https://www.youtube.com/watch?v=Nj-hdQMa3uA

Review of Regression

Mediation and Moderation

Applied Statistical Analysis

EDUC 6050

Week 11

Finding clarity using data

Today

Categorical Outcomes

Categorical Outcomes

For simple research questions
Not controlling for other factors
Doesn't provide a lot of information
(ie., only tells us difference or not)

CHI SQUARE ACTIVITY

General Requirements

1. One or more categorical variables

Goodness of Fit

Test of Independence

ID	X	Y
1	0	0
2	2	1
3	1	0
4	2	1
5	0	1
6	0	1
7	2	0
8	1	0

Hypothesis Testing with Chi Square (Independence)

The same 6 step approach!

1. Examine Variables to Assess Statistical Assumptions
2. State the Null and Research Hypotheses (symbolically and verbally)
3. Define Critical Regions
4. Compute the Test Statistic
5. Compute an Effect Size and Describe it
6. Interpreting the results

1 Examine Variables to Assess Statistical Assumptions

Basic Assumptions

1. Independence of data
2. Appropriate measurement of variables for the analysis
3. Expected frequency 5+

1 Examine Variables to Assess Statistical Assumptions

Basic Assumptions

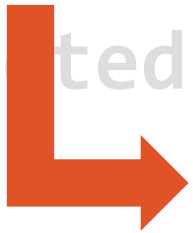
1. **Independence** of data
2. Appropriat
   for the a
3. Expected

Individuals are independent of each other (one person's scores does not affect another's)

1 Examine Variables to Assess Statistical Assumptions

Basic Assumptions

1. Independence of data
2. **Appropriate measurement** of variables for the analysis
3. Expected frequency 5+



Here we need interval/ratio outcome

1 Examine Variables to Assess Statistical Assumptions

Basic Assumptions

1. Independen
2. Approp
   for the an
3. Expected frequency 5+

Variance around the line should be roughly equal across the whole line

1 Examine Variables to Assess Statistical Assumptions

Examining the Basic Assumptions

1. **Independence:** random sample
2. **Appropriate measurement:** know what your variables are
3. **Expected frequency 5+:** Check expected frequencies

2 State the Null and Research Hypotheses (symbolically and verbally)

Hypothesis Type	Symbolic	Verbal	Difference between means created by:
Research Hypothesis	$OF \neq EF$	Observed frequency is not equal to expected frequency	True relationship
Null Hypothesis	$OF = EF$	Observed frequency is the same as the expected frequency	Random chance (sampling error)

3 Define Critical Regions

How much evidence is enough to believe the null is not true?

- generally based on an alpha = .05

Use software's p-value to judge if it is below .05

4 Compute the Test Statistic

Jamovi Tutorial

5 Compute an Effect Size and Describe it

"Phi"

$$\phi = \sqrt{\frac{\chi^2}{n}}$$

$$\textit{Cramer's } \phi = \sqrt{\frac{\chi^2}{n(df)}}$$

ϕ	*Cramer's* ϕ	Estimated Size of the Effect
Close to .1	Depends	Small
Close to .3	on df	Moderate
Close to .5	(pg 557)	Large

6 Interpreting the results

"The voters' opinions of the president's policies were associated with the voters' political affiliations, $\chi^2(2, N = 58) = 16.40$, $p = .02$, $\phi = .53$. More democrats and fewer republicans approved of the president's policies than would be expected by chance." – pg 577.

Break Time

Review

Questions?

Next week:

Review!!