The Mathematics Attitudes and Perceptions Survey: New Data and Alignment with Other Recent Findings

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Student attitudes about and perceptions of mathematics influence their success and learning, and have been of interest for many years in mathematics education. The Mathematics Attitudes and Perceptions Survey is a short, validated Likert-scale instrument that measures confidence, interest, relation of mathematics to the real world, persistence in problem solving, growth mindset, use of sense-making behaviours, and the extent of other novice attitudes towards mathematics. In this poster, we share the complete instrument and its categories, a brief summary of the development process and resulting model statistics, as well as scores across different populations measured so far (3 institutions, variety of courses). The student responses include new data since the publication of the instrument as well as additional analysis of groups, in particular a comparison of attitudes between genders that matches with recent results relating STEM persistence to attitudes and beliefs (Ellis et al., 2016; Wang et al., 2016).

Key words: student attitudes, student perceptions, student beliefs, survey tool

Motivation and Development

Development of the Mathematics Attitudes and Perceptions Survey (MAPS) was prompted by interest in matching up results regarding student attitudes in mathematics to those captured via similar surveys "scored" relative to expert consensus views in physics (Adams et al., 2006), chemistry (Barbera et al., 2008), biology (Semsar et al., 2011), earth sciences (Jolley et al., 2012), and computer science (Dorn & Tew, 2015). These contain many similar statements and share aspects of development (Adams & Wieman, 2011), though for MAPS the quantitative aspects followed more conventional instrument development in terms of factor analysis and model fitting.

The survey consists of 31 Likert-scale statements scored based on alignment with expert views and reported behaviours involving mathematics. The instrument was designed iteratively with interviews of faculty and students, rounds of responses from multiple populations of students leading to factor analysis and model confirmation. Further details and preliminary population scores are available in an initial article (Code et al., 2016).

Results So Far

While our data does not have sufficient detail for comparison in some demographic variables, nor for a relation to teaching methods like Sonnert et al. (2015), we have similar findings to the recent MAA study of calculus programs, including an overall decrease in such attitudes over a first year of a calculus courses, with men overall reporting higher attitudes in most categories including confidence in their mathematical ability (Maciejewski, 2016). The drop in attitudes in introductory post-secondary courses and the gender gap are similar to results in other fields with the instruments which helped inspire MAPS (Hansen & Birol, 2013; Bates et al., 2011). This convergence of results, along with the ease of deployment, suggests the value of MAPS in measuring student attitudes and perceptions in mathematics. Our poster will present the full instrument, categories, and a variety of data from different populations so far.

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