Attributions of Mathematical Excellence in Teaching and Learning (AMETL)

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Purpose

The **purpose** of AMETL project is to investigate teachers' beliefs about how they explain systemic racial and gender differences in mathematics education outcomes by developing and validating the AME instrument.

The **central hypothesis** is that teachers' attribution beliefs interact with students' racial and gender identities, causing racial and gender inequity in the learning opportunities available to students in mathematics classrooms.

Significance

The AMETL project seeks to uncover influences of teachers' belief systems in shaping the mathematical educational experiences and outcomes of students due to systemic racial and gender differences that persist in the field.

- Development of a validated instrument to measure teachers' beliefs about race and gender in relation to mathematics learning.
- Inform teacher education and professional development programs regarding ideologies that undergird deficit and anti-deficit attributions about students' mathematical potential.
- Potential for systemic change by uncovering teachers' attribution beliefs and their impacts on the learning opportunities of students.

Attributions of Mathematical Excellence Theoretical Framework

Mathematical excellence is…	Innate	Environmental
Fixed	Genetic attributions (cf. BGD; ability deficit) The achievement gap reflects differences in students' innate ability for mathematics which is more common among White and some Asian* males.	Social attributions (cf., BSD; cultural deficit) The achievement gap results from differences in students' families (e.g., parental support), upbringing, and cultural values which predispose White and some Asian males to succeed in mathematics.
Malleable	*Personal attributions* (cf., BSM; personal effort deficit). The achievement gap is the result of students' personal effort and persistence which is more common among White and some Asian males.	*Educational attributions* (anti-deficit) The achievement gap is evidence of an opportunity gap; White and some Asian males receive disproportionate access to high quality learning opportunities and instructional support.

Teachers' Attribution Beliefs

Belief in Genetic Determinism (BGD): innate biological or genetically determined traits play the largest role in molding an individual (Keller, 2005).

Belief in Social Determinism (BSD): an individual's fundamental essence is shaped permanently by social factors (e.g., upbringing, social background or status, peer contact, socialization) (Rangel & Keller, 2015).

Belief in School Meritocracy (BSM): school success can be explained in terms of effort (Wiederkehr et al., 2015). Social institutions reward individual ability and effort (Young, 1961; Jost et al., 2003).

Study Design

STUDY 1

Item Development (Year 1)

- What indicators do teachers use to identify mathematical excellence or struggle?
- To what sources (e.g., inherent traits, cultural background, personal effort, educational opportunity) do teachers attribute students' mathematical excellence or struggle?

STUDY 2

Structure & Relations Study (Year 2)

- Is the structure of the AME instrument consistent with theory?
- To what extent are AME scores correlated in expected ways with related constructs?
- How well do AME scores predict within-classroom equity in achievement outcomes?

STUDY 3

Classroom Study (Years 2-3)

- To what extent are AME scores consistent with observed instruction and interviews about teaching practice?
- How well do AME scores predict within classroom equity in access to high-quality instructional interactions?

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