

**Poster Presentation:** #P6  
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### **Investigating the cognitive correlates of Science Achievement**

STEM (Science, Technology, Engineering, and Mathematics) is valued as one of the most important and fast-growing areas in education. Thus, educators are obliged to know more about the predictors of science achievement and its learning mechanisms. In Hong Kong, such research is still scarce apart from understanding the effect of medium of instruction on secondary school students' achievement (Yip, Tsang, Cheung, 2003).

In this proposal, science achievement is operationally defined as performance in a globally recognized achievement test, TIMSS 2019. The literature of science reasoning and achievement offered four candidates as cognitive predictors of science achievement, namely spatial cognitive skills (Hodgkiss et al., 2018), metacognitive beliefs and skills (Conley et al., 2004; She, Lin, & Huang, 2019) relational reasoning (Murphy, Firetto, & Greene, 2016), and reading comprehension (O'Reilly & McNamara, 2007).

Previous research has preliminarily established links between these four cognitive predictors and science achievement, yet standardized assessments were not consistently used and usually only one of these skills are investigated in those studies. Therefore, it is unclear whether these skills exert unique contribution on achievement after controlling covariates (e.g., non-verbal IQ, working memory, age, SES) and the effect of other predictors. By putting these candidate predictors in a single project, our study aims to conduct a systematic investigation on these predictors and their respective unique contribution to science achievement, to compare their relative importance, and also to explore if these factors interact with each other. Preliminary data from a pilot study will be discussed.

Three research questions will be addressed in this research project. First, we aim to identify the cognitive correlates of science achievement in Hong Kong. The second question concerns the mechanisms underlying the relation between the cognitive correlates and science achievement. The final question asks the developmental patterns of these relations across a 1-year interval. We plan to recruit 250 Cantonese-speaking Form 3 students from local secondary schools, with age ranging from 14-15 years old. These students will be recruited from schools with different bandings and different medium of instructions. Data will be collected during Summer break.

Findings from this project will be one of the first studies to inform us about the predictors of scientific achievement in Hong Kong from an individual differences perspective and will inform possible intervention strategies.