

The patient-as-fixed-effect fallacy

Consequences for statistical power and Type I errors

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Introduction

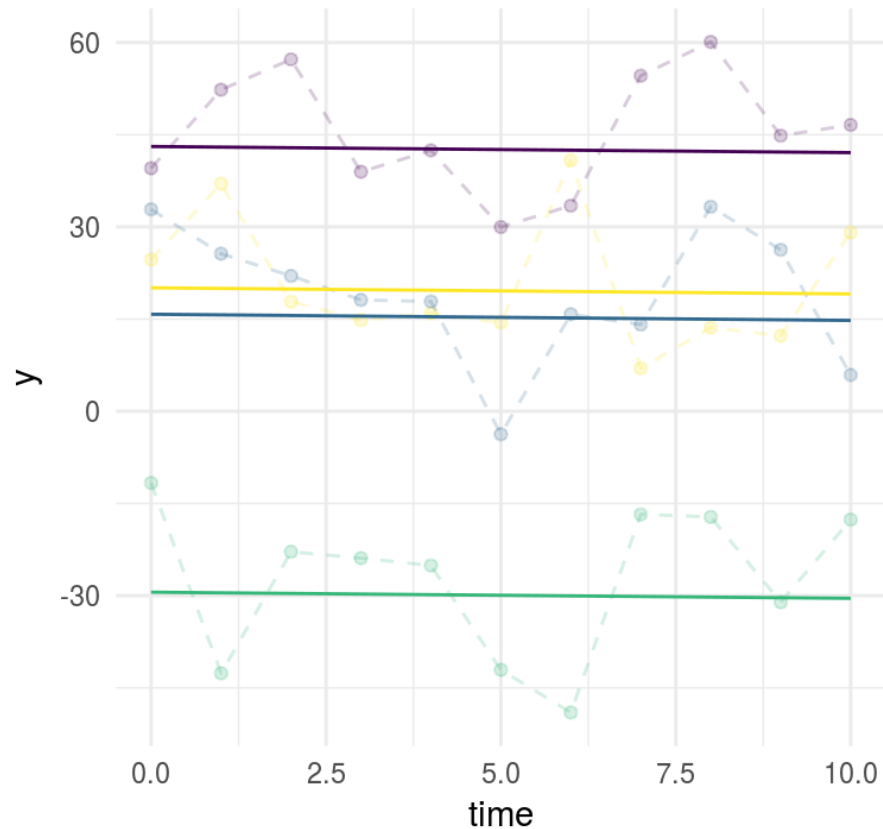
- In clinical psychology patients are often repeatedly measured during the treatment period.
- The data are usually analyzed using linear mixed-effects models (LMMs).
- Researchers have many choices to make (researchers degrees of freedom)
- These modeling choices influence both Type I and II errors.

Aim

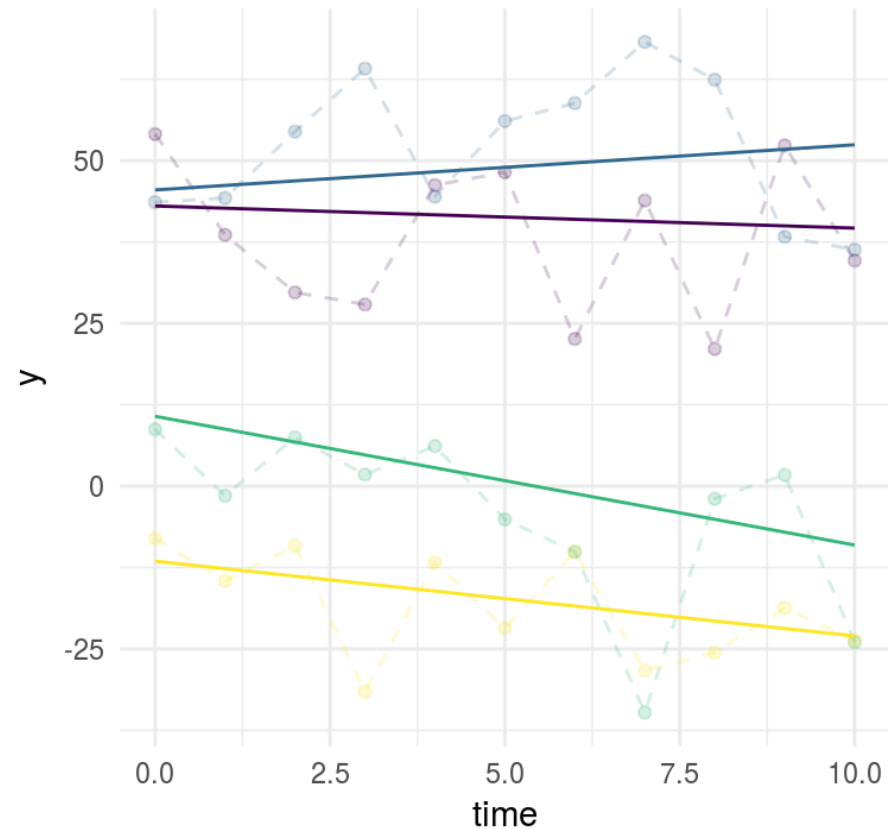
- Investigate the consequences of ignoring a random slope on:
 - Power
 - Type I errors

The models

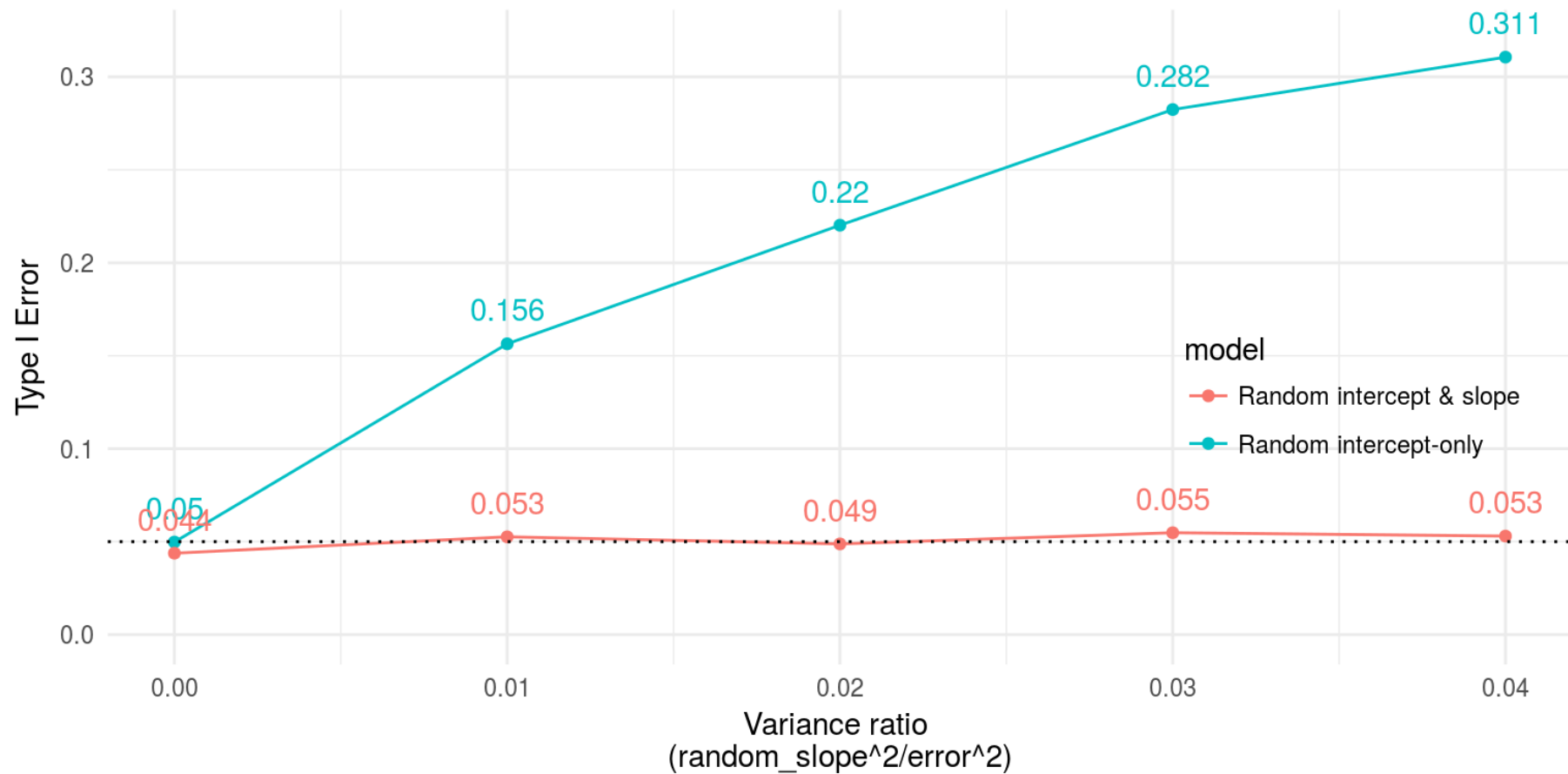
Random intercept-only



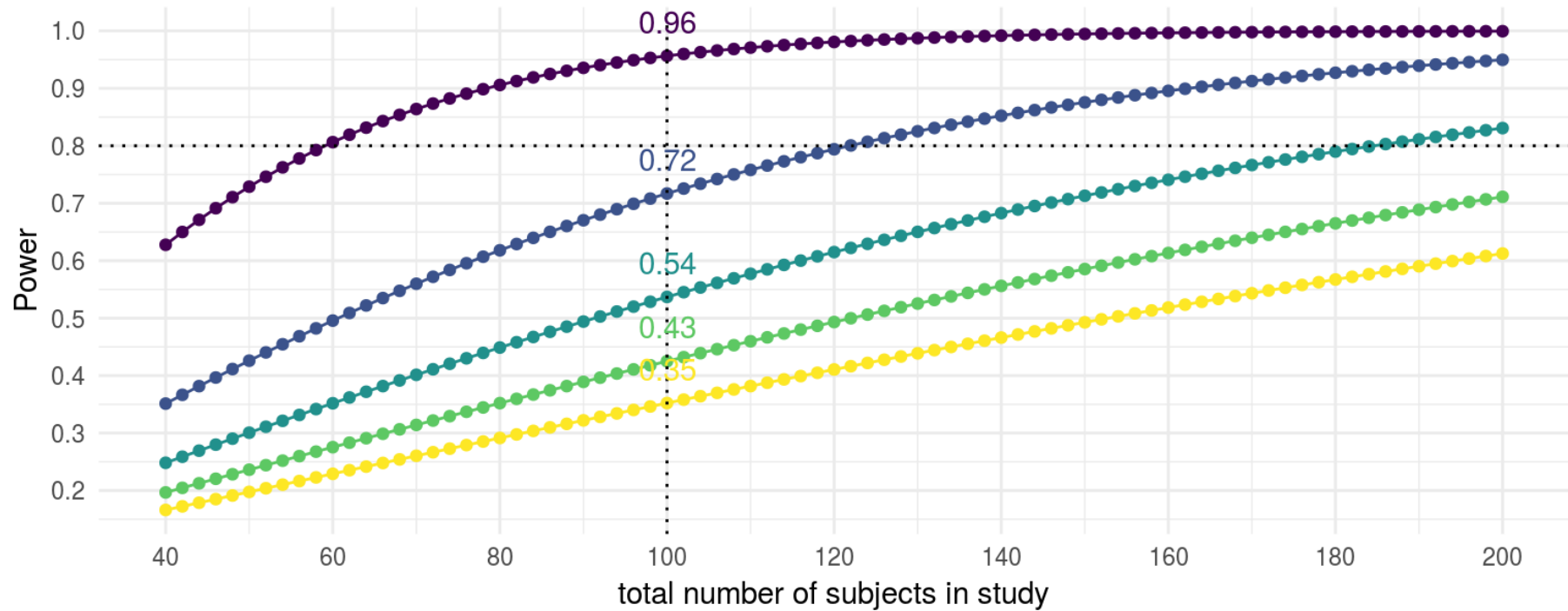
Random intercept & slope



Type I Errors



Power



Variance ratio
(random_slope^2/error^2) — 0 — 0.01 — 0.02 — 0.03 — 0.04

Cohen's d = 0.5

Conclusions

- Avoid the fallacy of calculating power for a test you never intend to perform.
- Pre-register your statistical model, or how model selection will be performed (if data-driven).

Thank you!