Longitudinal Models

Measuring

- Must obtain a minimum of two measurements at different points in time
- Must have variability in the scores (temporal variability)
- Ideally, you use the same measure
  - Need to have construct validity, showing that both measures are showing the same thing
  - Problems with using the same measure?

for Measuring Change

- Find the mean difference between scores
  - Several problems with this approach (esp. if variable is measured using multiple items)
- Correlate the two measures and subtract each p's coefficient from 1.00
  - Opposite of test-retest reliability
- Obtain intraclass correlation coefficient and subtract each p's coefficient from 1.00
  - Another reliability approach

Better Options

- _____Model
  - Use this if you are mostly interested in the pattern of change for the variable
- _____Model
  - Use this if you are interested in which factors predict change in a variable

_____ Variance

- If you correlate Time 1 and Time 2 scores together, they will probably correlate strongly, but not perfectly
- The leftover variance is called residual variance
- If the Time 1 score only predicts a fraction of the variance in Time 2, then something else must be causing the score to change at Time 2

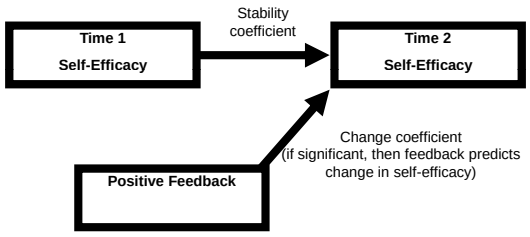
Logic of _____Models

- Residual variance = CHANGE
- If a third variable explains variance in the Time 2 variable controlling for the variance explained by the Time 1 variable, you are predicting change in the variable

Steps in Longitudinal Model Estimation

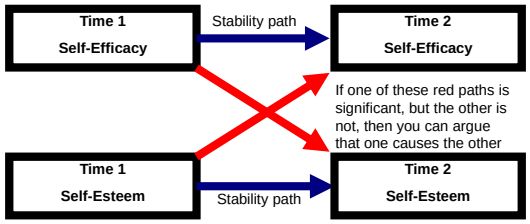
- Using hierarchical regression:
  - Estimate the _____in Block 1
    - Predictor = Time 1 score, Outcome = Time 2 score
  - Add the other variables in Block 2
  - Note the standardized β's and R^2 change (esp. in Block 2)
  - If the standardized β is positive, then the variable predicts an increase in the outcome
  - If the standardized β is negative, then the variable predicts a decrease in the outcome

A Longitudinal Model



- Sometimes you are faced with a chicken-and-the-egg problem, but you can't conduct a true experiment
- Cross-lagged panel designs examine how the variables influence each other over time, even though they occur concurrently
  - You have to assess the variables at multiple time points
- If there seems to be a pattern of one predicting change in the other, you may argue causality without an experiment

A (very simple)

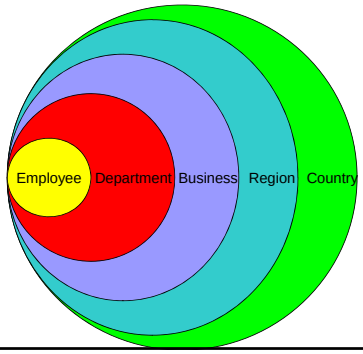


Multilevel Models

Logic of Models

- Every person is nested within larger groups (e.g., school, business, etc.)
- Macro-level variables may influence all members of that group (e.g., SES, resources, etc.)
- Multilevel models examine how both micro-level variables (e.g., personality) and macro-level variables (e.g., SES) influence people's behavior
- Therefore, each person is "nested" within larger groups, which are in turn nested within larger contexts

A _____Model



_____ of Multilevel Models

- Can do preliminary analysis in SPSS
  - Tag each school or business by group
  - Conduct a One-Way ANOVA on the dependent variables using Group as the IV
  - If there are differences, you may want to examine Group-Level variables
- Use Hierarchical Linear Modeling programs (e.g., "HLM") to examine influence of higher-order variables
  - Can only examine influence of higher-order variables on lower-order ones
  - Ex. Department-level variables on employee's behavior (not other way around)

HLM and _____

- Lower-order variables can also be "nested" within the person
- Diary studies assess several data points for each person
  - Daily diary
  - Event-contingent sampling
- So, you may examine personality (higher-order predictor) as having an influence on a person's daily behavior in addition to daily experiences (lower-order predictor)