

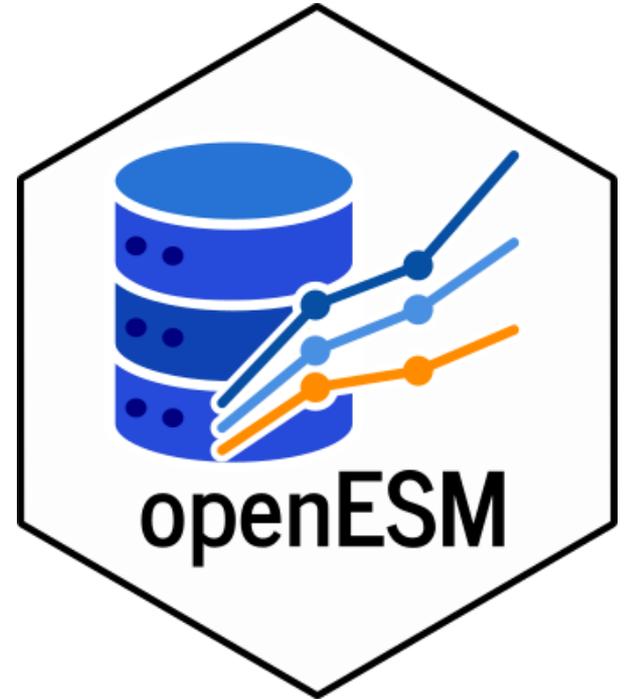


Marburg
University

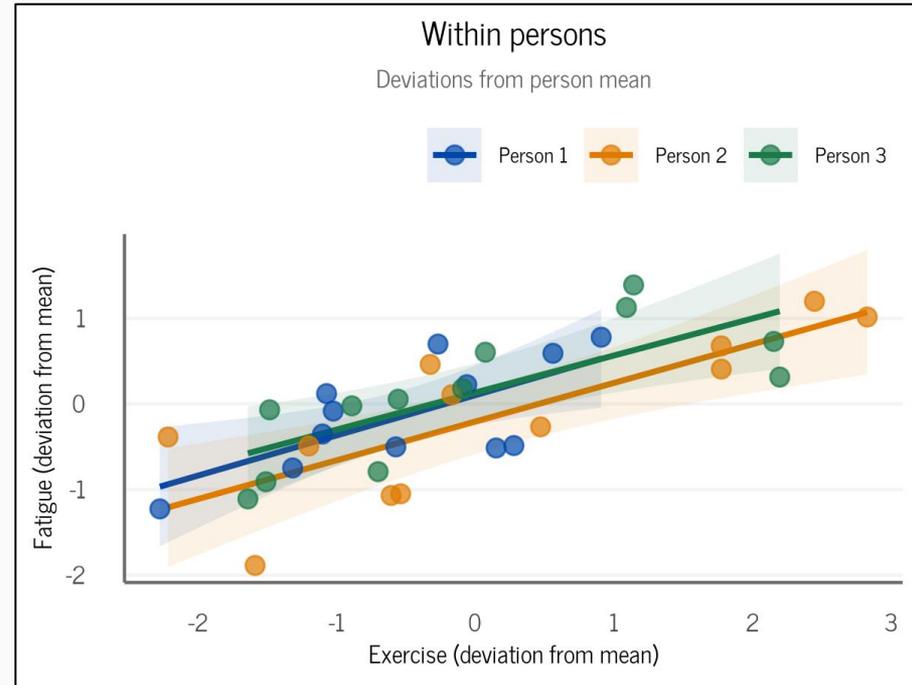
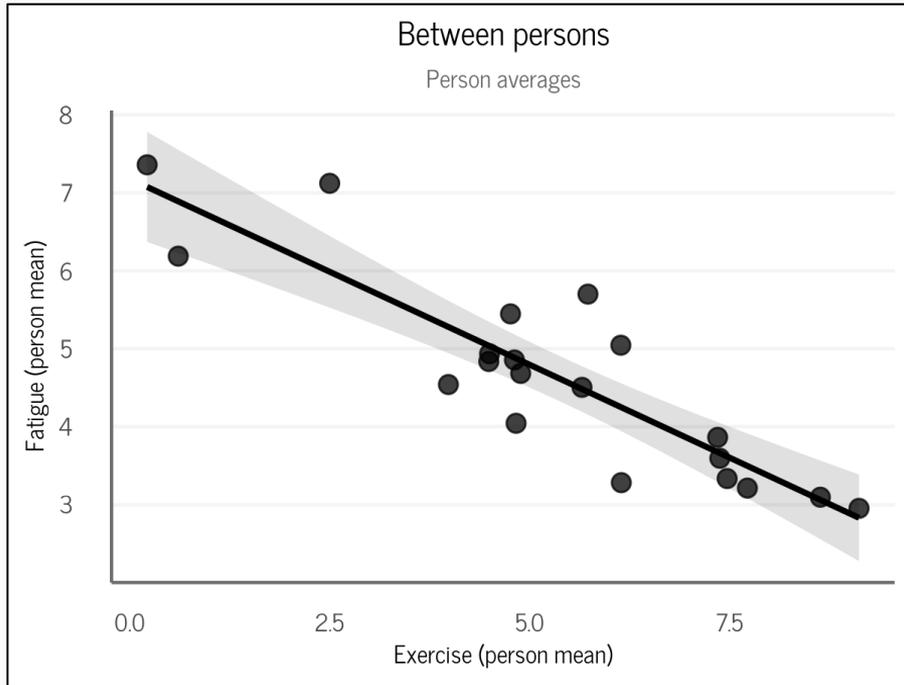
Introducing openESM

NTU Seminar Talk · March 2026

Björn Siepe Department of Psychology, Marburg University



Why Time Series Data?

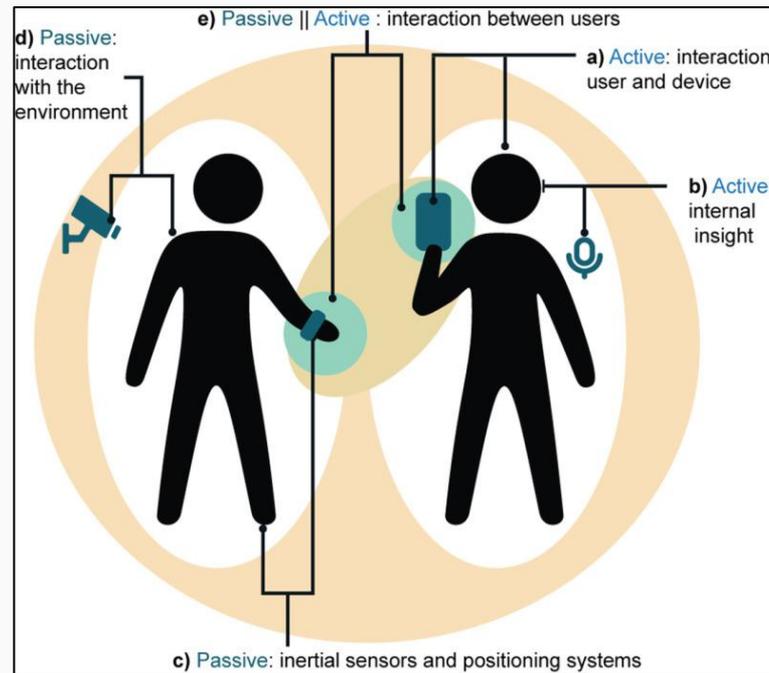


Experience Sampling Data

“Active” self-report data



“Passive” sensor data





Biological Psychiatry: Cognitive Neuroscience
and Neuroimaging

Volume 8, Issue 8, August 2023, Pages 841-851



Archival Report

Accurate Prediction of Momentary Cognition From Intensive Longitudinal Data

Zoë W. Hawks ^{a b}  , Roger Strong ^{a b}, Laneé Jung ^a, Emorie D. Beck ^c, Eliza J. Passell ^a,
Elizabeth Grinspoon ^a, Shifali Singh ^{a b}, Madelyn R. Frumkin ^d, Martin Sliwinski ^e, Laura T. Germine
^{a b}

Moments that Matter? On the Complexity of using Triggers Based on Skin Conductance to Sample Arousing Events within an
Experience Sampling Framework

[Sjoerd van Halem](#) , [Eeske van Roekel](#), [...], and [Jaap Denissen](#)  [View all authors and affiliations](#)

[Volume 34, Issue 5](#) | <https://doi.org/10.1002/per.2252>

Article | [Open access](#) | Published: 15 October 2024

Everyday helping is associated with enhanced mood but greater stress when it is more effortful

[Ekaterina Pronizius](#), [Paul A. G. Forbes](#), [Anja C. Feneberg](#), [Bianca Miculescu](#), [Urs M. Nater](#), [Giulio Piperno](#),
[Giorgia Silani](#), [Ana Stijovic](#) & [Claus Lamm](#) 

[Scientific Reports](#) **14**, Article number: 24120 (2024) | [Cite this article](#)

Workplace Stress in Real Time

Three Parsimonious Scales for the Experience Sampling Measurement of Stressors and Strain at Work

Luca Menghini , Massimiliano Pastore und Cristian Balducci

JOURNAL ARTICLE

A Little Autonomy Support Goes a Long Way: Daily Autonomy-Supportive Parenting, Child Well-Being, Parental Need Fulfillment, and Change in Child, Family, and Parent Adjustment Across the Adaptation to the COVID-19 Pandemic

Andreas B Neubauer , Andrea Schmidt, Andrea C Kramer, Florian Schmiedek
Author Notes

Child Development, Volume 92, Issue 5, September/October 2021, Pages 1679–1697,
<https://doi.org/10.1111/cdev.13515>

Published: 27 September 2021

Mobile Health Daily Life Monitoring for Parkinson Disease: Development and Validation of Ecological Momentary Assessments

[Jeroen Habets¹](#) ; [Margot Heijmans¹](#) ; [Christian Herff¹](#) ; [Claudia Simons^{2,3}](#) ;
[Albert FG Leentjens²](#) ; [Yasin Temel¹](#) ; [Mark Kuij⁴](#) ; [Pieter Kubben^{1,5}](#) 



Body Image

Volume 35, December 2020, Pages 181-191



Body Positivity (#BoPo) in everyday life: An ecological momentary assessment study showing potential benefits to individuals' body image and emotional wellbeing

[Alicia Stevens](#), [Scott Griffiths](#)  

Pooled and person-specific machine learning models for predicting future alcohol consumption, craving, and wanting to drink: A demonstration of parallel utility.

©REQUEST PERMISSIONS

Soyster, P. D., Ashlock, L., & Fisher, A. J. (2022). Pooled and person-specific machine learning models for predicting future alcohol consumption, craving, and wanting to drink: A demonstration of parallel utility. *Psychology of Addictive Behaviors*, 36(3), 296–306. <https://doi.org/10.1037/adb0000666>

What does a typical ESM study look like?



How many individuals?

136.6

participants on average



How many timepoints?

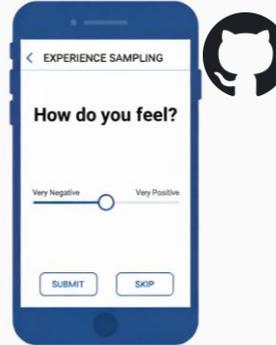
51.51

observations per person

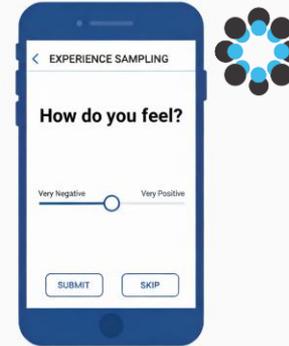
What if we could use data from multiple studies?



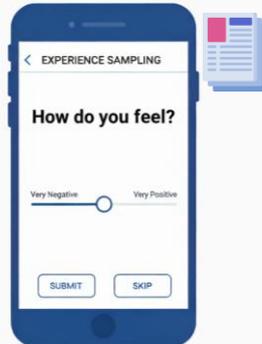
N = 150
Affect



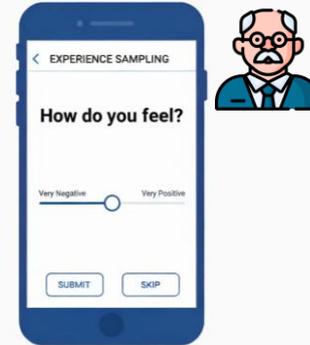
N = 79
Personality



N = 243
Depression



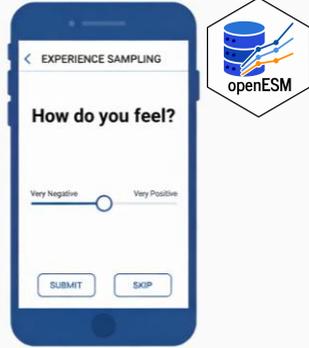
N = 104
Life Events



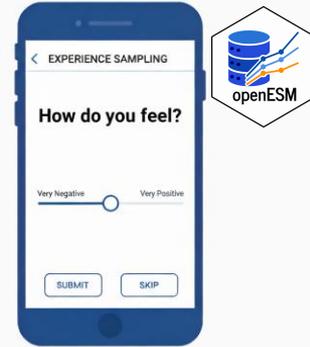
N = 150
Work Stress



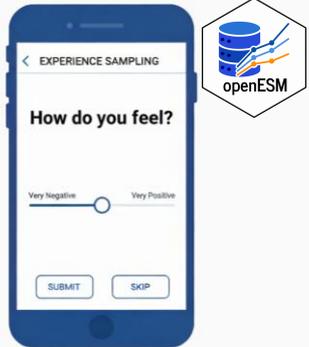
N = 150
Affect



N = 79
Personality



N = 243
Depression



N = 104
Life Events



N = 150
Work Stress

Introducing openESM

60 datasets · 16,000 participants · 740,000 observations

 and  packages for easier access



Substantive Research

Test theories across
contexts



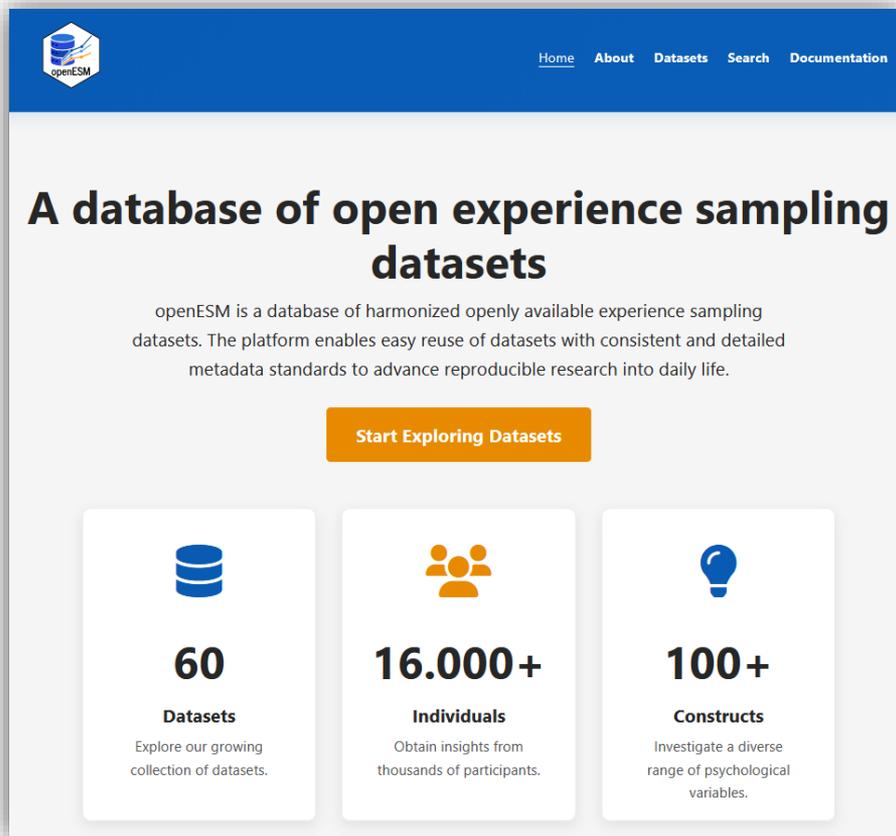
Design Research

Improve measurement
choices



Statistical Methods

Benchmark and develop
methods



The screenshot shows the homepage of the openESM website. At the top left is the openESM logo, and at the top right are navigation links for Home, About, Datasets, Search, and Documentation. The main heading is "A database of open experience sampling datasets". Below this is a descriptive paragraph about the platform's purpose. A prominent orange button labeled "Start Exploring Datasets" is centered. The lower section features three white cards with icons and statistics: a database icon for "60 Datasets", a group of people icon for "16.000+ Individuals", and a lightbulb icon for "100+ Constructs". Each card includes a brief description of the data.

openESM

[Home](#) [About](#) [Datasets](#) [Search](#) [Documentation](#)

A database of open experience sampling datasets

openESM is a database of harmonized openly available experience sampling datasets. The platform enables easy reuse of datasets with consistent and detailed metadata standards to advance reproducible research into daily life.

[Start Exploring Datasets](#)

 60 Datasets Explore our growing collection of datasets.	 16.000+ Individuals Obtain insights from thousands of participants.	 100+ Constructs Investigate a diverse range of psychological variables.
--	---	--

Live Demo



```
● ● ●  
  
# install and load package  
install.packages("openesm")  
library(openesm)  
  
# get overview over data  
list_datasets()  
  
# download specific datasets  
df_lists <- get_dataset(c("0001", "0004"))  
  
# get citation  
cite(df_lists[[1]])  
  
# get additional notes  
notes(df_lists[[1]])
```



```
● ● ●  
  
# install and load package  
pip install openesm  
import openesm  
  
# get overview over data  
openesm.list_datasets()  
  
# download specific datasets  
df_lists = openesm.get_dataset(["0001",  
                                "0004"])  
  
# citation for first dataset  
print(df_lists[0].cite())  
  
# additional notes  
print(df_lists[0].notes())
```



1. Cleaning

Harmonized NAs, removed
redundant columns

E.g., standardized ID, beep, day



2. Harmonization

Same variable names for
same questions

E.g., "depressed" across datasets

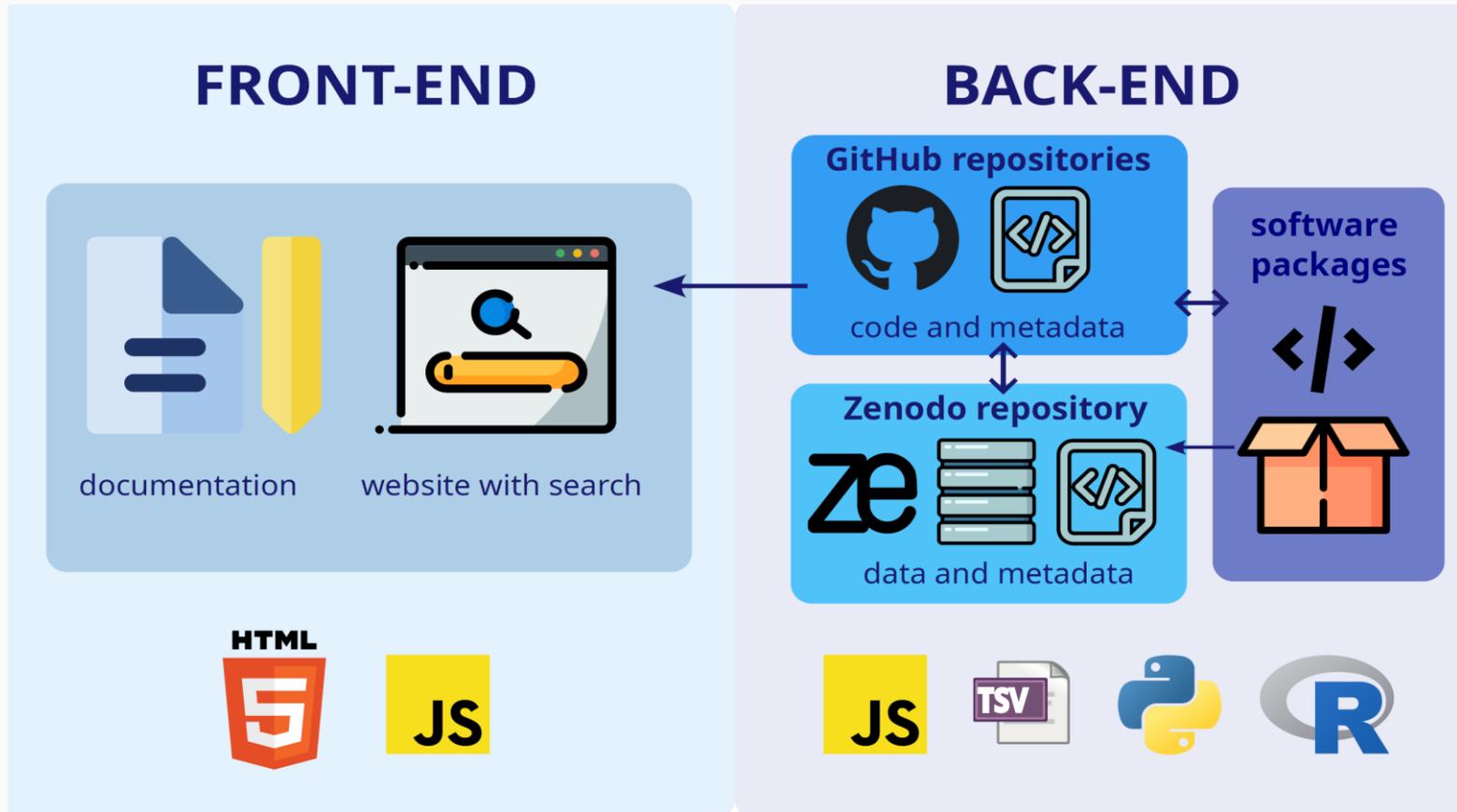


3. Annotation

Hierarchical construct tags
for each item

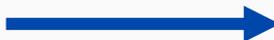
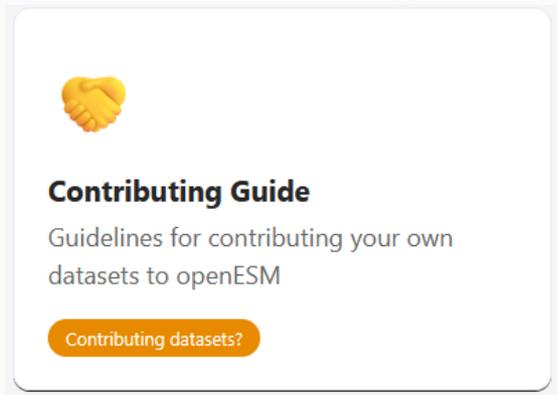
*E.g., "angry" → anger, negative
affect, affect*

Architecture



Contributing Data

1. Read Contributing Guide



2. Open GitHub Issue

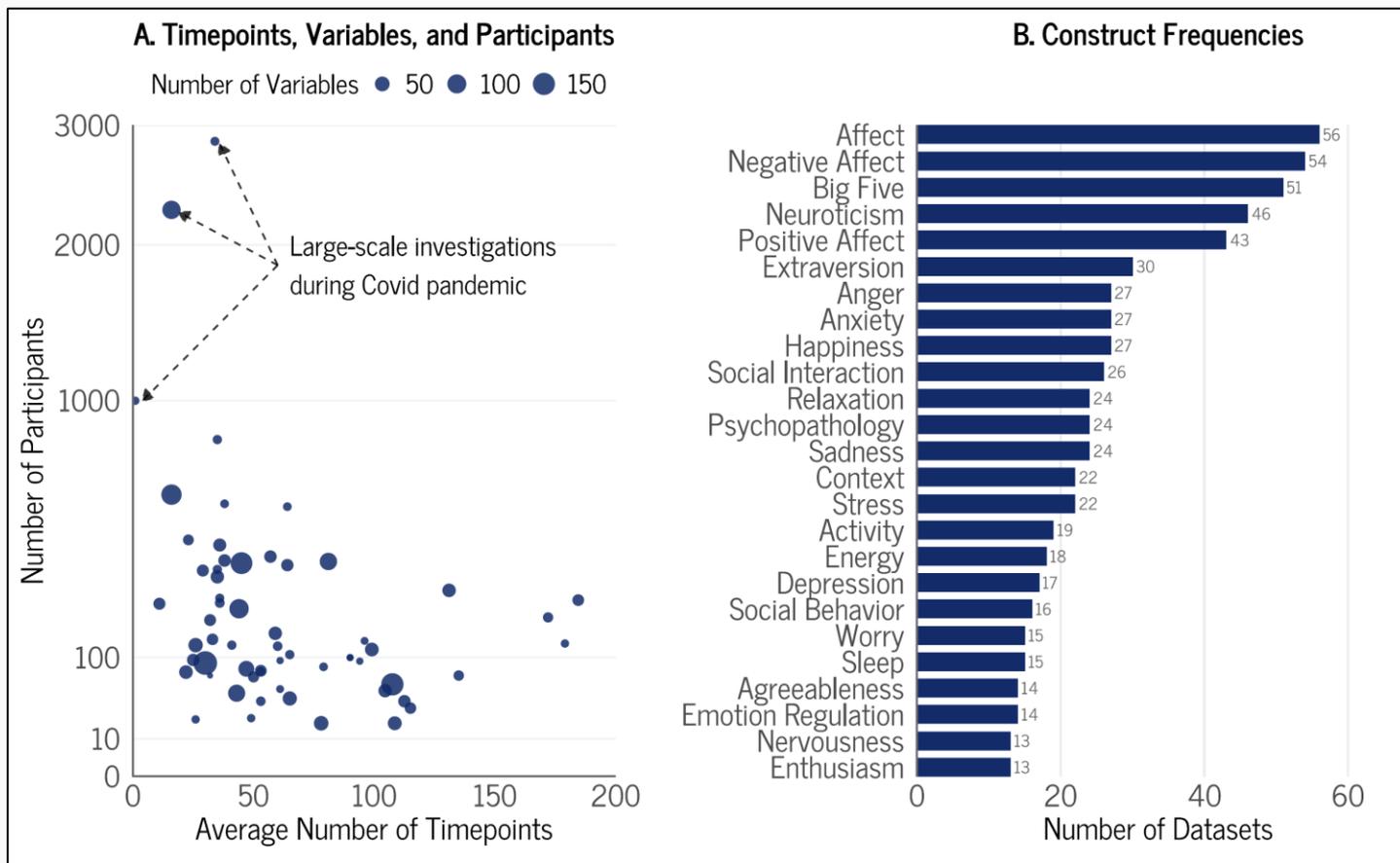


Example:

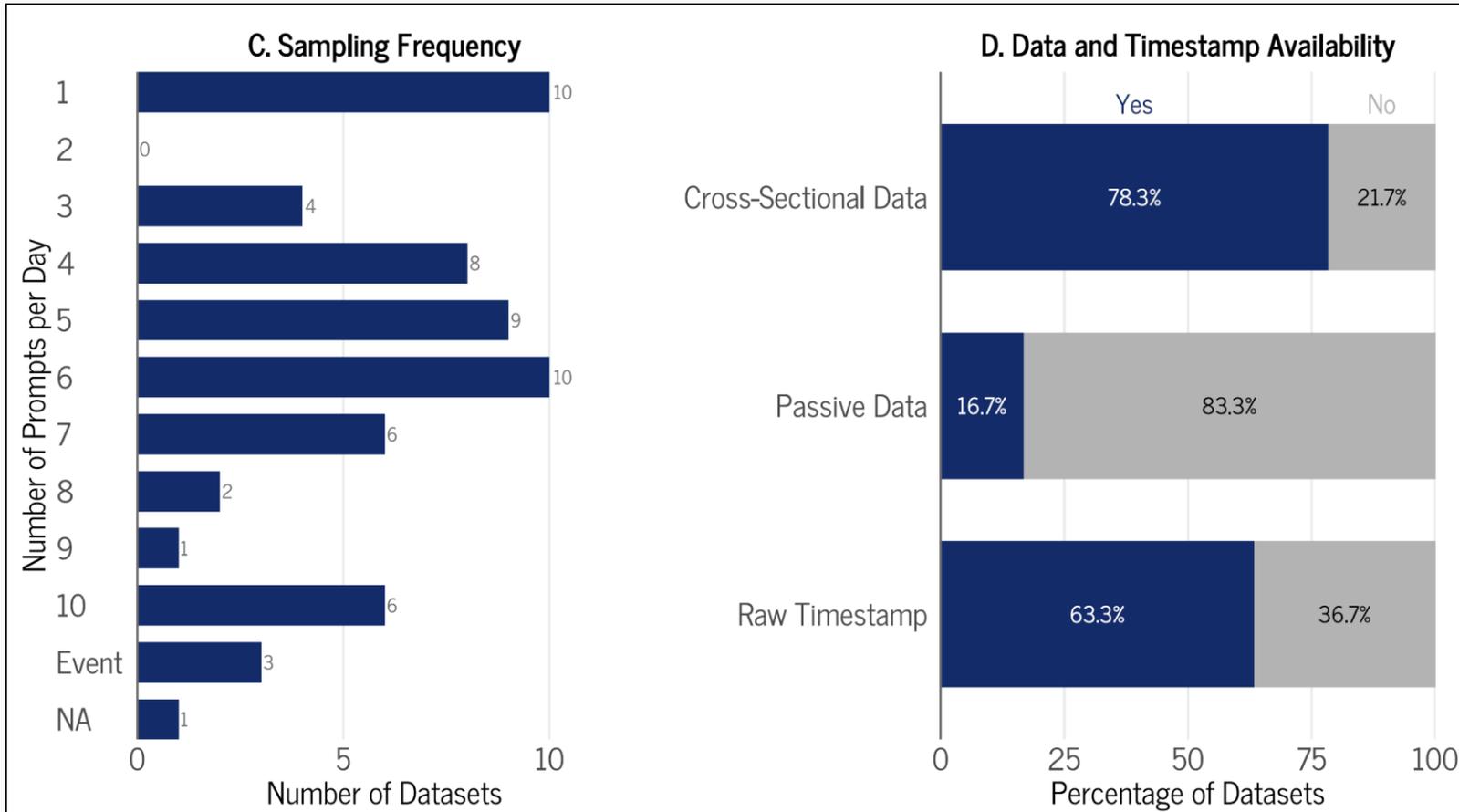
Proposal to Contribute 30-Day Gaming and Well-Being Daily Diary Dataset (n=443 with 20+ completions) #2

Open

What's inside



What's inside



Example Analysis

RESEARCH QUESTION

Does high positive affect co-occur with low negative affect within persons?

DATA



39 datasets · 8,456 individuals · ~529K observations

HETEROGENEITY



How strongly do participants differ?
How much does the effect vary across samples?

ANALYSIS



Within-person momentary correlations: multi-level meta-analysis quantifying effect size and between-person / between-sample heterogeneity
Additional sensitivity analyses

Example Analysis



Pooled $r = -0.49$
[95% CI: -0.54, -0.42]

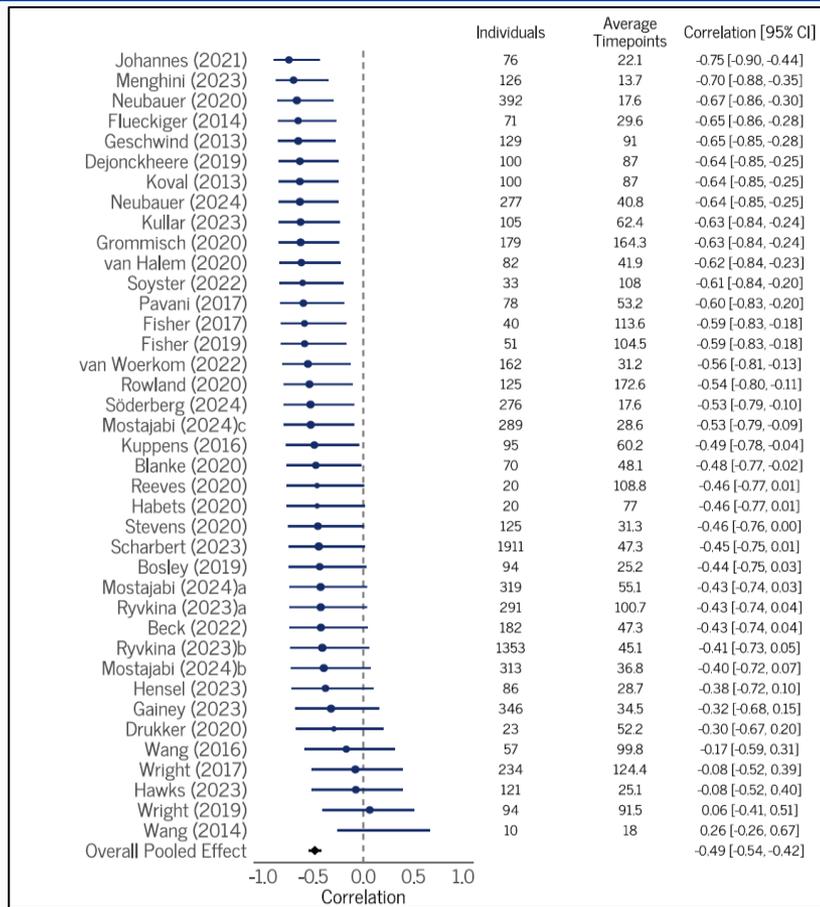
- Considerable heterogeneity across participants and samples



More prompts/day → stronger negative correlation



Stable across 12 preprocessing and modeling choices



Next Steps



Community

Involve researchers,
expand data diversity



Data & Metadata

Extend coverage and
documentation



Software

Add benchmarking and
filtering tools

Goal: Turn openESM into a continuously evolving community resource for cumulative ESM research

Collaborators



Anabel Büchner



Eiko Fried



Yong Zhang



Matthias Kloft



Daniel Heck



Jonas Haslbeck

Thank You!



<https://openesmdata.org>



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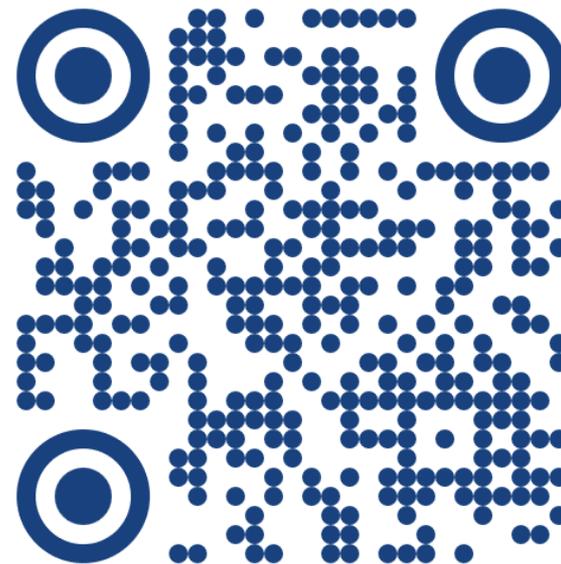


<https://bsiepe.github.io>



bsiepe.bsky.social

Slides & Preprint



References

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Mondragón-González, S.L., Burguière, E., N'diaye, K. (2023). Mobile Devices, Connected Objects, and Sensors. In: Colliot, O. (eds) Machine Learning for Brain Disorders. Neuromethods, vol 197. Humana, New York, NY.

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<https://doi.org/10.1177/10731911211067538>

Resources

- All icons either from PowerPoint or fontawesome
 - <https://fontawesome.com/icons/bluesky>
- Python Software Foundation. (n.d.). *The Python logo*. <https://www.python.org/community/logos/> (PSF Trademark Policy)
- R Foundation for Statistical Computing. (2016). *R logo*. <https://www.r-project.org/logo/> (CC-BY SA 4.0)