The Role of Context in Children's Brilliance Beliefs (#28321)

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Author(s)
Jalisha Jenifer (The University of Chicago) - jjenifer@barnard.edu
Jilana Jaxon (New York University) - jilana.jaxon@nyu.edu
Andrei Cimpian (New York University) - andrei.cimpian@nyu.edu
Susan Levine (The University of Chicago) - s-levine@uchicago.edu

1) Have any data been collected for this study already?
It's complicated. We have already collected some data but explain in Question 8 why readers may consider this a valid pre-registration nevertheless.

2) What's the main question being asked or hypothesis being tested in this study?
Research question: Do children's beliefs about the innateness of intelligence (brilliance) for math and reading/writing vary based on the nature of the context?

Hypothesis: The relationship between academic domain and brilliance will vary based on the context, with children believing that math requires more brilliance than reading/writing in a selective context (such as performance in a competition) but not in an everyday context (such as performance in school). We will also explore whether children's grade (or age) moderates this relationship, with older (vs. younger) children being more likely to differentiate between brilliance for math and reading in the selective contexts.

3) Describe the key dependent variable(s) specifying how they will be measured.
• Math brilliance beliefs in an "everyday" context: measured by 3 item questionnaire w/ 4-point scale
• Reading/writing brilliance beliefs in an "everyday" context: measured by 3 item questionnaire w/ 4-point scale
• Math brilliance beliefs in a "selective" context: measured by 3 item questionnaire w/ 4-point scale
• Reading/writing brilliance beliefs in a "selective" context: measured by 3 item questionnaire w/ 4-point scale
• Math-specific brilliance beliefs in everyday context: everyday math beliefs – everyday reading beliefs
• Math-specific brilliance beliefs in a selective context: selective math beliefs – selective reading beliefs
• Context-dependent math brilliance beliefs: selective math beliefs – everyday math beliefs
• Context-dependent reading brilliance beliefs: selective reading beliefs – everyday reading beliefs

4) How many and which conditions will participants be assigned to?
Participants will be assigned to one of 16 counterbalanced orders that manipulate:
• The ordering of 2 questionnaire blocks (Block A = brilliance belief questionnaire, Block B = additional questionnaires on self-efficacy, math interest, check for understanding, negative feedback – see section #8)
• The ordering of math and reading/writing items within Block A
• The ordering of the Self-Efficacy and Math Interest questionnaire within Block B
• The ordering of 2 items designed to check participants' understanding of a competition within Block B

5) Specify exactly which analyses you will conduct to examine the main question/hypothesis.
We will use mixed-effects linear regression to examine the main effects of domain (math vs. reading/writing), context (selective vs. everyday), and grade (or age), as well as all two- and three-way interactions between these three variables.

Our main prediction is of either (1) a two-way interaction between domain and context (with no domain differences for the everyday context + higher math than reading/writing brilliance beliefs for the selective context) or (2) a three-way interaction between domain, context, and grade/age (such that the two-way interaction above is present for older but not younger children).

6) Describe exactly how outliers will be defined and handled, and your precise rule(s) for excluding observations.
We will exclude participants who did not comply with task instructions as well as participants whose sessions were compromised due to experimenter error. Outliers will be defined as points that are at least 2.5 standard deviations from the mean and have a Cook's distance value greater than 4/n. All outliers will be excluded from our analyses.

7) How many observations will be collected or what will determine sample size? No need to justify decision, but be precise about exactly how the number will be determined.
Based on a power analysis for regression (f = 0.25, alpha = 0.05, power = 0.80), we are aiming to collect at least 128 participants across our two study locations (New York and Chicago). Our final sample size may vary based on the number of consent forms received back from our partnering schools. However, we will not look at any data until data collection (including distribution of consent forms) has been completed.

8) Anything else you would like to pre-register? (e.g., secondary analyses, variables collected for exploratory purposes, unusual analyses planned?)

-Variables collected for secondary analyses:

- gender (male, female)
- math self-efficacy: measured with 4 item questionnaire w/ 4-point scale
- math interest: measured with 4 item questionnaire w/ 4-point scale
- math ability: measured by a 4 minute math fluency worksheet
- reaction to negative feedback: measured by 2 questions about future behavior after receiving negative feedback

-Secondary predictions/analyses: We plan to conduct additional regressions to explore whether context-dependent brilliance beliefs for math (i.e., math brilliance beliefs in a selective context − math brilliance beliefs in an everyday context) are associated with factors that predict math success (math self-efficacy, math interest, reaction to negative math feedback). These regressions will also include grade (or age) and gender, as well as all two- and three-way interactions between context-dependent brilliance beliefs for math and these other two variables (grade and gender). Math ability may be included as a covariate. A regression with these predictors will be conducted with each of the following variables as DVs: math self-efficacy, math interest, reaction to negative math feedback.

We will also conduct these regressions with a different measure of math brilliance beliefs: math-specific brilliance beliefs in a selective context (selective math beliefs – selective reading beliefs) instead of context-dependent brilliance beliefs for math (math brilliance beliefs in a selective context − math brilliance beliefs in an everyday context).

We predict that brilliance beliefs for math (operationalized in one or both ways just discussed) will negatively relate to math self-efficacy, math interest, and reactions to negative feedback, and that this effect will be stronger for girls (whereas for boys it may even be positive) and for older students.

*This study is being pre-registered while data collection is in progress. Data from this project has not been looked at by anyone, and will not be looked at until data collection is complete and this preregistration has been submitted.