

Methods for Modeling Change

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True Change

- A problem that has been around for a while:
Separating true change from test-retest effects -> mostly ignored, sometimes modeled but what model is plausible, what else?
- (Selective attrition, missing not at random data)

Specification Issues

- Brain imaging: Modeling space x time jointly. What are good joint models? Specifically, if covariance over space is not smooth, not continuous (given anatomical restrictions), non-stationary
- Generally: Joint models of different domains, problems of dimensionality (e.g., brain x cognition): What is allowed to change? Between person and within person heterogeneity, e.g., do factor structures hold over time?

Mechanistic Interpretation

- Models of ageing often remain at a descriptive level
- Understanding the driving forces of the observed (interactive) processes

Frameworks

- Large heterogeneity
 - in modeling frameworks
 - In estimation procedures
 - In model performance metrics

Time Scales / Causality

- Expertise in decision making mostly in short term modeling under experimental control
- Expertise in ageing research mostly in long term modeling of observational data
- Time Scales need to be integrated, reliability issues when moving between time scales

Outlook

- Unified (generative) modeling frameworks (GPX?)
- Combining short and long time scales
- Joint models across multiple domains
- More extensive model selection to determine between and within person differences (e.g., kernel learning, person-specific models, hierarchical models/priors, or mixture models to represent different change profiles) or group comparisons if heterogeneity is observed
- Focus on statistical power, reliability such that change can be measured well
- But: Computational concerns! Approximations?