Statistics for Social Research III

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***Assignment #1 – Core Essential Elements***

Answer the following questions in short answer format and be prepared to discuss them with your classmates in the virtual residency or the discussion forum.

1. Why are quasi-experimental designs sometimes called “Split-Group Comparison” designs?
2. What are post-hoc procedures in statistical analysis, and why do they provide important context for hypothesis testing?
3. How does linear regression relate to correlational statistical procedures?
4. What is an ANOVA procedure, and how might it be used in quasi-experimental designs? How does it differ from an independent t-Test?
5. Why are quasi-experimental designs sometimes called “Split-Group Comparison” designs?

Creswell & Creswell (2018) define quasi-experimental designs as “Designs in which a researcher has only partial (or no) control over randomly assigning participants to levels of a manipulated variable of interest” (p. 225). With the lack of random assignment of participants, quasi-experiments study cause and effect that an independent variable has on a dependent variable. With the reliance on non-random criteria, subjects in quasi-experiments are assigned to separate groups and compared, thus the reference to “split-group comparison”.

1. What are post-hoc procedures in statistical analysis, and why do they provide important context for hypothesis testing?

Post-hoc procedures are research tasks performed after the study has been completed. These actions are deemed valuable because it provides additional justification or assessment of findings. An example of a post-hoc application is when ANOVA provides a test for significance for mean differences and there is a rejection of the null hypothesis indicating a difference between at least two of the treatment means. In the case where *k* is greater than 2, the differences are not obvious, the researcher must follow the ANOVA with post hoc tests to determine exactly where significant differences may exist (Gravetter & Wallnau, 2014). The post-hoc procedure, therefore, strengthens the context for hypothesis testing by providing more specific analysis to findings and assessments.

1. How does linear regression relate to correlational statistical procedures?

Correlational procedures, such as the Pearson correlation, measure the strength (degree and direction) of a relationship between two quantitative variables. When correlational data points present a straight line, a linear relationship is achieved, thus as X increases by one unit, the value of Y also changes by a consistent and predictable amount. Regression is the statistical technique used for finding the best-fitting line for the set of data, with the resulting line called the regression line (Causwell & Causwell, 2018). Gravetter & Wallnau (2014) explain that assessment of the linear regression provides an equation for the straight line and this equation presents as a useful mathematical description of the relationship between X values and Y.

1. What is an ANOVA procedure, and how might it be used in quasi-experimental designs? How does it differ from an independent t-Test?

 Analysis of variance (ANOVA) is a statistical tool used to evaluate the mean differences among two or more populations using sample data (Gravetter & Wallnau, 2014). ANOVA is readily utilized in experimental designs with one dependent variable that is a continuous parametric numerical outcome measure, and multiple experimental groups within one or more independent (categorical) variables. Sawyer, S. F. (2009).

Quasi-experimental designs lack random assignment of participants and are often used when true experiments are not feasible for ethical or practical reasons. If non-probability sampling, such as convenience or purposive sampling, is carried out appropriately, ANOVA procedures can be applied to sample data sets.

Gravetter & Willnau (2014) state that the t-test can be seen as an ANOVA in an abbreviated form. The difference is that the independent t-Test is used to study means from only two groups while ANOVA is used to study three or more groups.

WORKS CITED

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Rubin, C. & Babbie, S. (2017). Research methods for social work (9th ed)*.* Brooks/Cole, Cengage Learning.

Sawyer, S. F. (2009). Analysis of variance: The fundamental concepts. *Journal of Manual & Manipulative Therapy*, *17*(2), 27E-38E. https://doi.org/10.1179/jmt.2009.17.2.27E