Monitoring System (VU-AMS). Both systems have an associated software package for data cleaning, scoring, and analysis. In the current workshop, we aim to give participants interested in integrating the method into their studies an overview of the workflow for an ambulatory experiment involving ICG.
First we will give a brief introduction in the underlying autonomic and cardiac physiology, why it is relevant to measure, and how it is captured using ICG. Then we will demonstrate how to record with both the MWM and VU-AMS systems, while addressing practicalities and discussing research design. Finally participants will be guided through the process of cleaning, scoring, and analysing ICG data, in a hands-on practical using pre-recorded data on their own computer. By the end of the workshop, participants should be able to make an informed decision on whether ICG could enrich their research practice and how they could practically implement it in their studies.

Time: 09:00 – 12:30 (midway break for coffee and tea)
Location: NU-3A67

13:30 Getting started with pre- and post-registration of Experience Sampling Method studies

Olivia J. Kirtley, Julie J. Janssens

Against the backdrop of the replicability crisis in psychological science, increasing numbers of researchers are adopting open science practices to increase transparency, reproducibility, and replicability of scientific research. Preregistration is an open science practice in which researchers create a locked, uneditable, time-stamped record of a study's hypotheses, research questions, and analysis plan, before collecting data. More recently, the concept of registration has been broadened to include 'post-registration', to accommodate registration of research using pre-existing data. But where should ESM researchers start with learning how to pre- and post-register their studies, and what are the opportunities and challenges of working with study registration? In this workshop, we offer a gentle, hands-on introduction to study registration using the registration template and tutorial for ESM research as our guide. We will cover key considerations for registering studies prior to and after data collection, including which platforms to use for registration, and how to work with the Registered Reports article format, an advanced form of preregistration. Registration is a scientific skill and like any other scientific skill takes time and guidance to learn, therefore, we will also provide practical advice for researchers about how to overcome common challenges with study registration. The workshop is open to researchers from all areas within the ambulatory assessment field and to researchers at all career stages, from masters students to principal investigators. No prior experience with pre- or post-registration is necessary to participate in the workshop. Attendees will require a laptop.

Time: 13:30 – 17:00 (midway break for coffee and tea)
Location: NU-3A65