

## Research Colloquium of Professorship of Predictive Analytics

# State-Trace Analysis Meets Personality Measurement: Why the Big Five Tests Are Not Based on Five Latent Dimensions and How to Fix Them

**Dr. Johannes Titz**

**Monday, 3:30 p.m. – 5:00 p.m., June 30, 2025**

**Location:** Reichenhainer Straße | 31/33, C43 **Online:**  
<https://webroom.hrz.tu-chemnitz.de/gl/san-c56-fzk-lac>

### Abstract:

Unidimensionality is a fundamental yet often overlooked prerequisite for measurement. In the context of psychological measurement, the central question is whether a set of items can be logically reduced to a single latent factor. In this talk I advocate for the application of state-trace analysis as a decisive tool to address this question. State-trace analysis provides a simple, general, and rigorous criterion for unidimensionality: monotonicity between item pairs. In this talk I demonstrate the utility of state-trace analysis through exemplary applications within the framework of the five-factor model, analyzing data from the International Personality Item Pool-NEO-120 (N = 618, 000) and the NEO Personality Inventory-Revised (N1 = 857, N2 = 500). The findings reveal that maintaining the five-factor model requires significant revisions to numerous items, highlighting the potential of state-trace analysis to enhance personality measurement beyond existing methodologies. The paper concludes by discussing strategies to promote broader adoption of this method and how future designs in personality research can be tailored to effectively incorporate state-trace analysis.



### About the Speaker:

Dr. Johannes Titz is a Postdoctoral Researcher at TU Chemnitz in the Department of Psychology, where his research focuses on unidimensionality, with a particular emphasis on State-Trace Analysis and Guttman Scaling. He operates primarily on an Arch GNU/Linux system and has a strong passion for using R in his work.