

BI-CO MATHEMATICS COLLOQUIUM

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“Using Response Time Data to Model Cognition and Cognitive Decline”

Monday, February 14, 2022

Talk at 4:00 – Park 338

Abstract:

The world is being digitized and moved from paper and pencil to electronic systems (e.g., in medical records, educational testing, and the collection of survey data.) This talk will argue that a wealth of information exists in the metadata recorded as a byproduct of electronic data collection. We focus on response times (RT) or how long it takes survey respondents to answer a standard cognitive assessment. While research in neuroscience and psychometrics show that RT are useful for modeling ability in highly controlled environments, to our knowledge, the usefulness of RT in modelling cognition and related outcomes has not been shown in a standard survey setting where everyday life intrudes on data collection. Using the National Social, Health and Aging Project (NSHAP), which contains two measures per respondent of the Montreal Cognitive Assessment (MoCA) taken five years apart, we show that the time it takes to answer standard questions measuring cognition is highly correlated with both current measured levels and later declines in cognition. These response time measures are also highly correlated with other measures of physical decline. Our paper shows the usefulness of collecting item-by-item, time-stamped response time data and using these data to better understand respondent’s cognitive capacity and behavior. Our results suggest a large amount of useful information about cognition is likely contained within most social science surveys with time-stamping that has, to date, gone unused. In addition, our results have implications for clinicians who may be able to use the response time data to supplement the cognitive score and to better understand current cognitive performance and later cognitive decline.

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