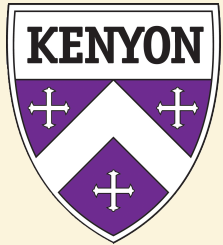


Lies, Damned Lies, and Meta-Analysis



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Origins of Meta-Analysis

- Developed in mid-1970s by Glass, Rosenthal, Schmidt, and others
- Goal: To synthesize increasingly large numbers of studies
- Early issues:
 - Role of unpublished work
 - Quality of constituent studies
 - Fixed vs. random effects

Bias in ES Estimates

- Non-significant studies more likely to be censored from literature (publication bias)
- Non-significant analyses may be swapped for more sig. analyses (*p*-hacking)
- Researchers selectively report sig. analyses as if they were predicted (HARKing)
- Small studies tend to overestimate ES (small study bias)
- ***In reality, published literature reflects an unknown combination of these biases.***

New Techniques

- Meta-regression, esp. PET-PEESE (Stanley & Doucouliagos, 2014)
- Tests of excess significance
 - Ioannidis & Trikalinos (2007)
 - Francis (e.g., 2013)
 - Incredibility index (Schimmack, 2012)
 - R-Index & TIVA (Schimmack, 2014a; 2014b)
- *p*-curve (Simonsohn, Nelson, Simmons, 2014a; 2014b)
- ~~Trim & Fill~~

Practical Concerns

- How should researchers decide which tools to use?
 - Only skeptics/quants use anything more than a simple average, right?!
- Different techniques:
 1. Require different meta-data
 2. Have different assumptions
- How many studies are sufficient?
- Role of heterogeneity?
- Role of covariates/more complex analyses?

Selecting Effects for Meta-Analysis

- Keep everything (Glass, 2015)
- Address study quality (Verhagen et al., 2001)
- Top 10– Keep only the most precise 10% of studies (Stanley et al., 2010)
- Analyze only predicted effects for which $p < .05$ (Simonsohn et al., 2014a, 2014b)

Emerging Issues

- Pre-registration
 - Scooping?
- Cumulative meta-analysis
 - curatescience.org
- Empirical options for testing meta-analytic tools (e.g., with the Many Labs data sets)

Conclusions

- Researchers need practical tools and guidance to do high quality meta-analysis
 - Esp. for complex designs
 - *metafor* (Viechtbauer, 2014)
 - Lakens et al. (in press) paper
- Best practices for adjudicating conflicting test results

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Additional Material

Quality Checklist: For Studies

- The Delphi List (Verhagen et al., 1998)

Item	Options
Was a method of randomization performed?	Yes/No/Don't know
Was the treatment allocation concealed?	Yes/No/Don't know
Were the groups similar at baseline regarding the most important prognostic indicators?	Yes/No/Don't know
Were the eligibility criteria specified?	Yes/No/Don't know
Was the outcome assessor blinded?	Yes/No/Don't know
Was the care provider blinded?	Yes/No/Don't know
Was the patient blinded?	Yes/No/Don't know
Were point estimates and measures of variability reported for the primary outcome measures?	Yes/No/Don't know
Did the analysis include an intention-to-treat analysis?	Yes/No/Don't know

Quality Checklist: For Meta-Analyses

- AMSTAR (Shea et al., 2007)

Item	Options
Was an 'a priori' design provided?	Yes/No/Can't Answer/NA
Was there duplicate study selection & data extraction? (i.e., 2+ coders)	Yes/No/Can't Answer/NA
Was a comprehensive literature search performed?	Yes/No/Can't Answer/NA
Was the status of publication (i.e., grey literature) used as an inclusion criterion?	Yes/No/Can't Answer/NA
Was a list of studies (included and excluded) provided?	Yes/No/Can't Answer/NA
Were the characteristics of the included studies provided?	Yes/No/Can't Answer/NA
Was the sci. quality of the included studies assessed & documented?	Yes/No/Can't Answer/NA
Was the scientific quality of the included studies used appropriately in formulating conclusions?	Yes/No/Can't Answer/NA
Were the methods used to combine findings of studies appropriate?	Yes/No/Can't Answer/NA
Was the likelihood of publication bias assessed?	Yes/No/Can't Answer/NA
Was the conflict of interest stated?	Yes/No/Can't Answer/NA

Lakens et al. (in press), *BMC Psych*

- Six Recommendations for Reproducibility of Meta-analyses
 1. “Future proof:” Disclose all meta-data with quotes from text
 2. Quality Control: At least 2 coders, formulas for ES conversions and calculations
 3. PRISMA: Report essential info
 4. Pre-register: Set your protocol ahead of time to distinguish confirmatory from exploratory tests
 5. Share your data and code to facilitate re-analysis
 6. Consult a statistician and a librarian

Effect of Temperature on Pro and Antisocial Behavior

- With Dermot Lynott (U. Lancaster)
- Heat causes antisocial behavior
(Baron, 1972; Baron & Lawton, 1972; Baron & Bell, 1975; Baron & Bell, 1976; Baron, 1976; Bell & Baron, 1976; Bell & Baron, 1977; Palmarek & Rule, 1979; Bell, 1980; Kenrick & McFarlane, 1986; Vrij & Van der Steen, 1994; Boyanowsky, 1999; Breines, 2012; Fay & Maner, 2014; Gockel et al., 2014)
- Heat primes warmth → prosocial behavior
(Schneider, Lesko, & Garrett, 1980; Williams & Bargh, 2008; Kang et al., 2011; Kolb et al., 2012; Ijzerman et al., 2013; Story & Workman, 2013; Lynott et al., 2014; Lynott, 2014; Lynott et al., 2015)
- Write me for more info!