

Multiple Regression Analysis: Simultaneous & Stepwise

Analysis

- Basic Equation:
 - $y = \beta_0 + \beta_1x$
 - β_0 = y-intercept; β_1 = slope
 - **outcome variable** (y): the variable we want to predict
 - **predictor variable** (x): what we think will predict changes in the outcome variable

Regression Analysis

- A linear formula that can explain how a set of variables predict the variance in an outcome
- Several predictor variables
 - Ex. What predicts your grade in a class?
- The magnitude of the association for each predictor controls for the variance explained by all other predictors (like semi-partial correlations)
- So, the unique contribution of each predictor on the outcome can be examined

How well do the predictor variables predict?

- Overall strength:
 - _____ (R)
 - R^2 = % variance in outcome variable explained by *all predictor variables*
- Individual strength:
 - _____ (β)
 - change in R^2 (ΔR^2) in stepwise and hierarchical analyses

Regression Analysis

- All predictors are entered in one block
- Use this when you are interested in the unique contribution of all of the predictors
- Note the standardized β for each predictor and R^2 for the set

Regression Analysis

- The best predictor is automatically identified and entered into the first block
- The second best predictor is automatically identified and added in the second block, etc.
- Use this when you are interested in:
 - The best predictor in the set
 - The additional amount of variance explained with the inclusion of each predictor
- Note the standardized β for each predictor, R^2 for the set and R^2 Change for each block

Regression Analysis

- Researcher enters variables into blocks based on an established theory
- Types of analyses using hierarchical
 - Mediation effects
 - Moderation effects
 - Model estimation
 - All of the above will be covered in Exam 5
- Note the standardized β for each predictor and R^2 Change for each block

Important Notes

- Predictors can be categorical OR continuous
- If the outcome is continuous, use linear regression
- If the outcome is categorical (dichotomous), use logistic regression
 - Ex. Dropping out of school or being fired from the job
 - You can use multiple predictors to estimate the outcome
