Middle School Mathematics Beliefs Scale
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Middle School Mathematics Beliefs Scale (MMBS)

This measure assesses students' self-reported beliefs about themselves and what it means to be effective learners of mathematics.

Purpose

- The MMBS is intended to measure the mathematical beliefs of middle school students and can be used to explore the relationship between these beliefs and other factors related to mathematics learning.
- The construct of Mathematics Beliefs is operationalized in this measure via six factors:
    - Self-Efficacy: one's belief in their own ability to be successful in a given situation;
    - Growth Mindset: the belief that abilities and intelligence can improve over time;
    - Valuing Mistakes, Struggle, and Persistence: the belief that encountering difficulties and making mistakes is vital for growth in the learning process;
    - Speed: students' beliefs of the importance of speed in being successful in mathematics
    - Using Experiences in School Mathematics: the belief that school mathematics is useful in the real world, as well as the belief that everyday experiences can be useful in learning mathematical concepts
    - Outcome Orientation: the extent to which students' believe in the value of learning for the sake of developing competence or new skills, as compared to learning in order to receive external validation or competitive success

Measure Details

- The MMBS has 34 items across six subscales:
    - Self-Efficacy: 6 items
    - Growth Mindset: 5 items
    - Valuing Mistakes, Struggle, and Persistence: 12 items
    - Speed: 4 items
    - Using Experiences in School Mathematics: 4 items
    - Outcome Orientation: 3 items
- All items are measured on a 0 - 100 scale, with 0 representing "never true of me" and 100 representing "always true of me."

Contribution to the Field

- This measure was developed due to the limited availability of measures of mathematical beliefs which consist of the factors identified above. The construct of "mathematical beliefs" is multi-faceted, and existing measures may provide insight to particular components; however, you may need to administer multiple measures in order to gather data on multiple factors of beliefs. This can also limit the extent to which research can

explore the relationships between different components of mathematical beliefs, or with other factors which influence students' math learning experiences.
- In addition, existing well-validated beliefs measures can utilize language that is deficit-oriented or outdated. This measure attempts to provide an updated approach to measuring students' mathematical beliefs with language that supports asset-based, equitable development of their beliefs about themselves and about mathematics as a discipline.

Development History and Previous Uses

- The MMBS was developed through co-constructing research-based items with a team of mathematics and equity scholars. Initial rounds of revision were conducted to adjust the language of the items to minimize the chance that students' beliefs about themselves as math learners may be negatively impacted as a result of taking the survey.
- The asset-based items were administered, and initial modeling analyses were conducted. The measure was revised again, and then re-administered to the same students at a later time point; this data was used to refine the items into their final version.
- The measure has been used with a demographically diverse sample of middle grades students within a small-scale efficacy study for a mathematics problem-solving learning platform, CueThinkEF+.

Accessing the Measure

- To access the measure, please contact:
    - Dr. Sam Rhodes at rhodessr2@vcu.edu

Associated Publications

Rhodes, S., Gutierrez de Blume, A., Bryck, R., Wang, J., Frimpong, P., & Serianni, B. (2025). Validity evidence for the Middle School Mathematical Beliefs Scales (MMBS). In Yao, X., McCloskey, A., & Zbiek, R.M. (Eds.), *Proceedings of the forty-seventh annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Penn State University.