Philipps Universität Marburg

GIMME, GIMME more (network models): Multiverse analysis for dynamic network models

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Analytical Flexibility in Time Series Modeling

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- Many analytical choices: Model selection, preprocessing, model specification, interpretation...
- Often, only one set of choices is conducted and reported
- Robustness to arbitrary choices is underappreciated

GIMME

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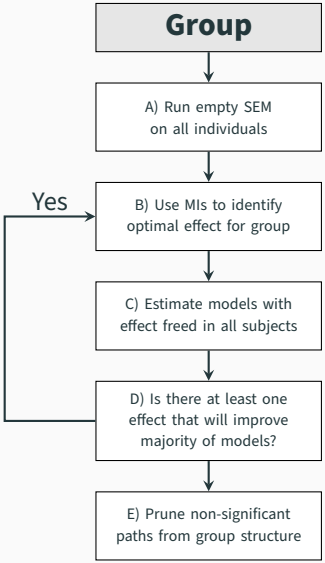

Adapted from Gates et al., 2017

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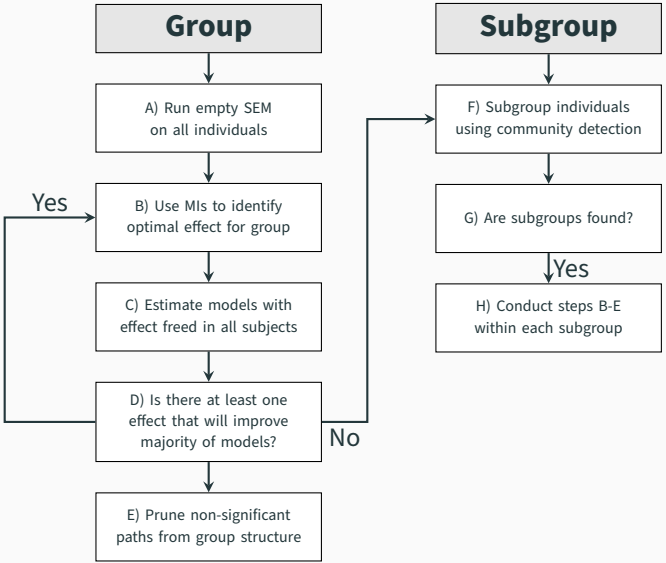

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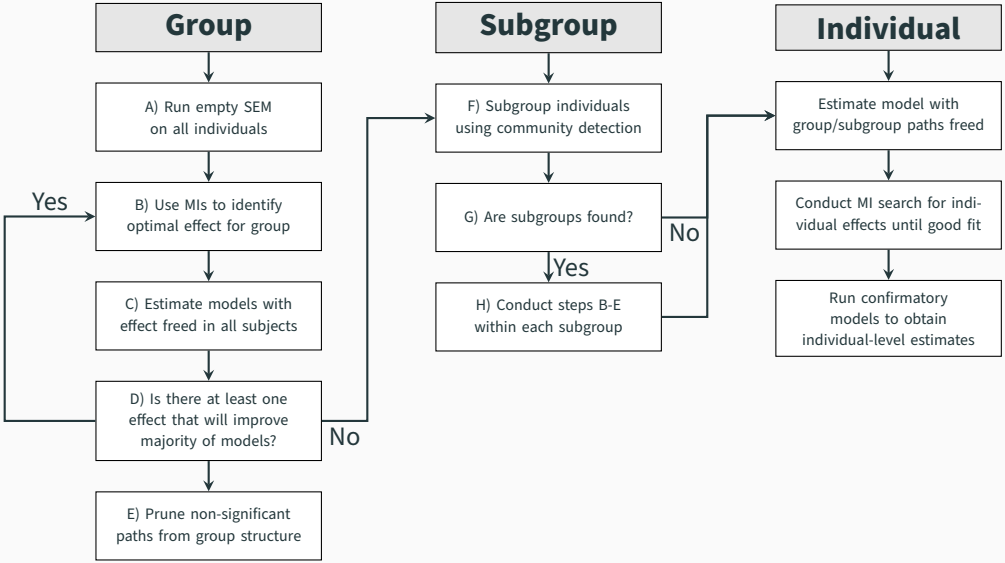

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This Study

- Investigate the impact of arbitrary alternative modeling decisions on previously published results
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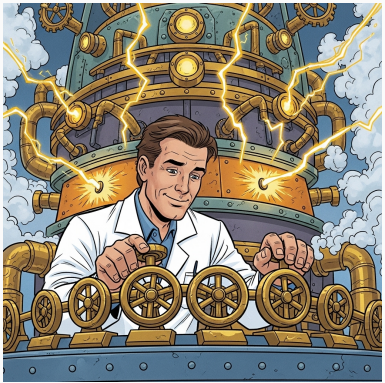

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Datasets

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Personality Dataset (Wright et al., 2019):

- $n = 94$ participants with personality disorder diagnosis, average $t = 91.48$ (1x/day)
- Items: Affect, interpersonal behavior, stress, and functioning (all sum scores), and daily functioning (5-point Likert)

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Emotion Dataset (Kullar et al., 2024):

- $n = 105$, average $t = 62.31$ ($SD = 8.11$)
- Items: Nine momentary emotions (Likert 7-point)

GIMME Variations

1. Group threshold $\in \{50\%, 60\%, \mathbf{75}\%, 80\%\}$
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Five parameters refer to the fit indices used for model selection:

3. RMSEA cutoff $\in \{.03, .\mathbf{05}, .08\}$
4. SRMR cutoff $\in \{.03, .\mathbf{05}, .08\}$
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6. CFI cutoff $\in \{.90, .\mathbf{95}, .97\}$
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Conducted a small simulation study showing the arbitrariness of these choices

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  - For 12 individuals, the most central node was identical to the reference model in less than one-third of all specifications

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  - On average, $\sim$ 9 paths different in absence/presence from reference fit
  - For those different effects: Absolute average difference of 0.2

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- **Subgroup**:
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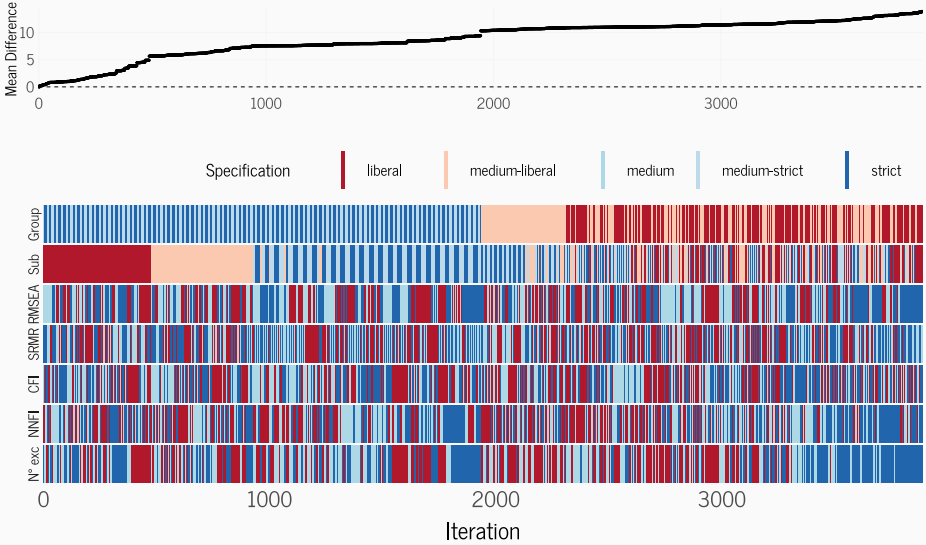
  - Subgroup threshold of 50% instead of 51%: Change of 128 paths
- **Individual**
  - On average, $\sim$ 9 paths different in absence/presence from reference fit
  - For those different effects: Absolute average difference of 0.2
  - For 30 individuals, the most central node was identical to the reference model in less than one-third of all specifications

Emotion Results



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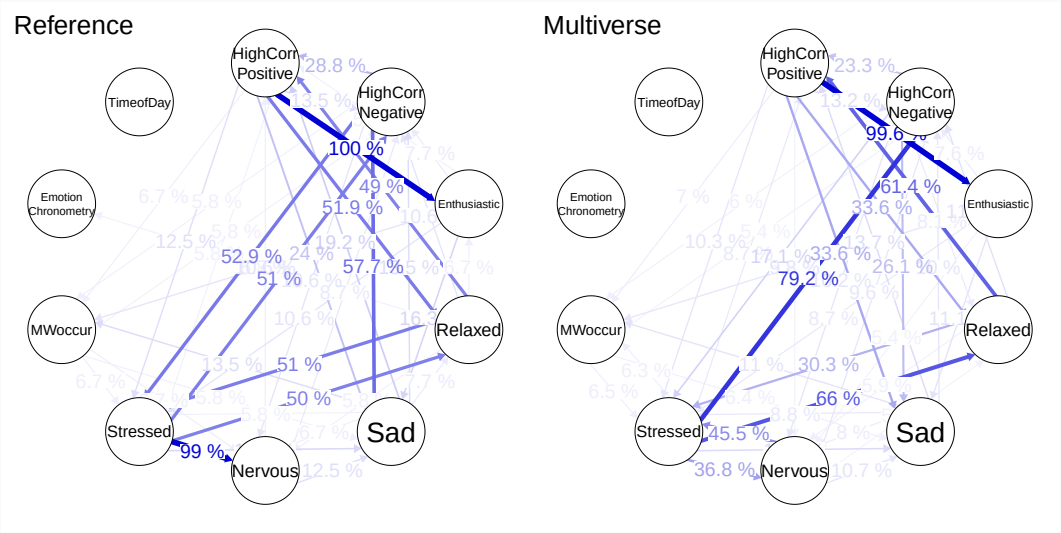

Shiny App

Shiny App for the paper "Network Multiverse" (Siepe & Heck, 2023). Find the source code on GitHub.

Takeaways

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Broader implications:

- Multiverse has often focused on preprocessing, but is relevant for algorithmic decisions
- Interesting relationship between simulation studies and multiverse analyses

Get In Touch

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- https://bsiepe.github.io/

Paper & Slides

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