



Faculty of **Education**  
The University of Hong Kong

## EDUCATIONAL AND PSYCHOLOGICAL MEASUREMENT COLLOQUIUM SERIES

# Using Item Response Theory to Address the Limitations of Sum Scores: The Montreal Cognitive Assessment Example

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**May 24, 2018 (Thursday)**

**13:00 – 14:00**

**Room 108, Runme Shaw Building, HKU**

### *Abstract*

Most cognitive assessments use the total scores in categorizing cognitive impairment levels. The total scores are typically calculated with each test item contributing equally, without considering the properties of each item in relation to important confounding factors. Item response theory (IRT) analysis provides a potential solution to minimize the effect of confounding factors in the testing of true cognitive ability, without developing multiple versions of the test. This research evaluates the reliability of IRT analysis compared with the traditional scoring method in estimating cognitive ability using the Montreal Cognitive Assessment (MoCA) in an older population with low education. The study involves 1876 older adults from a nonclinical population living in public rental housing estates in Hong Kong screened using the Cantonese MoCA. Formal education was used as a grouping variable to estimate multiple-group IRT models. The reliability of the MoCA based on total scores and IRT ability estimates was compared. Results showed that measuring cognitive impairment levels using IRT is more reliable. This analysis provides evidence in support of the future use of IRT analysis in electronic cognitive screening to ensure measurement precision across populations.

### *About the Speaker*

Dr. Hao Luo holds a joint appointment as an Assistant Professor at the Department of Social Work and Social Administration and the Department of Computer Science, The University of Hong Kong. She received her PhD in Statistics from Uppsala University, Sweden. Her research focuses on big data analytics and latent variable modeling in health and mental health with the overarching goal of improving health policy and solving social problems.

*Everyone is welcome to attend!*

*If interested, please confirm your attendance by sending an email to [kpsantos@hku.hk](mailto:kpsantos@hku.hk).*