Contribution ID: **359** Type: **Oral Presentation**

When Should I Measure? Finding the Best Sampling Schedule for Recovering Longitudinal Dynamics in Panel Data Studies with Continuous-Time Models

Thursday 24 July 2025 15:45 (15 minutes)

One of the key questions in longitudinal research is when to take measurements of the variables of interest. Panel studies usually focus on the dynamics between two processes over time (e.g., depressive symptoms and self-esteem), and include few repeated measures (<10). This forces researchers to find the most efficient way to design their study and collect their data. Recently introduced in Psychology, continuous-time models are very convenient in this context, as they can accommodate irregularly spaced measurements, both between and within individuals.

Previous research on deciding the optimal time interval between measurements have proposed various criteria, such as using the time interval at which the overall cross-effects are largest, or the time interval leading to best estimation reliability. However, relatively less attention has been paid to the effect of stochastic innovations (i.e., dynamic error) on the sampling design, despite its key role in the stability of the system.

In a Monte Carlo simulation, we used state-space continuous-time models to characterize the dynamics of two variables measured longitudinally through panel designs. We compared various sampling schedules, including those suggested in recent research, to evaluate their effectiveness in recovering bivariate trajectories under various levels of stochasticity. We discuss the strengths and weaknesses of different sampling approaches and provide practical recommendations on using continuous-time modeling in panel data studies.

Primary authors: REAL-BRIOSO, Nuria (Universidad Autónoma de Madrid); ESTRADA, Eduardo (Universidad Autónoma de Madrid)

Presenters: REAL-BRIOSO, Nuria (Universidad Autónoma de Madrid); ESTRADA, Eduardo (Universidad Autónoma de Madrid)

Session Classification: Symposium : ”Advancing Dynamic Methods for Modeling Change Over Time”

Track Classification: Statistical analyses: Statistical analyses