



Department of Psychology  
The University of Hong Kong

香港大學心理學系

**Brown Bag Lunchtime Seminar**  
**(Theme: Cognition and Neuroscience)**

**Contribution of Relational Reasoning to Mathematical Competence –  
Revealing the Underlying Mechanisms and Developing Potential Intervention**

12:30 p.m. – 1:30 p.m. | December 9, 2022 (Friday)  
Rm 813, 8/F, The Jockey Club Tower | Centennial Campus | The University of Hong Kong



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**Abstract**

Relational reasoning, the ability to discern meaningful patterns from streams of information, has been considered as fundamental to cognitive functioning and learning. Preliminary evidence showed its association with mathematical achievement (e.g., Zhao et al., 2021). Yet, several key theoretical questions remain unanswered – 1) the contribution of relational reasoning manifested in different modalities, 2) the specific mathematical domains associated with relational reasoning, 3) the underlying mechanisms, and 4) the potential causal relations.

This seminar will present two completed correlational studies and one upcoming intervention study that attempted to address the above unexplored theoretical issues. In Study 1, sixth graders ( $n = 230$ ) were assessed on both nonverbal and verbal relational reasoning as well as their mathematical achievement. Both nonverbal and verbal relational reasoning were found to uniquely contribute to concurrent computational skills and mathematical problem solving. In Study 2, the underlying mechanisms were examined by a longitudinal design tracking the same group of participants ( $n = 189$ ). Results indicated that while arithmetic principle understanding fully mediated the prediction from nonverbal relational reasoning to future computational skills, the ability to represent word problems fully mediated the contribution of relational reasoning in both modalities to mathematical problem solving.

For the upcoming Study 3, another sample of seventh graders ( $n = 165$ ) will be recruited to enrol in a randomized controlled trial. While participants in the intervention condition will receive instructions on the component processes of relational reasoning (Grossnickle et al., 2016), phonics knowledge will be delivered for those in the control condition. The intervention is expected to significantly improve participants' relational reasoning as well as mathematical outcomes.

The implications of the above studies and future directions will be discussed.

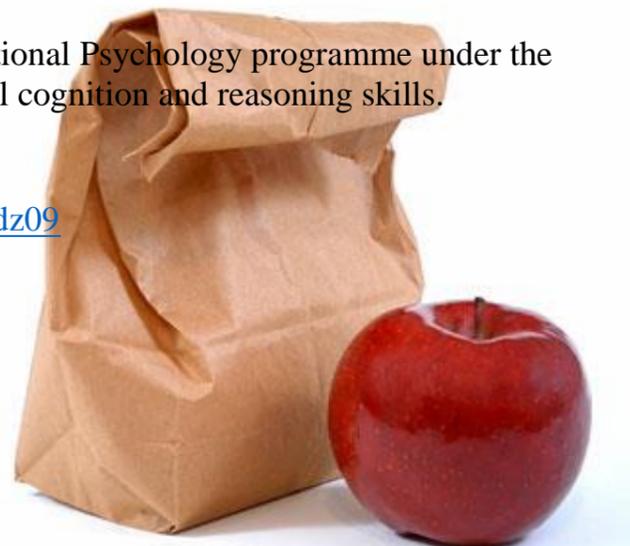
**About the speaker**

Eason is currently in his final year of the Ph.D. with a specialization in Educational Psychology programme under the supervision of Dr. Terry Wong. His primary research interests are mathematical cognition and reasoning skills.

**Zoom (For participants who couldn't attend the Seminar in person)**

<https://hku.zoom.us/j/3951550048?pwd=SncvL3RYakEycUtpL29vdDJEEdlEwdz09>

Meeting ID: 395 155 0048 | Password: psyc



**~All are Welcome~**

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