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).
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: \(A \rightarrow B\)

Study 2: \(B \rightarrow C\)

Study 3: \(A \rightarrow C\)
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)

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

43 articles excluded → did not express effect sizes in $r$, $z$, or $\beta$
(third 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
- 37,150 participants as total sample size
- The sample sizes of primary studies included in a ‘typical’ MA
  - Minimum: 72
  - Median: 422
  - Mean: 1299
  - Maximum: 18,687
- 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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