

# A Meta-Meta-Analysis: Identifying Typical Conditions of Meta- Analyses in Educational Research

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# Our Objective

- × To identify a comprehensive and recent overview of **meta-analytic conditions** in educational research.
  - × For **future simulation studies** on meta-analytic techniques.

# Meta-Analysis (MA)

- × **Popular** statistical tool in many research fields.
  - × **Overall conclusions** from different independent studies.
- × Often used in **decision making** for policymakers and clinical practitioners in educational research.
- × **New meta-analytic models** to extend the range of research questions that can be answered.
  - × Relative recent extension: meta-analytic structural equation modeling (MASEM).

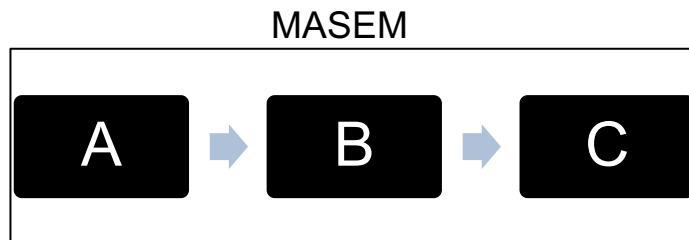
# MASEM

- × To test **multiple relations** between a set of variables in **one model**.
- × Two stages:
  - **Stage 1:** pooled correlation matrix is formed out of different correlation matrices of the variables of interest.
  - **Stage 2:** SEM is fitted on this pooled correlation matrix.
- × Research questions that are **not answered** in the primary studies can be addressed by MASEM.

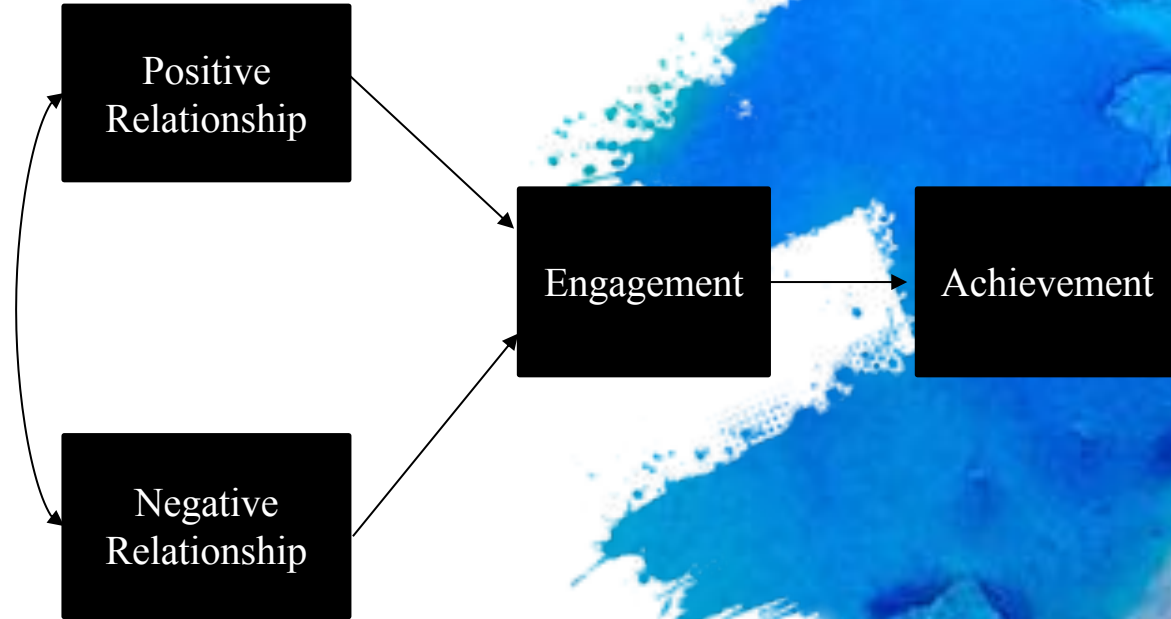
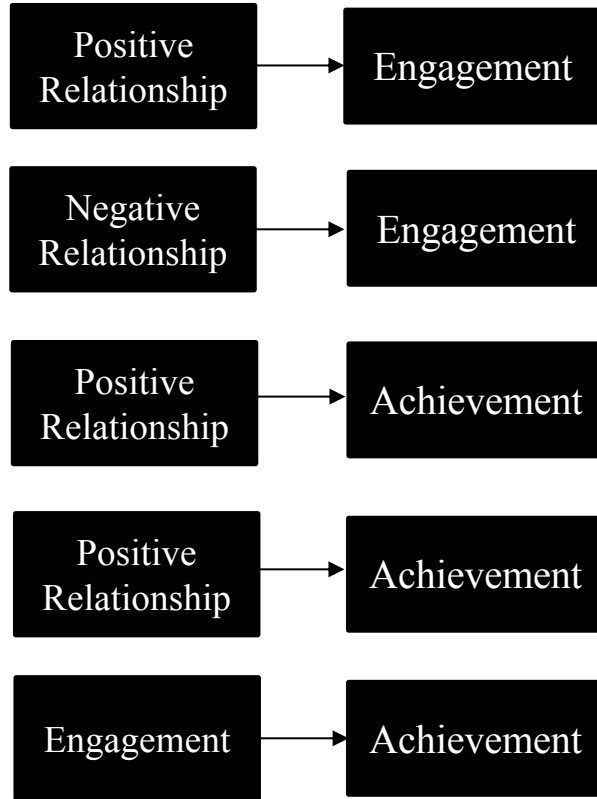
Study 1: A → B

Study 2: B → C

Study 3: A → C



# MA & MASEM



# Simulation Study

- × To **evaluate** the **performance** of new extended meta-analytic techniques.
- × Applying the statistical tool to **several simulated datasets**.
  - × Randomly generated under some specific population model in different conditions of interest.
- × **Comparing** the statistical estimates obtained in each generated datasets with the population values.
- × For **generalization** purposes → important that generated data correspond to realistic research situations.
  - × In educational research → **insufficient** information.



# Method

All articles (i.e., 143) of the journal 'Review of Educational Research' between 2010 and 2017 were screened

84 articles excluded → no meta-analysis  
(first inclusion criteria)

43 articles excluded → did not express effect  
sizes in  $r$ ,  $z$ , or  $\beta$   
(third inclusion criteria)

2 articles excluded → no substantive  
research  
(second inclusion criteria)

14 articles included in  
meta-meta-analysis

# Method

- × Per included meta-analysis → **Coded** relevant **characteristics**.
  - × e.g., number of variables of interest, number of observed effect sizes, sample sizes, and estimated pooled effect sizes.
- × Across meta-analyses → **Calculated minimum, median, mean, and maximum** value of the relevant characteristics.



# Results: A 'typical' MA


- × 44 **included studies** in a 'typical' MA
- × 37150 participants as **total sample size**
- × The **sample sizes of primary studies** included in a 'typical' MA
  - × Minimum: 72
  - × Median: 422
  - × Mean: 1299
  - × Maximum: 18687
- × Three **variables**
- × The actual **pooled effect size** (Pearson's  $r$ )
  - × Minimum: .16
  - × Median and mean: .23
  - × Maximum: .33
- × The **number of observed effect sizes** contributing to a specific pooled effect size
  - × Minimum: 32
  - × Median: 48
  - × Mean: 47
  - × Maximum: 59

# Results

- × 97% : At least one **moderation** analysis.
- × 57% : Interested in investigating relations between **more than two variables**.
- × 36% : Seemed (also) interested in testing **mediation**.

# Discussion

- × Practical issues
  - × **Discrepancy** between **number of primary studies** and **number of observed effect sizes** contributing to a specific pooled effect size.
  - × **Reporting** methodological information.
  - × Limited **timespan**.
- × Most included meta-analyses arose from **complex hypotheses**.
  - × **Extending meta-analytic techniques**.
- × Typical meta-analytic conditions for **future simulation studies** on meta-analytic techniques in educational research settings.



# Thanks!

Any questions?

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