Final Exam: Conceptual Definitions

Lecture 09: Differences from the population

Effect size: A measure of how different two groups are from one another (or a measure of the magnitude of treatment). Represented by Cohen's *d*, Pearson's *r*, or Eta squared, η^2.

Estimated standard error: $s_{\bar{x}}$ is an estimate of the real standard error, $\sigma_{\bar{x}}$, when the value of σ is unknown. It provides an estimate of the standard distance between a sample mean, $\bar{x}$, and the population mean, σ.

Test statistic: A numerical summary of the degree to which a sample is unlike the samples predicted by the null hypothesis, H_0

t Distribution: The complete set of *t* values computed for every possible random sample for a specific sample size, n. The *t* distribution approximates the shape of a normal distribution, especially for large samples or samples from a normal population.

t Statistic: Is used to test hypotheses about an unknown population mean, μ, when the value of σ is unknown. The formula for the *t* statistic has the same structure as the *z*-test statistic formula, except that the *t* statistic uses the estimated standard error in the denominator.

Lecture 10: Differences between two groups (part I)

Dependent variable: The outcome of interest that the independent variable might have an effect on

Independent variable: The variable that is hypothesized to have an effect on some outcome of interest

Inferential Statistics: Used to make inferences (reach a conclusion) about the data

Statistical Significance: A result is said to be significant, or statistically significant, if it is very unlikely to occur when the null hypothesis is true. That is, the result is sufficient to reject the null hypothesis. Thus, a treatment has a significant effect if the decision from the hypothesis test is to reject H_0

Lecture 11: Differences between two groups (part II)

Dependent-samples: Also called *within-subjects*. Compare the same group of people to themselves.

Independent-samples: Also called *between-subjects*. Compare two different or unrelated groups of people

Lecture 12: Differences between many groups

Alpha escalation: Type I Error rate increases drastically as you run additional analyses

Eta squared: The proportion of the total variability in the dependent variable that is accounted for by variation in the independent variable. It is the ratio of the between groups sum of squares to the total sum of squares

Experiment-wise alpha level: The total probability of a Type I error that is accumulated from all of the individual tests in the experiment. Typically, the experiment-wise alpha level is substantially greater than the value of alpha used for any one of the individual tests

Factor: Independent variable(s) in the study

Level(s): Groups within each independent variable

Response: The dependent variable in the study

Lecture 13: Differences between many factors

Factorial designs: Designs in which two or more factors are completely crossed (i.e., measurements are taken for every combination of factor levels)

Interaction: Describes the degree to which the effect of one factor depends on the level of the other factor

Main effect: When an analysis of the data reveals a difference between the levels of any factor

Lecture 14: Testing relationships with correlations

Coefficient of Determination: Percentage of variances in one variable that is accounted for by the variance in the other variable

Correlational designs: Examine the extent to which two variables are associated

Negative correlation: As one variable changes, the other variable changes in the opposite direction

Positive correlation: As one variable changes, the other variable changes in the same direction

Zero correlation: There is no relationship between the two variables

Lecture 15: Making predictions using regression

Alpha: a is also referred to as the *intercept*, and is the value of y when the value of x is zero

Beta: b is also referred to as the *slope*, and determines how much the y variable changes when x is increased by 1 point (or unit of measurement)

Regression: A statistical technique for finding the best-fitting line (i.e., the regression line) for a set of data

y-hat: $\hat{y}$ is the predicted value from the regression equation