

Abstract

Student engagement in Math and Science subjects plays a critical role not only in fostering academic achievement in such academic areas but also in motivating secondary school students to choose Science, Technology, Engineering and Mathematics (STEM) career tracks. However, studies have shown that there has been a decline in students' motivation and engagement in Science and Math courses. It is therefore important to identify psychological factors that can promote various domains of engagement in math and science classes. The triarchic model of grit that reflects individuals' tendency to show passion, perseverance, and adaptability for long-term goals, can lead to adaptive academic functioning such as student engagement in specific domains of academic performance. However, no longitudinal study has been carried out to examine whether triarchic model of grit dimensions predict subsequent math and science engagement as well as the psychological mechanisms underpinning the link of grit to such academic outcomes. Guided by the hierarchical model of achievement motivation, this project will test whether the triarchic model of grit dimensions (i.e., perseverance of effort, consistency of interests, and adaptability to situations) accounts for Math and Science academic engagement domains (i.e., behavioral, cognitive, emotional, and social). It will provide preliminary evidence on the mediating roles of achievement goal orientations as previous research demonstrates that motivation can operate as a psychological mechanism underscoring the link of grit to academic outcomes. As both perseverance and adaptability dimensions of grit have been linked to higher autonomous and controlled motivation in a collectivist setting, it is likely that the ability of these grit dimensions to predict mastery-approach goals and performance-approach goals may be associated with Math and Science academic engagement. This project will adopt a longitudinal structural equation modeling approach to explore: (a) the association of triarchic model of grit facets with Math and Science academic engagement; and (b) the mediating effects of achievement goal orientations on the hypothesized link of grit to engagement in such academic domains among over 2,100 secondary school students, over 700 each in HK, mainland China, and Philippines. This research will contribute to theory through identifying psychological mechanisms that can explain why grit can predict engagement in Math and Science classes. This project will provide evidence on the generalizability and benefits of grit to several Asian societies.