Using multiverse meta-analyses to investigate the robustness of mental health research on psychological treatments for depression

Constantin Yves Plessen


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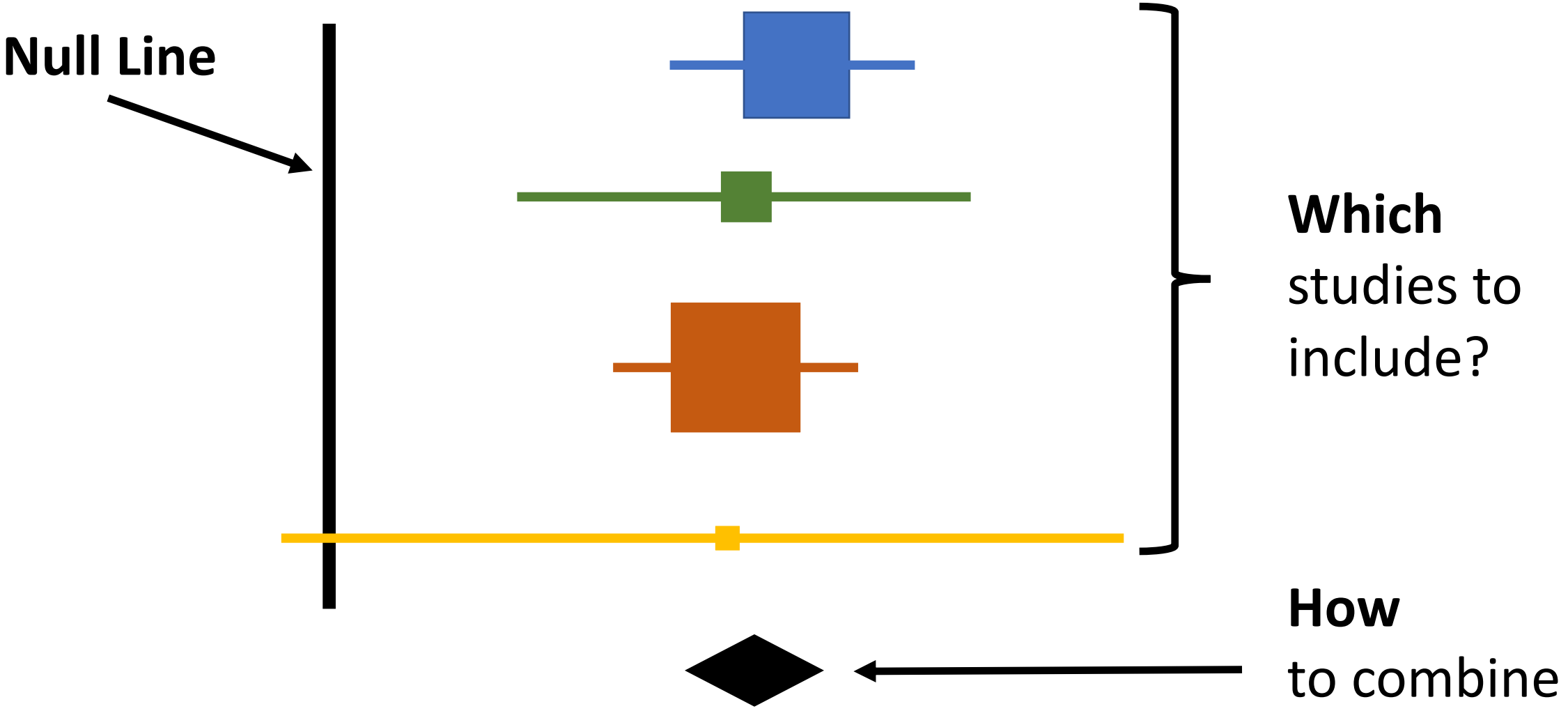
#EACLIPT 2022

Overview

1. Multiverse Meta-Analyses

2. Psychological Treatments for Depression

1 What has been done so far?


Null Line
Which studies to include?
How to combine them?

Review Article

Which Data to Meta-Analyze, and How?

A Specification-Curve and Multiverse-Analysis Approach to Meta-Analysis

Martin Voracek, Michael Kossmeier, and Ulrich S. Tran

Department of Basic Psychological Research and Research Methods, Faculty of Psychology, University of Vienna, Austria

OSF *R* code: https://osf.io/ac96w/

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Which Data to Meta-Analyze, and How?

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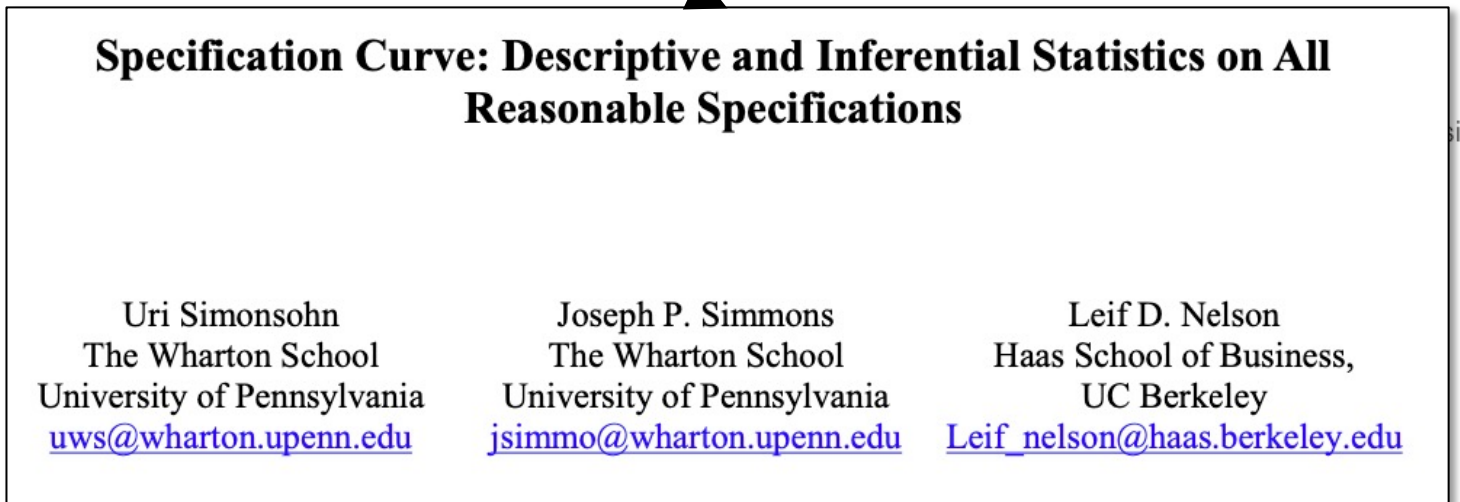

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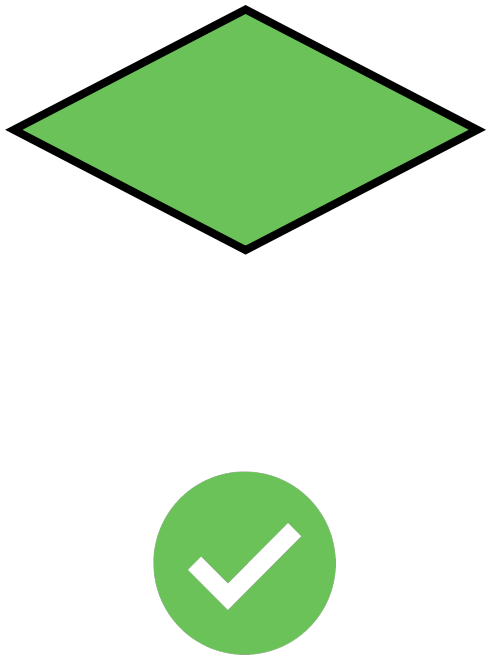
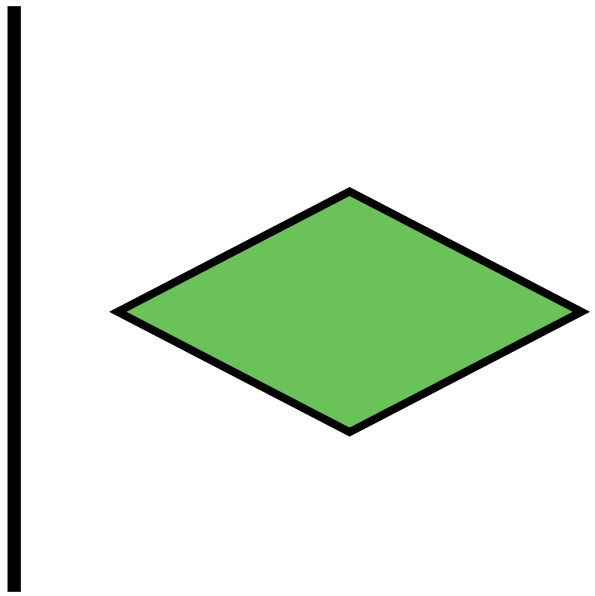
2 Why do multiverse meta-analyses?

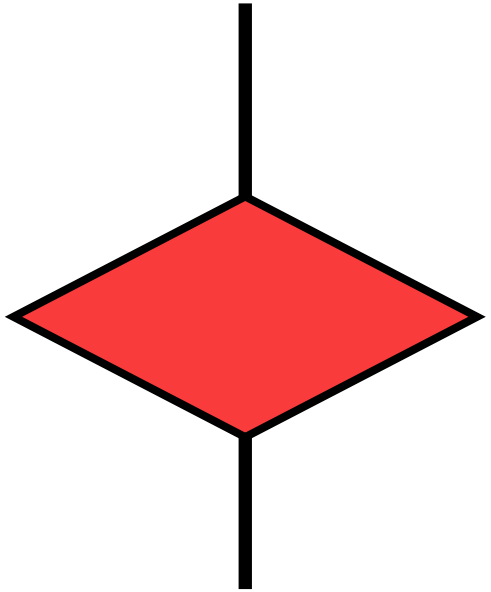
Meta-Analysis A



Meta-Analysis A



Meta-Analysis B



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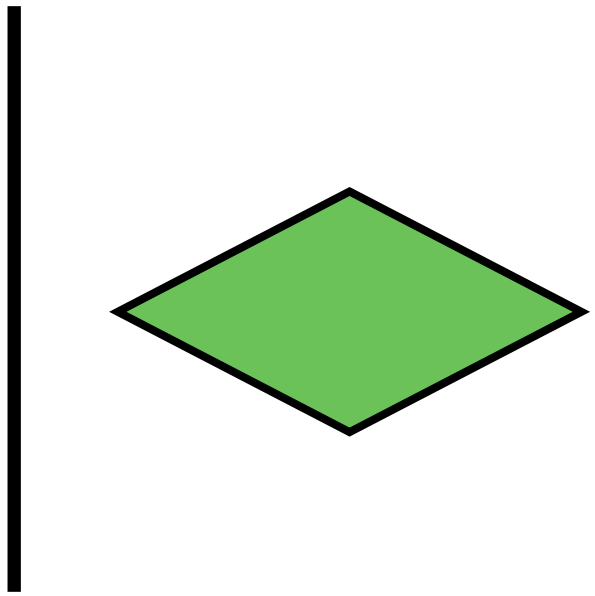
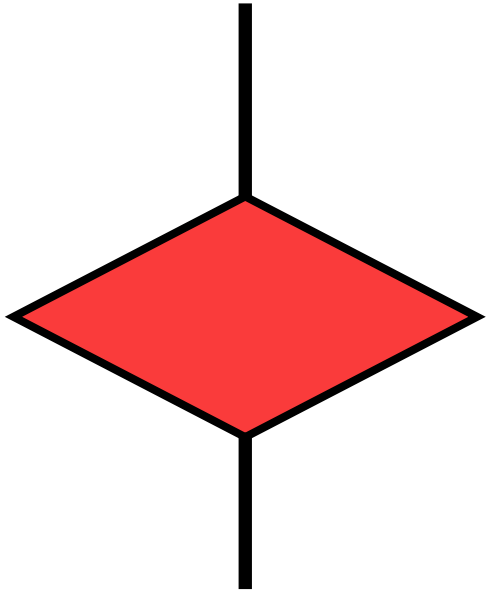
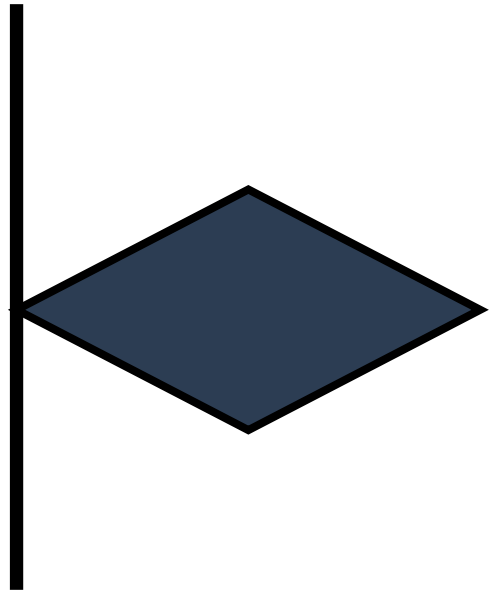


Meta-Analysis B



Meta-Analysis C



Arbitrary paths a meta-analyst can walk

- **Study Inclusion?**
- **Removing Outliers?**
- **Risk of bias?**
- **Which effect size estimator?**
- **Correction for publication bias?**

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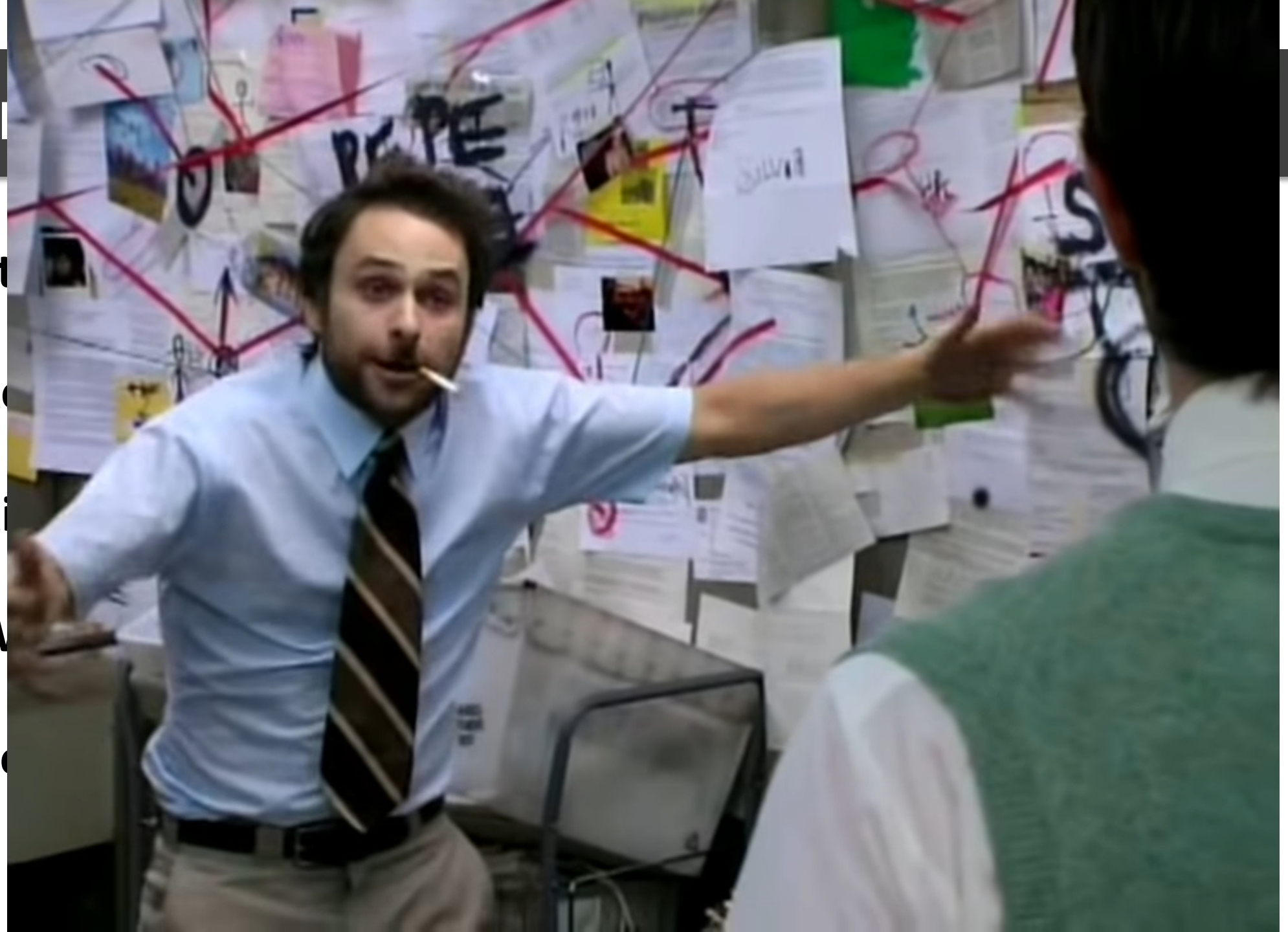
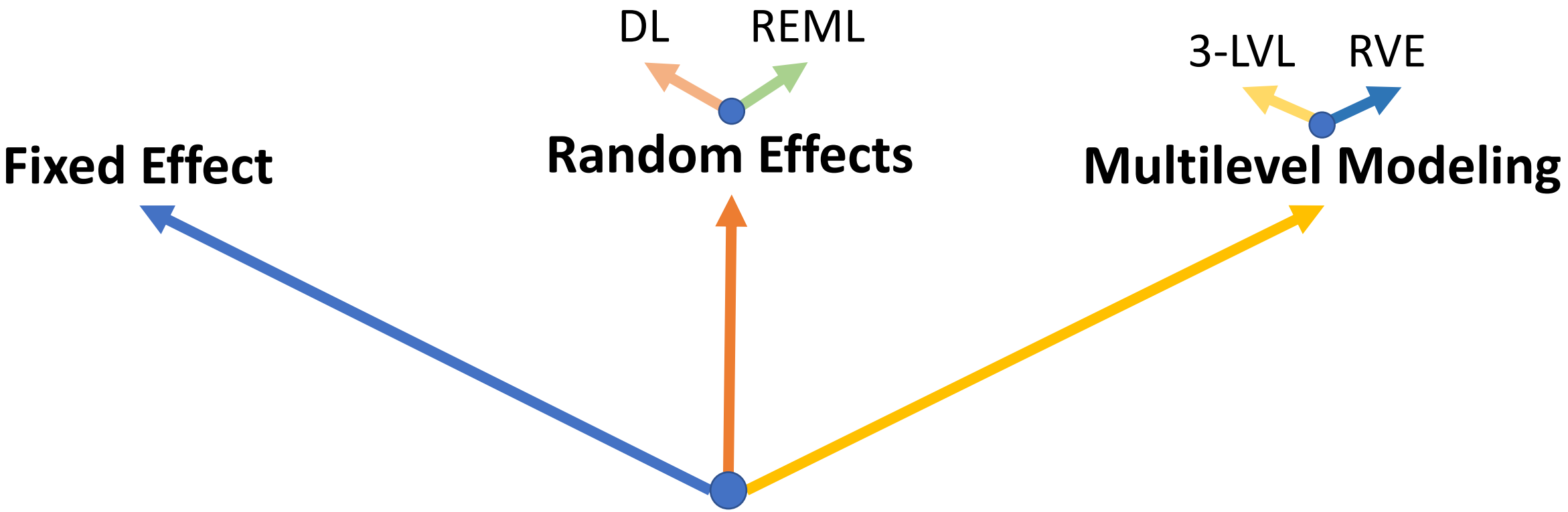


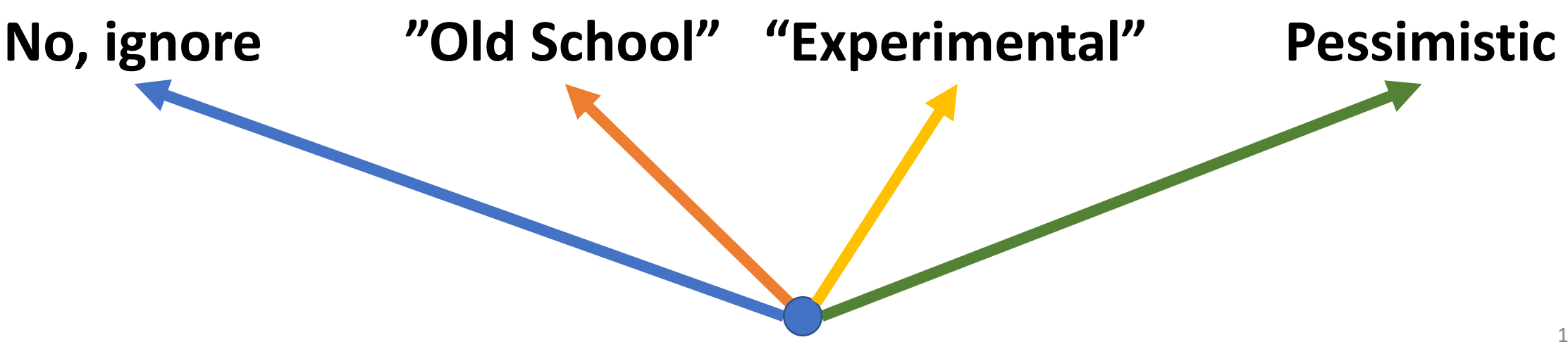
3 How to do multiverse meta-analyses?

Inclusion Based on Risk of Bias Assessment

Choosing an Estimator



Correcting for Publication Bias



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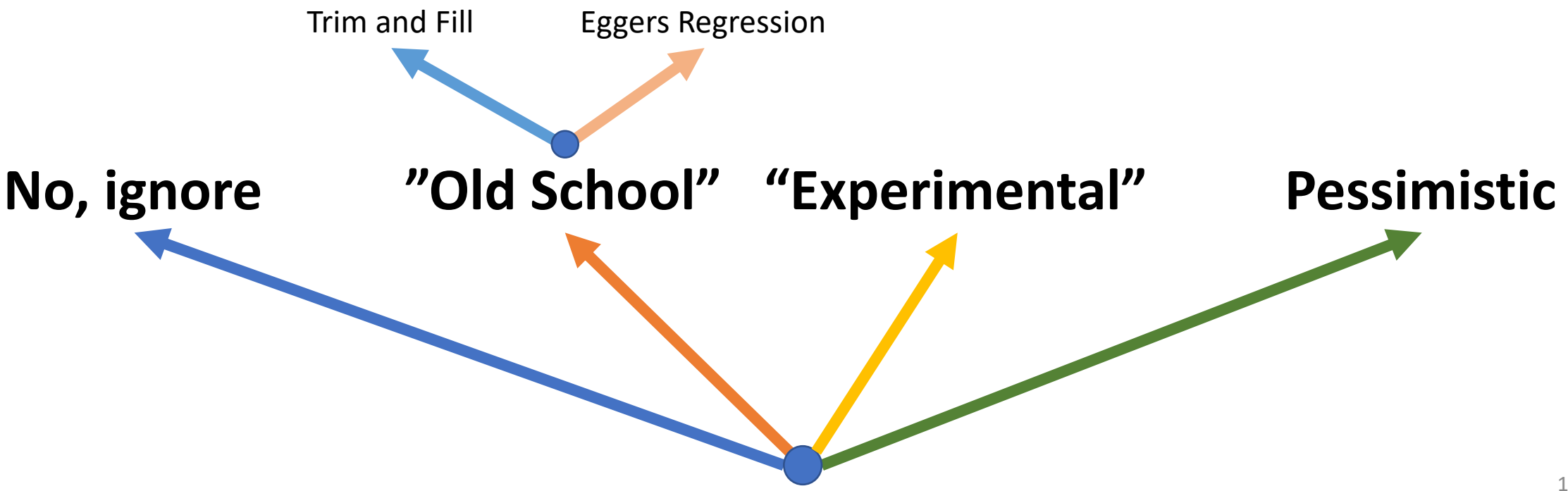

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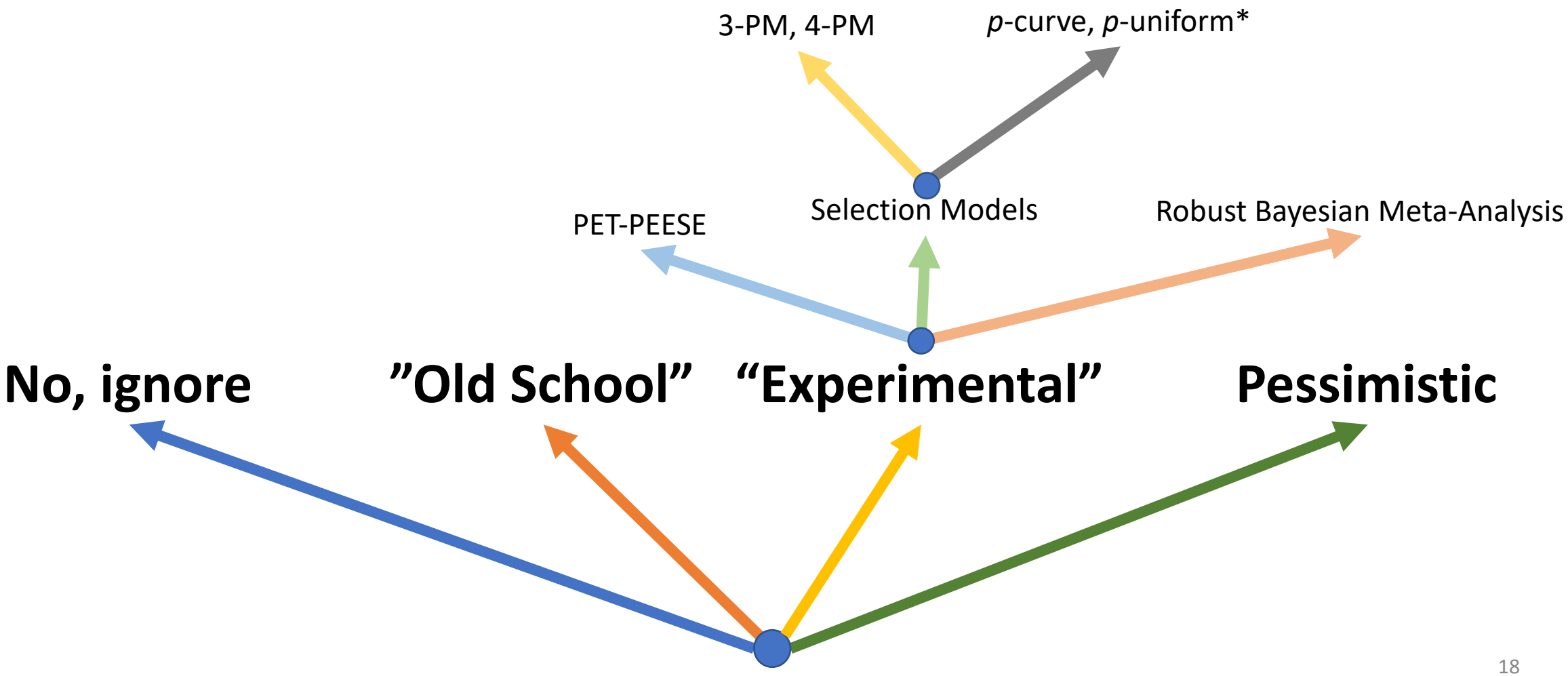
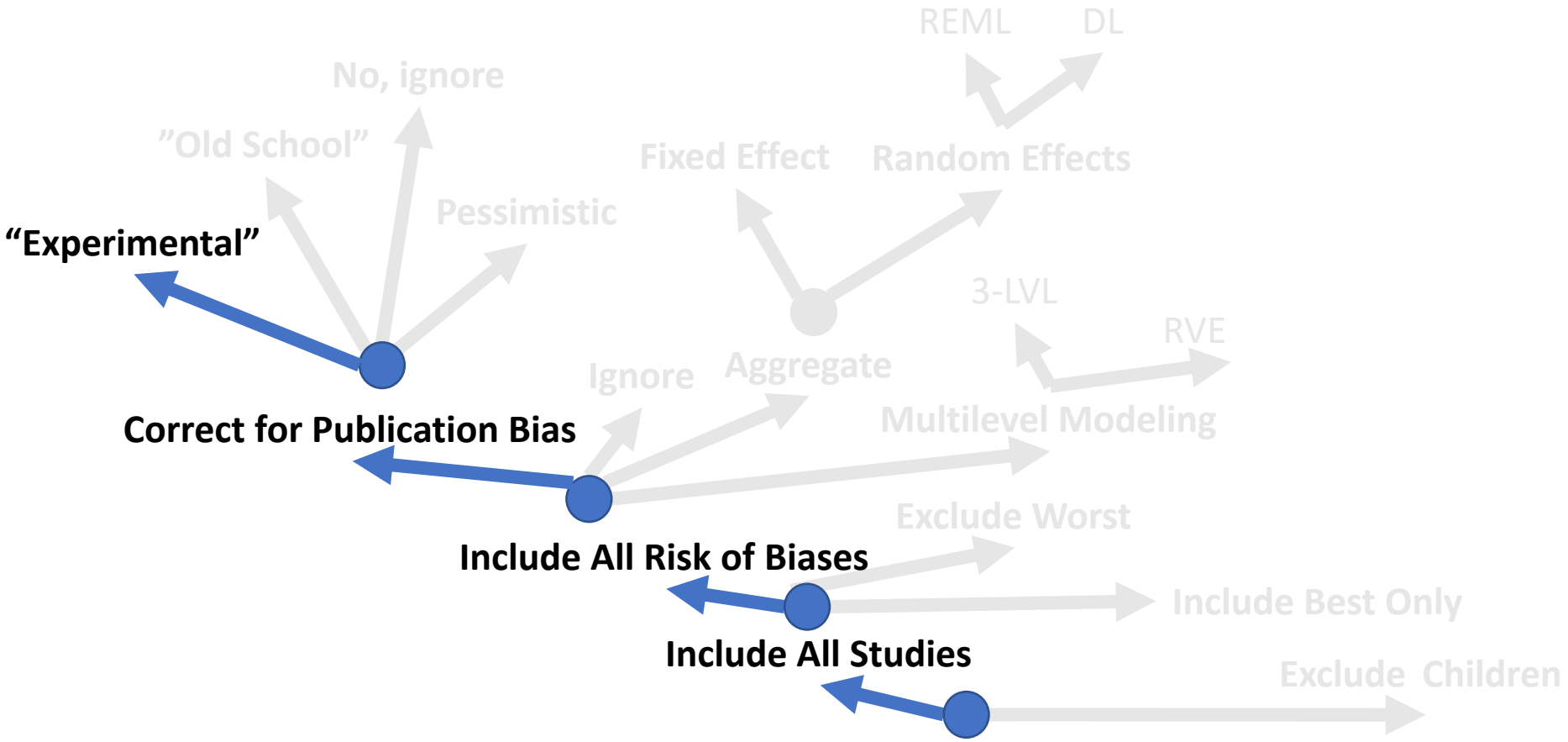
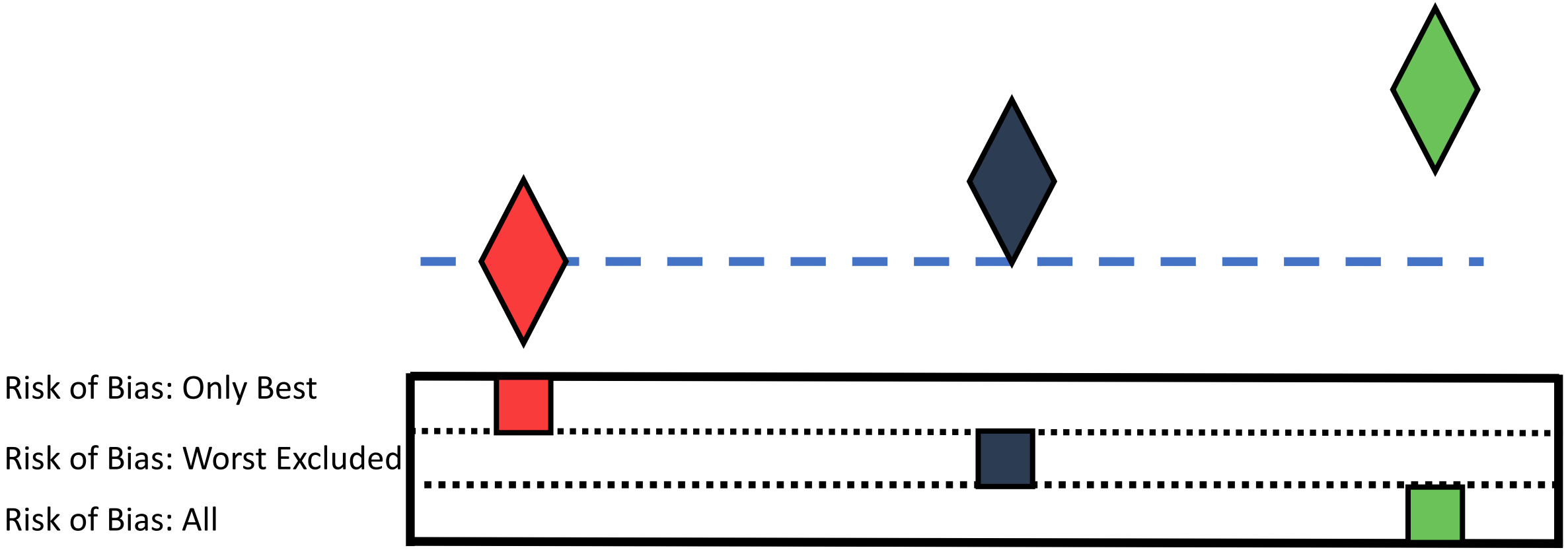
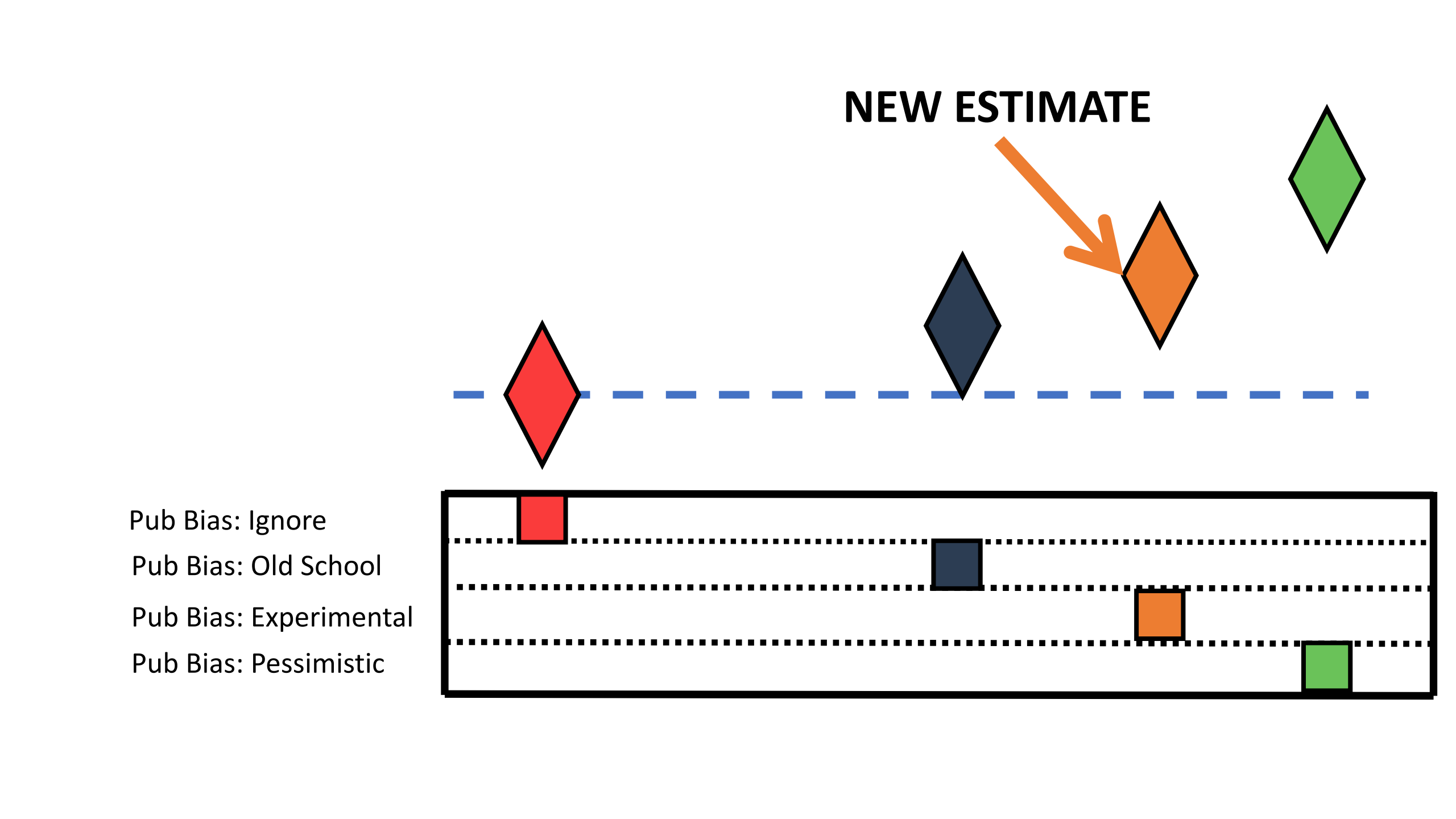


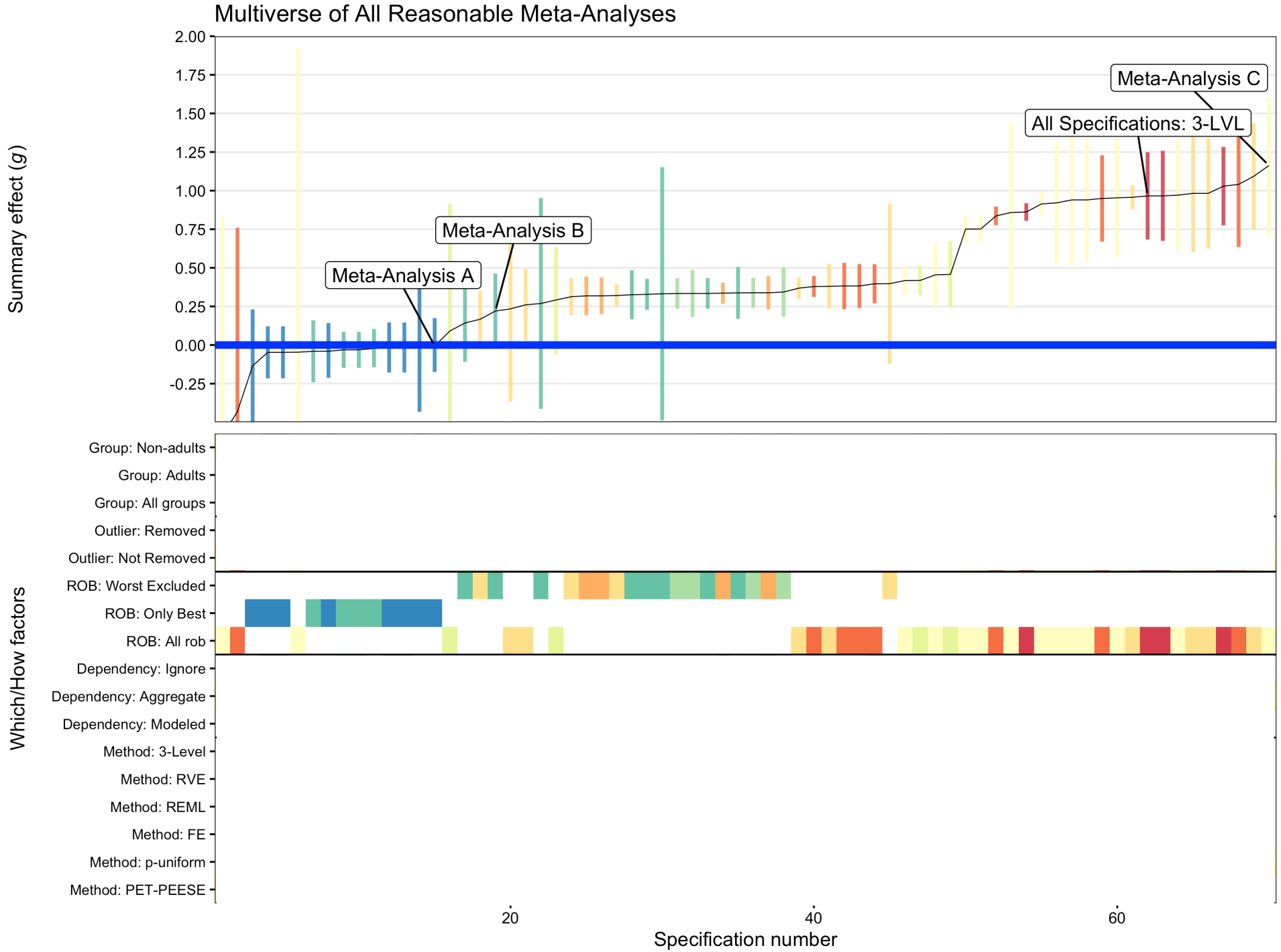
Example multiverse of meta-analyses

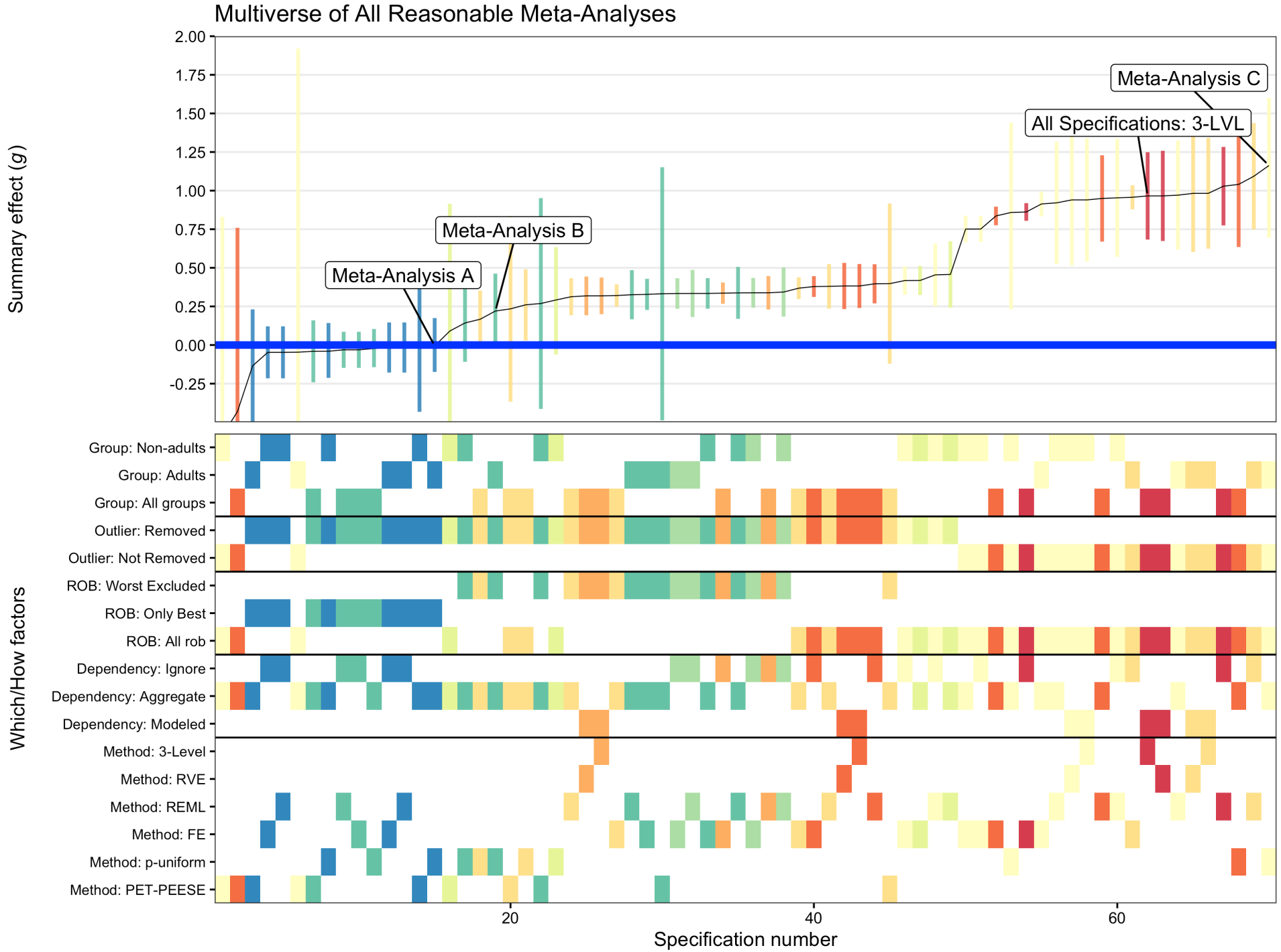


Visualizing the Multiverse of Meta-Analyses




NEW ESTIMATE
Pub Bias: Ignore
Pub Bias: Old School
Pub Bias: Experimental
Pub Bias: Pessimistic


Multiverse of All Reasonable Meta-Analyses
Summary effect (g)
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
-0.25
Meta-Analysis A
Meta-Analysis B
Meta-Analysis C
All Specifications: 3-LVL
Which/How factors
Group: Non-adults
Group: Adults
Group: All groups
Outlier: Removed
Outlier: Not Removed
ROB: Worst Excluded
ROB: Only Best
ROB: All rob
Dependency: Ignore
Dependency: Aggregate
Dependency: Modeled
Method: 3-Level
Method: RVE
Method: REML
Method: FE
Method: p-uniform
Method: PET-PEESE
20
40
60
Specification number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Psychological Treatments for Depression

- Dozens (hundreds?) of meta-analyses on psychological interventions for depression

- Multiverse containing data from
  - 415 RCTs
  - 1,206 included effect sizes
  - A sample size of 71,454 participants.
  - Psychological Treatments VS Control Groups

Key findings

- **4,281 estimated meta-analyses**
- **90% produced clinically relevant effect sizes**

✓**Overall, psychotherapy is effective in treating depression regardless of:**

- **Type of treatment**
- **Format**
- **Type of diagnosis**
- **Target group**

Key findings

- **However**, meta-analyses are likely to produce inflated ES if they
  - 1) restrict their control group to **wait-list control groups**,
  - 2) do not exclude **high-risk of bias studies**,
  - 3) do not **correct for publication bias.**

Future meta-analyses diverging from **small-to-medium summary effect sizes** indicate of extreme data analytical decisions.

Suggested Reading


Review Article

Which Data to Meta-Analyze, and How?

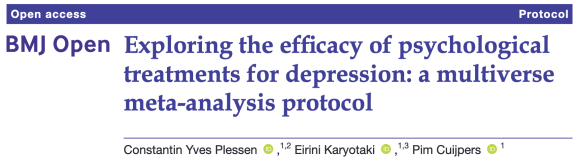
A Specification-Curve and Multiverse-Analysis Approach to Meta-Analysis

Martin Voracek, Michael Kossmeier, and Ulrich S. Tran

Department of Basic Psychological Research and Research Methods, Faculty of Psychology, University of Vienna, Austria

Voracek, M., Kossmeier, M., & Tran, U. S. (2019). Which data to meta-analyze, and how? *Zeitschrift für Psychologie*. https://doi.org/10.1027/2151-2604/a000357

R code for correlational meta-analyses: https://osf.io/ac96w/


Open access Protocol

BMJ Open Exploring the efficacy of psychological treatments for depression: a multiverse meta-analysis protocol

Constantin Yves Plessen [1,2] Eirini Karyotaki [1,3] Pim Cuijpers [1]

Plessen, C. Y., Karyotaki, E., & Cuijpers, P. (2022). Exploring the efficacy of psychological treatments for depression: a multiverse meta-analysis protocol. *BMJ open*, *12*(1), e050197. http://dx.doi.org/10.1136/bmjopen-2021-050197

Mülltiverse Analysis

March 7, 2021 Julia Rohrer 1 Comment

Rohrer, J. (2020). Mülltiverse Analysis. http://www.the100.ci/2021/03/07/mulltiverse-analysis/

Thank you

GitHub

cyplessen

- Slides
- Code

GitHub

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