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# Understanding secondary school students' motivations for mathematics subject choice: First steps in construct validation and correlational analysis

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With the increased workplace demand for STEM specialists, and the trend in capable students opting out of higher levels of secondary mathematics, the psychological influences on mathematics subject choice are important issues to explore. Expectancy-value theory (EVT) is used to examine the factors influencing such achievement choices. In the present study, as part of a larger programme of research on mathematics subject choice, we sought to validate self-report measures of students' expectancies for success, values they hold for the subject, and perceived costs associated with participation in mathematics.

The results of 500 survey responses collected from Year 10 students of ten secondary schools in New South Wales were analysed to examine the factorial structure of the underlying motivational constructs. These were validated using confirmatory factor analysis (CFA), with the measurement model confirmed to be valid and ready to be used for further analyses exploring relationships between the latent variables. However, the cost scales displayed a level of multi-collinearity, and were problematic in some pairs of sub-constructs displaying a higher level of correlation. Although the CFA provided strong support for a four-factor solution of cost, a higher order factor model with a unidimensional cost factor also provided a good fit to the data. Despite this, the four-factor solution for the cost construct was selected as they displayed adequate reliability and model fit, and a further correlational study revealed that the four cost factors had different relationships to the other positive motivation factors. Correlations between the expectancies and values dimensions echoed that of comparable previous studies of secondary students' mathematics motivations using EVT.

In stages to follow, latent profile analyses will be conducted to identify and classify profiles of individuals with similar beliefs based on patterns of categorical responses, to derive motivational profiles of students with similar beliefs in their levels of expectancies, values and costs. Gendered relationships among the various motivational profiles, as well as their relationship to achievement background, language background, dependency on selective schools, coeducational/single-sex learning environments, amongst other educational contexts will be explored. These will be followed by interviews of students representing each motivational profile to capture a further understanding of their experiences, the complexity of the interrelated influences on their motivation and on their choice of mathematics course. Results from the overall study can help increase an understanding of the factors affecting student motivation and the types of classroom experiences and programs that may help shift students into more favourable motivational profiles, so students may be more likely to choose and persist with a level of mathematics commensurate with their ability.