The impact of social structure and culture on mindset and math anxiety: Evidence from an Indian middle school

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Introduction

- Math anxiety and fixed intelligence mindsets are associated with poor academic performance (Suinn, Taylor, & Edwards, 1988; Ashcraft & Krause, 2007, Yaeger & Dweck, 2012)
- Maladaptive mindsets are especially prevalent among children from socially and economically disadvantaged groups (Claro et al., 2016), perpetuating disparities.

➔Understanding the factors that lead children from socially and economically marginalized populations to subscribe to a fixed mindset or experience math anxiety is critical for informing interventions.

Research Goals

- What factors predict fixed mindsets and math anxiety?

➔How do children's identities and perceived stereotypes about the academic abilities of different social groups relate to their academic mindsets and math anxiety?

- Sample economically-disadvantaged children in an urban Indian school, a context with a rich set of social dimensions (i.e., gender, religion, caste, and wealth)
- 80% of children's families earn less than $5.50/day

Method

Participants

115 7th-graders from a middle school in Gujarat, India (48 girls; 50% Hindu, 43% Muslim, 7% other; 49% self-identified as coming from a relatively poorer family compared to others in the city)

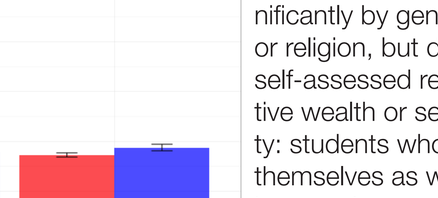
Measures

Two counterbalanced blocks:

Math Achievement
WIAT math (10 mins)
Woodcock-Johnson math (10 mins)
Arithmetic test (5 mins)

Social Predictors
Survey items assessing, e.g.:

Construct	Example question	Scale
Stereotype beliefs	*Some people are better at math because of their [gender/religion/caste/how rich or poor they are].*	Strongly disagree -- Strongly agree
Math mindset (adapted from Dweck, 2006)	*(My parents think) How good you are at math is fixed and cannot change.*	
Wealth or security	*How often do you worry about how much money your family has?*	
Math Anxiety (adapted from Ramirez, Gunderson, Levine, & Beilock, 2013)	*How nervous do you feel when you're in math class and your teacher is about to teach something new?*	



Results

- Confirmed expected negative relation between math anxiety and performance on 2/3 timed achievement measures (WJ: β=-0.034*, Arithmetic: β=-0.091*).

How do students' beliefs about math ability relate to their math anxiety?

The more fixed students' own 'math mindsets' and their perception of their *parents'* math mindsets, the greater their anxiety.

- Child math mindset (β=0.102*)
- Perceived parental mindset (β=0.146**)

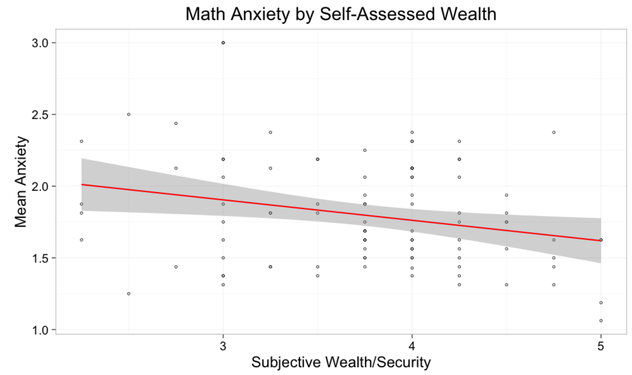
The more students endorsed stereotypes relating social dimensions and math ability, the greater their anxiety.

- Gender stereotype (β=0.144***)
- Caste stereotype (β=0.235***)
- Religion stereotype (β=0.185***)
- Wealth stereotype (β=0.072*)

Students with more fixed mindsets were more likely to endorse math stereotypes generally (β=0.213**).

How do students' own social identities relate to their math anxiety?

Levels of math anxiety did not differ significantly by gender or religion, but did by self-assessed relative wealth or security: students who saw themselves as wealthier were less math anxious (β=-0.142*).



How do students' social identities and stereotype beliefs interact?

- Students who saw themselves as wealthier were less likely to endorse a wealth stereotype (β=-0.335*)
- Endorsing a religion stereotype was related to math anxiety *only for Muslims* (β= 0.155*)
- Endorsing a gender stereotype was related to math anxiety *only for boys* (β= 0.167***)

Conclusions & Future Directions

- While gender has been the primary social dimension related to math anxiety in the U.S., religion and wealth seem to be particularly salient dimensions for students at this school.
- Endorsement of ambiguously-phrased stereotypes relating math to gender, religion, wealth, and caste were highly intercorrelated, and predictive of math anxiety.

➔Among socially and economically marginalized groups, subscription to stereotypes about academic ability may go hand in hand with differences in mindset and math anxiety.

- Ongoing work explores students' explanations for stereotypes.

➔Interventions on anxiety and mindset might target students' stereotypes about academic ability.

References

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Thank you to the students and teachers of Zenith School, Vadodora, Gujarat, IN.