The Moderating Role of Test Anxiety in the Relationships Between Self-Efficacy, Engagement, and Academic Achievement in College Math Courses

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Abstract : Previous research has revealed relationships between self-efficacy (SE), engagement, and academic achievement among students in Western countries, but these relationships remain unknown in college math courses among college students in China. In addition, previous research has shown that test anxiety has a direct effect on engagement and academic achievement. However, how test anxiety affects the relationships between SE, engagement, and academic achievement is still unknown. In this study, the authors aimed to explore the mediating roles of behavioral engagement (BE), emotional engagement (EE), and cognitive engagement (CE) in the association between SE and academic achievement and the moderating role of test anxiety in college math courses. Our hypotheses are that the association between SE and academic achievement was mediated by engagement and that test anxiety played a moderating role in the association. To explore the research questions, the authors collected data through self-reported surveys among 147 students at a northwestern university in China. Self-reported surveys were used to collect data. The motivated strategies for learning questionnaire (MSLQ) (Pintrich, 1991), the metacognitive strategies questionnaire (Wolters, 2004), and the engagement versus disaffection with learning scale (Skinner et al., 2008) were used to assess SE, CE, and BE and EE, respectively. R software was used to analyze the data. The main analyses used were reliability and validity analysis of scales, descriptive statistics analysis of measured variables, correlation analysis, regression analysis, and structural equation modeling (SEM) analysis and moderated mediation analysis to look at the structural relationships between variables at the same time. The SEM analysis indicated that student SE was positively related to BE, EE, and CE and academic achievement. BE, EE, and CE were all positively associated with academic achievement. That is, as the authors expected, higher levels of SE led to higher levels of BE, EE, and CE, and greater academic achievement. Higher levels of BE, EE, and CE led to greater academic achievement. In addition, the moderated mediation analysis found that the path of SE to academic achievement in the model was as significant as expected, as was the moderating effect of test anxiety in the SE-Achievement association. Specifically, test anxiety was found to moderate the association between SE and BE, the association between SE and CE, and the association between EE and Achievement. The authors investigated possible mediating effects of BE, EE, and CE in the associations between SE and academic achievement, and all indirect effects were found to be significant. As for the magnitude of mediations, behavioral engagement was the most important mediator in the SE-Achievement association. This study has implications for college teachers, educators, and students in China regarding ways to promote academic achievement in college math courses, including increasing self-efficacy and engagement and lessening test anxiety toward math.

Keywords : academic engagement, self-efficacy, test anxiety, academic achievement, college math courses, behavioral engagement, cognitive engagement, emotional engagement

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