KU Leuven Open Science Day

With great responsibility comes great power: Overcoming methodological challenges for conducting power analysis in intensive longitudinal research

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Abstract

In recent years, psychology research has been increasingly focused on understanding how individuals' complex psychological process evolves in daily life. To study these dynamics, researchers collect ecologically valid intensive longitudinal data. In an intensive longitudinal design, individuals are repeatedly assessed many times a day over a period of time. Even though these methods are very popular, they do not escape the criticisms derived from the replication crisis in psychology. It was only until recently that there has been an increasing interest in how to make intensive longitudinal research more transparent and reproducible.

In this sense, my research is focused on addressing methodological pitfalls in the implementation of open science practices in intensive longitudinal research. In particular, on developing statistical methods to conduct rigorous sample size planning.

A crucial step when planning a scientific study is to select the sample size that would allow researchers to derive informative conclusions. For researchers interested in rigorously testing a hypothesis, a criterion to choose the necessary sample size is statistical power. High power is desirable because it hinders gross overestimation of the effect-size and, thereby, improves the replicability of research findings. Even though power analysis remains the gold standard for selecting the sample size in many research areas, it has not been well established in complex study designs, such as intensive longitudinal research. As an unfortunate consequence most published, empirical longitudinal studies do not report on any statistical power analysis to justify the used sample size.

Applying open science practices in research involves improving the methodological training and developing accessible techniques for applied researchers. We therefore discuss a methodological approach for conducting power analysis for intensive longitudinal study designs. This method involves using a simulation approach that can be implemented to select the sample size for a variety of designs and research questions. As an illustration, I introduce a user-friendly and open source application for performing a reproducible power analysis for intensive longitudinal designs. The methodology discussed can be easily extended to other complex data designs.

Slides

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Author biography

[Ginette Lafit](#) (KU Leuven) is a postdoctoral researcher at the Research Group of Quantitative Psychology and Individual Differences and the Center of Contextual Psychiatry. Ginette works in the field of statistics applied to psychology. Her research is focused on addressing methodological complexities and developing statistical methods for the analysis of intensive longitudinal data. Specifically, her research aims to develop statistical methods to perform sample size planning for intensive longitudinal designs and delineating methodological pitfalls in the implementation of open science practices in intensive longitudinal research. To make the statistical methods easily available, Ginette develops open source software. Her open source code is available [here](#).