Statistics One

Lecture 10

Mediation

Two segments

- Regression method
- Path analysis method

Lecture 10
Segment 1

Mediation: Regression method

Mediation

- Mediation and moderation may sounds alike but they are quite different
  - Mediation (Lecture 10)
  - Moderation (Lecture 11)
  - Both demonstrated in R (Lecture 12)

Mediation

Moderation

Mediation & Moderation

- KISS! Keep It Simple Stupid!
- Only 4 variables!
  - X: Predictor variable (could be an IV)
  - Y: Outcome variable (could be a DV)
  - M: Mediator variable
  - Z: Moderator variable

An example

- X: Psychological trait
  - Extraversion
- Y: Behavioral outcome
  - Happiness
- M: Mechanism
  - Diversity of life experience
- Z: Moderator (ZAP! or ZING!)
  - Socio-Economic-Status (SES)

Mediation

- A mediation analysis is typically conducted to better understand an observed correlation between X and Y
    - Why is extraversion correlated with happiness?

Mediation

- If X and Y are correlated then we can use regression to predict Y from X
  - $Y = B_0 + B_1X + e$

Mediation

- If X and Y are correlated BECAUSE of the mediator M, then (X → M → Y):
  - $Y = B_0 + B_1M + e$

    &
  - $M = B_0 + B_1X + e$

Mediation

- If X and Y are correlated BECAUSE of the mediator M, and:
  - $Y = B_0 + B_1M + B_2X + e$
  - What will happen to the predictive value of X
  - In other words, will B_2 be significant?

Mediation

- A mediator variable (M) accounts for some or all of the relationship between X and Y
  - *Some*: Partial mediation
  - *All*: Full mediation

Mediation

- CAUTION!
  - Correlation does not imply causation!
  - In other words, there is a BIG difference between statistical mediation and true causal mediation.

How to test for mediation

- Run three regression models
  - lm(Y~X)
  - lm(M~X)
  - lm(Y~X+M)

How to test for mediation

- Run three regression models
  - lm(Y~X)
    - Regression coefficient for X should be significant
  - lm(M~X)
    - Regression coefficient for X should be significant

How to test for mediation

- Run three regression models
  - lm(Y~X+M)
    - Regression coefficient for M should be significant
    - Regression coefficient for X?

Back to the example

- X: Psychological trait
  - Extraversion
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Simulated data

- Assume N = 188
- Participants surveyed and asked to report:
  - Happiness (happy)
  - Extraversion (extra)
  - Diversity of life experiences (diverse)

  - Assume all are scored on a scale from 1 - 5

Results

- First two models:
  - happy = 2.19 + .28(extra)
  - diverse = 1.63 + .28(extra)

  - For both, regression coefficient for X (extra) is statistically significant, $p < .05$

Results

- All three models:
  - happy = 2.19 + .28(extra)
  - diverse = 1.63 + .28(extra)
  - happy = 1.89 + .22(extra) +.19(diverse)
  - ALL regression coefficients statistically significant

Interpretation

- Partial, not full, mediation
- Partial mediation because the direct effect (extra) is still significant after adding the mediator (diverse) into the regression equation

Image in slide 5 was retrieved from
http://www.valdosta.edu/crc/images/mediation.jpg

Image in slide 6 was retrieved from
http://www.perroquet-island.com/journal/wp-content/
uploads/equipe.jpg