

Do Growth Mindset Interventions Impact Students' Academic Achievement? A Systematic Review and Meta-Analysis With Recommendations for Best Practices

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Learning Goals

- Growth mindset theory
- Notable studies (and their shortcomings)
- Study design
- Results
- Discussion

Growth Mindset Theory

- Your mindset can affect how you lead your life
- Fixed vs. Growth
- Growth mindset is appealing
- Does it even work?
 - (Blackwell, Trzesniewski, and Dweck, 2007) - Growth mindset prevents grade decline?
 - (Sisk et al., 2018) - Meta-analysis of 38 independent samples... troubling results

Sisk et al. Continued

- Many studies failed manipulation checks
- $\frac{1}{3}$ failed to show/test students developing a growth mindset
- Students may sniff out experiment
- Intelligence is very subjective
- Other studies show that growth mindset account for $< 1\%$ persistence resilience (possibly even detrimental)

Present Study

- First systematic and comprehensive literature review on growth mindset intervention (GMI) on academic achievement
- 3 meta analyses:
 - Does GMI promote academic achievement
 - Is GMI the underlying mechanism
 - Is GMI the underlying mechanism with highest-quality studies

Best Practices in Intervention Design

- Intervention compared to an active control condition
- No other differences between treatment and control
- A priori power analysis
- Random assignment at individual level
- Blinding
- Test if interventions changed mindsets

Best Practices in Documentation, Analyses, and Reporting

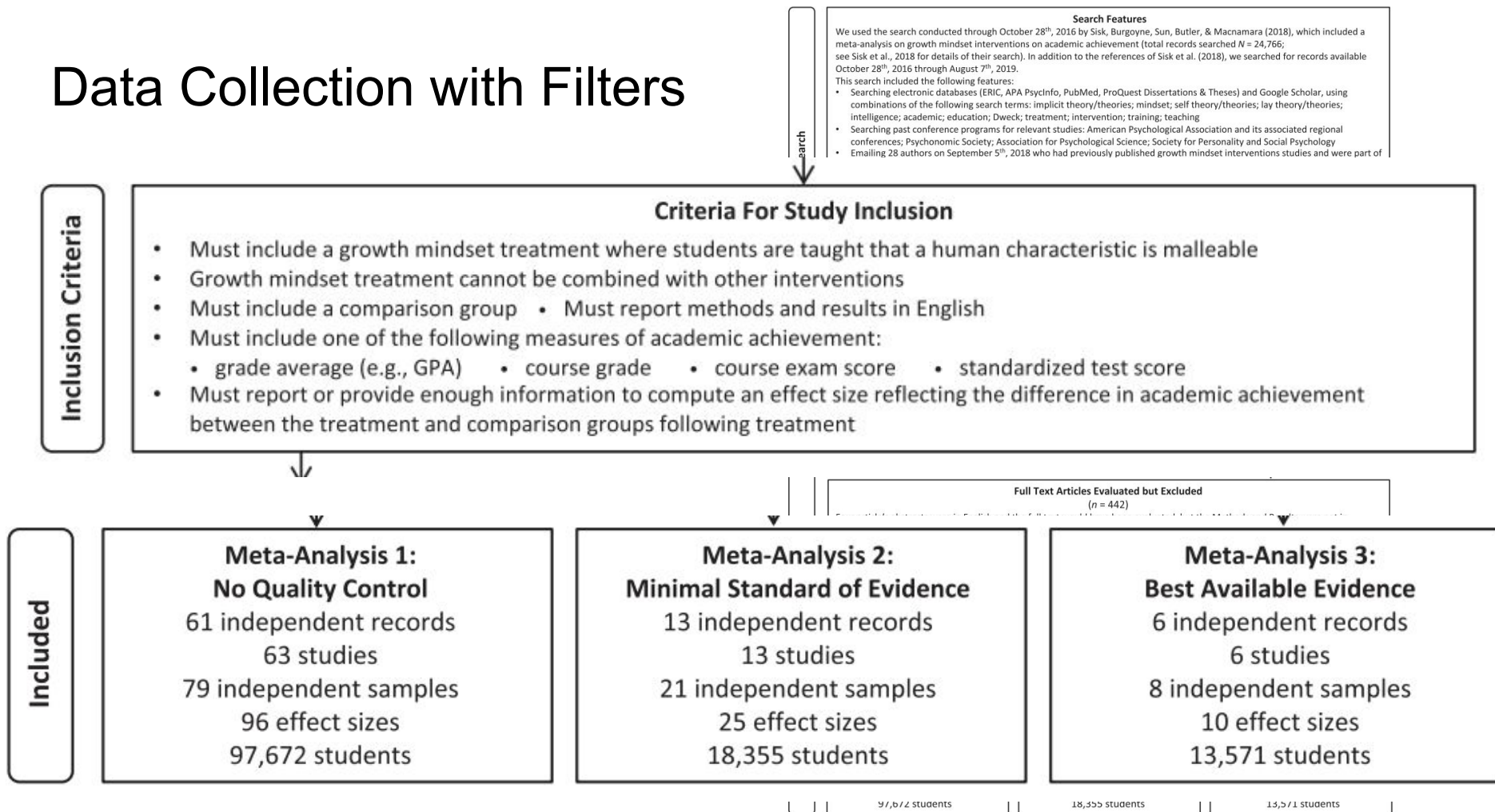
- Preregistration
- Reporting participation
- Reporting all subsamples

Best Practices in Avoiding Financial Conflicts of Interest

- There are possible conflicts of interests in performing honest research and making money.
- Growth mindset researchers with financial incentives may be less likely to question violations of best practices.

Figure 1
Flowchart Describing the Literature Search

Data Collection with Filters

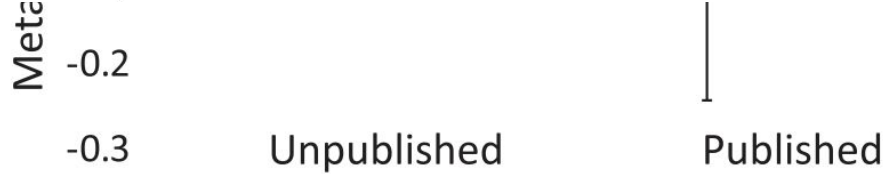


Suspicious Behavior

Figure 3
Differences in Effects of Published Versus Unpublished Growth Mindset Interventions Depending on the Authors' Financial Incentives to Report Positive Effects

Table 3
Studies Described as Preregistered That We Did Not Code as Preregistered and Rationale Why

Study reference	Rationale for not coding as preregistered
Burnette et al. (2018)	No hypotheses or analysis plan about the growth mindset intervention were included in the preregistration
Ganimian (2018)	Preregistration did not include an analysis plan
Orosz et al. (2017)	Authors state the study was in accord with the Declaration of Helsinki, but we could find no record of a preregistration
Yeager, Romero, et al. (2016)	There is no preregistration associated with this study. There is a wiki statement with hypotheses but no methods. It was posted approximately 3 months after data were collected, 3 weeks before manuscript submission. Authors state the study was preregistered before researchers received the data from the third-party research firm, but employees of the third-party research firm were study authors
Yeager, Lee, et al. (2016)	The preregistration contains no hypotheses, methods, or planned analyses for the impact of a growth mindset intervention on academic achievement
Yeager et al. (2018)	The registration was created after examining the data and analyzing a portion (approximately 760 participants) to “inform” the preregistration (see p. 3 of document)



Note. Error bars represent 95% confidence intervals.

Suspicious Behavior

Yeager et al. (2018), Yeager et al. (2019)

We used the 2018 unpublished preprint because 6,222 participants were missing from the published version.

~~version.~~
Authors state they only report the results of 50% of the sample following the preregistered analysis plan. However, according to this document, the first research question and planned analysis described estimating the treatment effect for the whole sample.

Study 1: No Quality Control

Method:

Meta-Analysis 1 included all relevant studies from our comprehensive search, regardless of quality.

Results:

- The overall effect of growth-mindset interventions in this model, if not accounting for publication bias, was small and statistically significant: $d = 0.05$
 - This corresponds to a 98% overlap between the control and the intervention.
 - It is less when taking into account publication bias.
- Results did not differ significantly for low-SES students

Meta-Analysis 2: Minimal Standard of Evidence

Method:

Leniently, the authors included studies that demonstrated mindset being changed to a growth mindset. (25/96 effect sizes).

Results:

- There was no significant growth mindset intervention effect on academic achievement
- There were not enough papers with financial incentives to conduct a moderator analysis (lack of best practices).

Meta-Analysis 3: Best Available Evidence

Method:

Use the 10 best practices before (e.g. blinding, careful control, all samples reported, etc.) to filter out papers. No papers had more than 8. Only six papers had more 5.

Results:

- When examining these interventions, there was no significant growth mindset intervention effect on academic achievement.
- Since not all best practices are equal, they tried 230 different combinations of best practices with 3 or more best practices and at least 5 papers. **After correcting for publication bias, there were no significant models**



Table 15
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Mcnamara et. al

Growth Mindset
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Limitations

- Limited amount of research in the timeframe when the meta-analysis was conducted.
- Only English documents.
- Quality of included studies is lacking.

Discussion

- Is growth mindset intervention helpful? Not well supported.
 - “Growth mindset is a recursive process over time.” Not well supported.
 - “Growth mindset helps struggling students.” Not well supported.
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- At the end of the day, future research needs to be done with better design practices
 - Avoid hype
 - Weigh potential harms and benefits