Three level meta-analyses

Wim Van den Noortgate & Wilfried Cools
Katholieke Universiteit Leuven, Belgium

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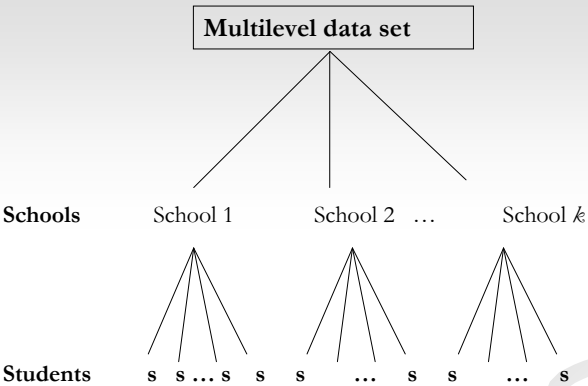

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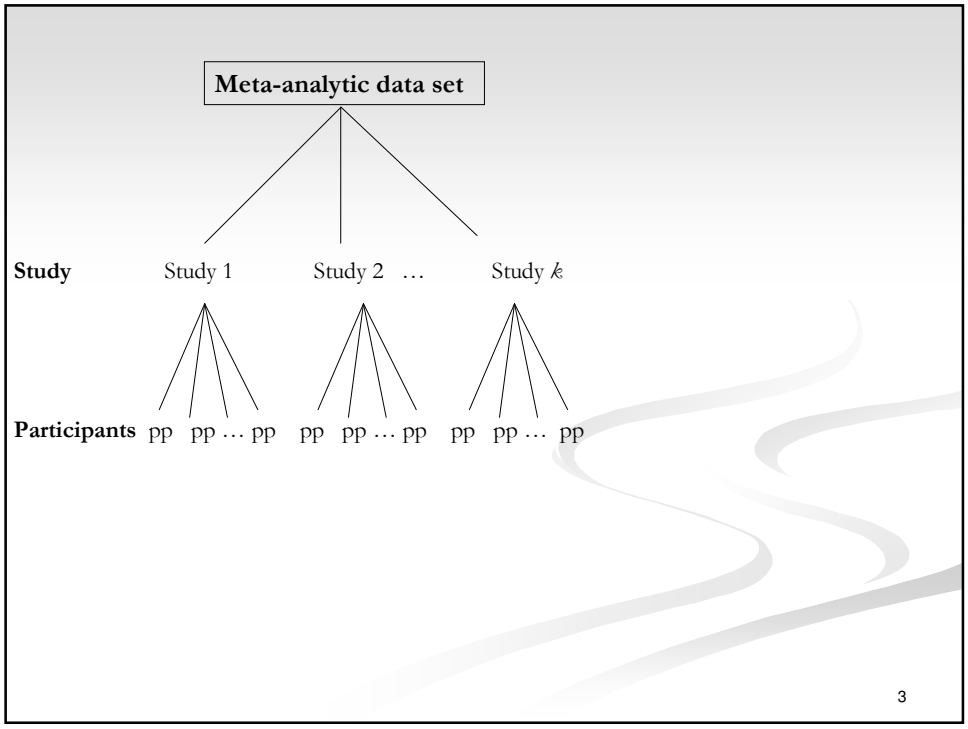
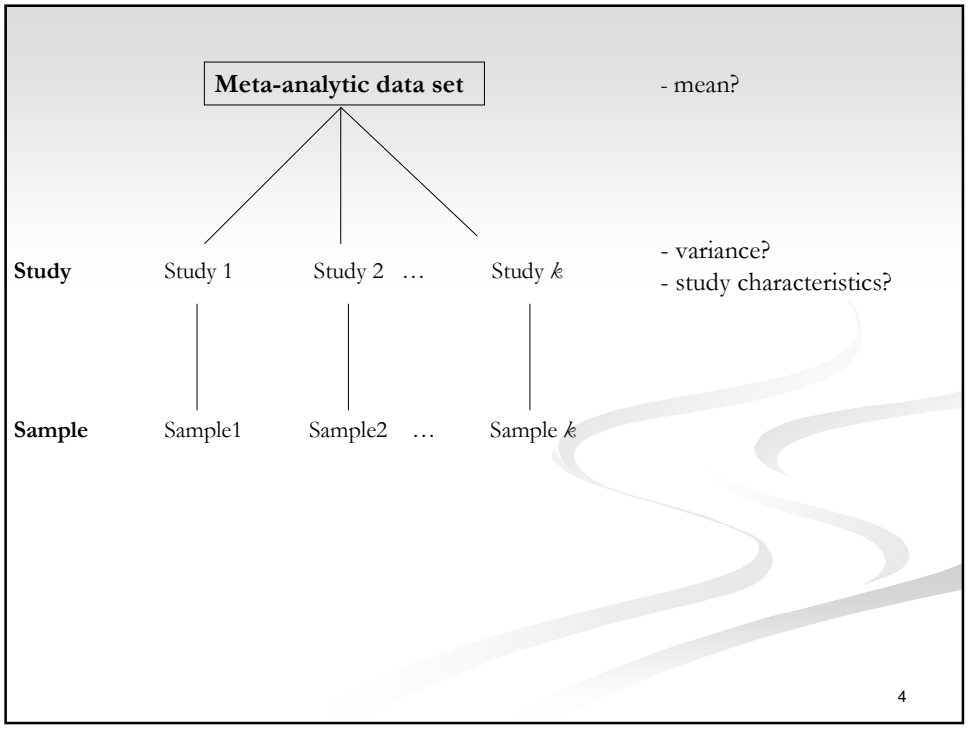

Meta-analytic data set
Study
Study 1
Study 2 …
Study k
Participants
pp pp … pp
pp pp … pp
pp pp … pp
3


Meta-analytic data set
- mean?
- variance?
- study characteristics?
Study
Study 1
Study 2 …
Study k
Sample
Sample1
Sample2 …
Sample k
4

Example 1: Mechanisms of masked priming: A meta-analysis

Van den Bussche, E., Van den Noortgate, W., & Reynvoet B. (Psychological Bulletin, 2009)

→ 23 studies, 88 experiments

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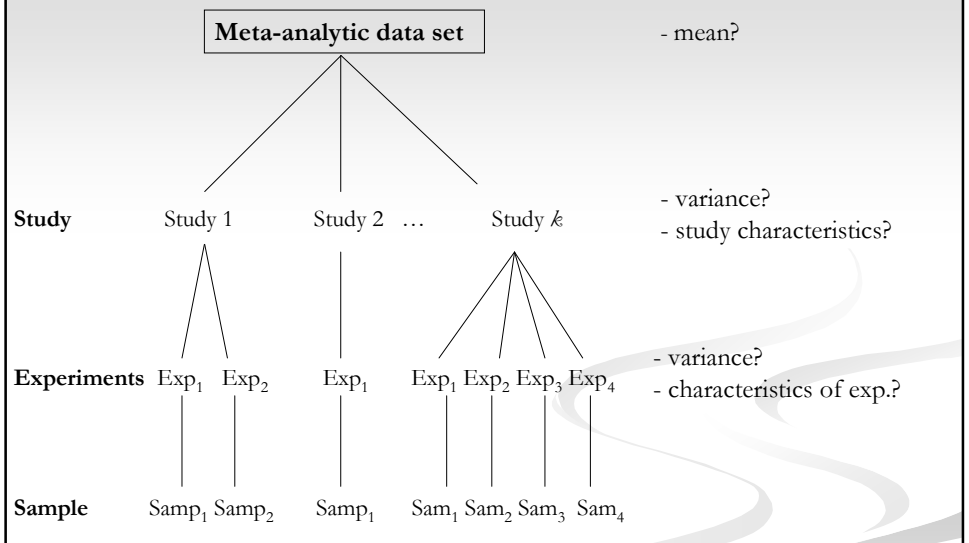

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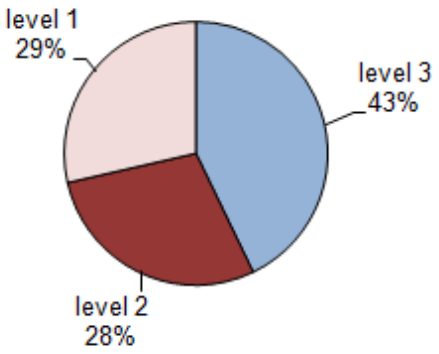
Random Effects Model



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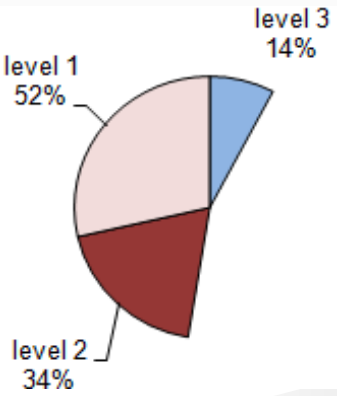
Mixed Effects Model



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Example 2: The effect of choice-making as an intervention for problem behavior: A meta-analysis

Van den Noortgate & Onghena (2009). *Evidence-Based Communication Assessment and Interventions*

Reanalysis of

Shogren, K.A. et al. (2004), *Journal of Positive Behavior Interventions*

→ 13 single-case studies, 31 cases

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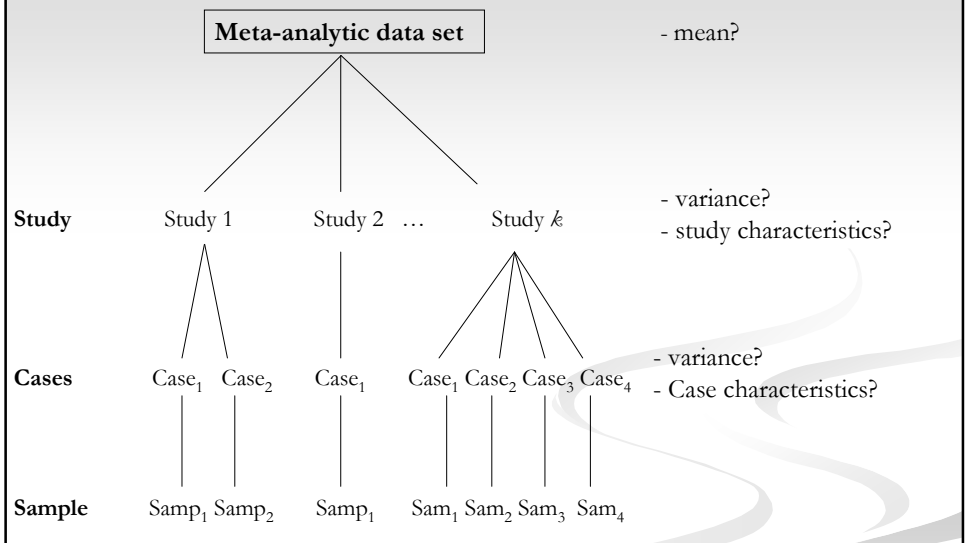

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Fixed		
Intercept	1.72 (0.35)	
Male		
Choice		
Variances		
Level 3:	0.51 (0.81)	
Level 2:	2.11 (0.79)	
Level 1:	0.19	

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Fixed		
Intercept	1.72 (0.35)	1.60 (0.63)
Male		0.09 (0.67)
Choice		0.22 (0.85)
Variances		
Level 3:	0.51 (0.81)	0.60 (0.97)
Level 2:	2.11 (0.79)	2.23 (0.87)
Level 1:	0.19	0.19

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Fixed			
Intercept	1.72 (0.35)	1.60 (0.63)	1.43 (0.58)
Male		0.09 (0.67)	0.20 (0.68)
Choice		0.22 (0.85)	0.26 (0.78)
Variances			
Level 3:	0.51 (0.81)	0.60 (0.97)	----
Level 2:	2.11 (0.79)	2.23 (0.87)	2.73 (0.79)
Level 1:	0.19	0.19	0.19

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- How many studies do you need for a powerful meta-analysis?
- Use of ML-Des (*MultiLevel Design Efficiency by simulation*, Cools, Van den Noortgate & Onghena, *Behavior Research Methods*, 2008)
- Meta-analysis used as a 'pilot' study, *k* and effect size varied.
- Number of cases/study: 1-5; number of observation/case: 15-35

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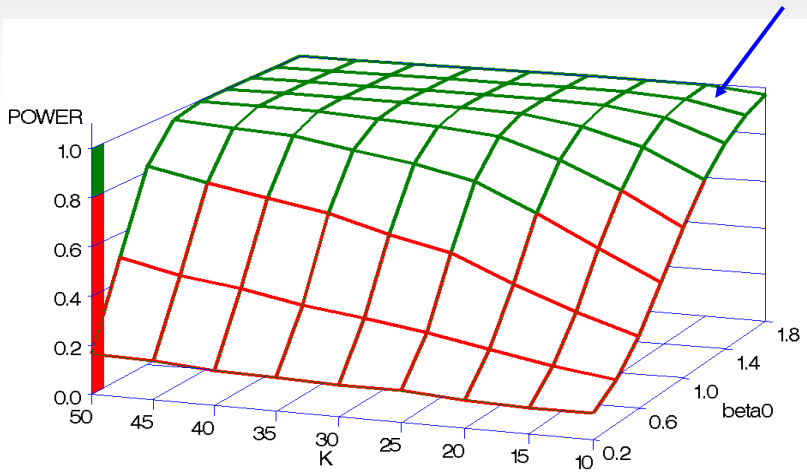
Power for the overall effect



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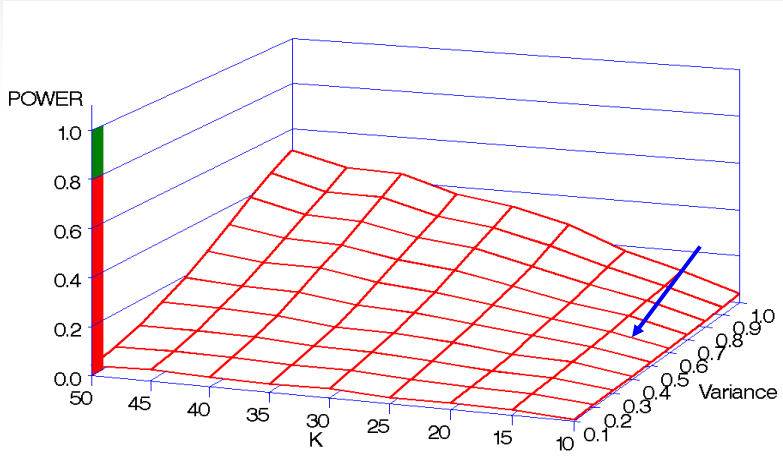
Power for the between study heterogeneity (Wald)



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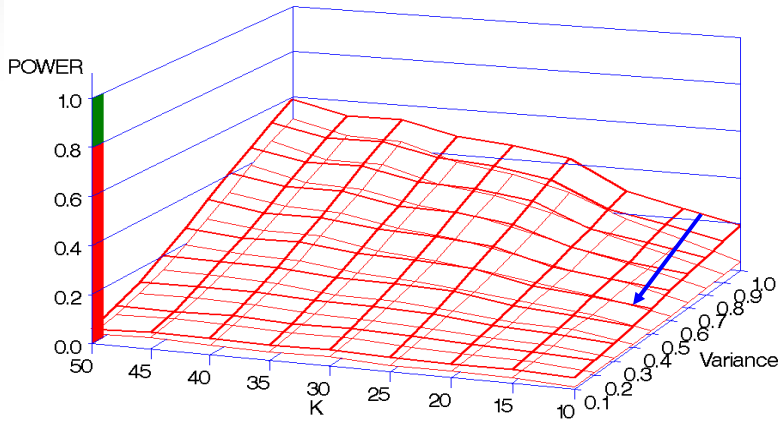
Power for the between study heterogeneity (LRT)



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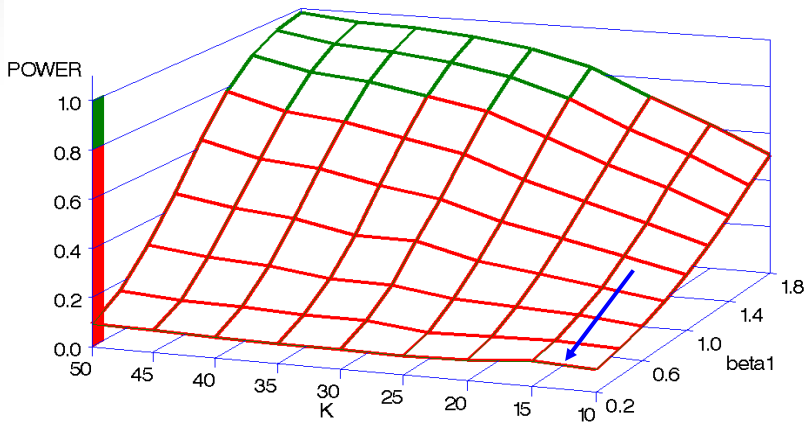
Power for the 'Choice' effect



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Conclusions

- Using a three-level model for dependent effect sizes

- Meta-analyses not always powerful
- Power depends on the parameter
- A simulation approach for more complex models, e.g., ML-Des

Thank you

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