Growing Together: Assessing the Peer Effects of a Growth Mindset Intervention

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In the National Study of Learning Mindsets (NSLM), students were randomly assigned to complete either a growth mindset intervention or a control activity during two 25-minute sessions. In the intervention, students read and listened to materials describing scientific evidence about how the brain works and why people can grow their intellectual abilities over time. The program encouraged students to think about why they might want to grow their brain in order to make a difference on something that matters to them, such as their family, community, or a social issue they care about.

The current project investigates whether students who did not receive the growth mindset intervention benefitted from being in contact with students who did — a phenomenon called "peer effect". Since the overall effectiveness of the mindset intervention is a combination of its direct effect and its peer effects, a better understanding of the latter is necessary in order to have a complete picture of the impact of the intervention. In addition, it would provide valuable information to educators and administrators about how information and beliefs are transmitted among students.

This project leverages tools from causal inference to evaluate the peer effects of the intervention among female students. Since the experiment was not designed to estimate peer effects, the resulting estimates are imprecise. The analysis suggests promising designs for future experiments focusing on peer effects.

Study Design

The researchers first constructed groups of 'peers' from the data. Ideally, peers would be identified using a survey that asks students to list their closest friends. Lacking such information, however, the researchers constructed peer groups using tracking information as a proxy. Specifically, each peer group in the study is comprised of female students who took the same mathematics class in the 9th grade, based on the assumption that students at this developmental stage tend to interact more within genders than between genders.

Key Findings

- This study used robust nonparametric methods to investigate the existence of peer effects, that is, whether students who did not receive the intervention benefited from it indirectly if their peers received it.

- The growth mindset intervention used in the National Study of Learning Mindsets did not produce peer effects on grade point average (GPA) among female students according to the present analysis.

- Future experiments assessing peer effects for social psychological interventions should solicit peer information directly from students and randomize the probability of receiving the treatment within each school.

Research Team

- **Early Career Fellow:** Guillaume Basse, Stanford University

Area of expertise: statistics

Sample

This study leverages data from the National Study of Learning Mindsets (NSLM), the largest-ever randomized controlled trial of a growth mindset program in the U.S. in K-12 settings, in which a brief online growth mindset program was administered to 9th grade students during the 2015-2016 academic year. The NSLM features a nationally representative probability sample of regular U.S. public high schools. Additional information about the NSLM sample of schools and students can be accessed here.

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This snapshot was published at the close of the National Study of Learning Mindsets Early Career Fellowship and captures in-progress work.

The study then focused on the female students who did not receive the mindset intervention, but whose peer group contained either more than 75% (high exposure) or less than 25% (low exposure) of students who did receive the intervention. Because the intervention was randomized with probability 50%, this represents only a small effective sample of approximately 170 female students out of the original 4,370.

The choice of the low exposure and high exposure cutoffs is subject to an interesting tradeoff. Choosing more extreme cutoffs would likely increase the magnitude of peer effects in the sample (if they do exist) but would reduce the effective sample size even further, down from 170. Choosing less extreme cutoffs would have the opposite effect: the sample size would increase but the magnitude of peer effects in the sample would be reduced.

Finally, the researchers compared the grade point average (GPA) of female students who did not receive the intervention, but had high exposure to classmates who did, with the GPA of female students who did not receive the intervention and also had low exposure to classmates who did.

Key Findings

The growth mindset intervention did not produce peer effects on GPA among female students according to the present analysis.
The researchers found no evidence of peer effects on GPA in the effective sample they considered. This null finding is subject to a number of caveats. First, the peer groups constructed in the study may not be a good proxy for actual friendship. This would dilute the signal, and lead to an underestimation of the true peer effects. Second, the effective sample size of 170 students creates imprecise estimates. If peer effects of relatively small magnitude did exist for the growth mindset intervention, they may have been obscured by the combination of these two issues.

With that said, the study led to insights about the design of future research related to peer effects.

Future experiments assessing peer effects of academic interventions should solicit peer information directly from students and randomize the probability of treatment within each school.
The challenges encountered in the analysis suggest two important features that should be incorporated in future experiments that aim to assess peer effects. First, the experiment must include precise and relevant peer information, preferably through a student survey. Second, the design of the experiment should vary the probability of students participating in an intervention within schools. For instance, if within a school the intervention is administered in classrooms, then the probability of students receiving the intervention should be randomly chosen (at the classroom level), among values like 10%, 25%, 75% and 90%. This would vastly increase the effective sample size for studying peer effects.

Insights and Future Directions

Assessing the peer effects of social psychological interventions is crucial since their overall effect is a combination of both direct and peer effects. The literature on the topic, in the context of the mindset intervention, is scarce and this project provides methodological guidelines for tackling this question.

While the current study is inconclusive regarding peer effects of the growth mindset intervention, it identifies valuable opportunities for future work on developing appropriate experimental designs for studying these effects. The project suggests two concrete features to be incorporated in experiments targeting peer effects: relevant peer information and randomization of the probability of treatment within schools, as described above. Future work will place a particular emphasis on the design tradeoffs between estimating the direct effect and estimating the peer effects of the intervention.