ANALYSIS

(Descriptive Statistics)

Group _____

1. Write your operationalized research hypothesis.

2. Put all of your data (results) in a table.

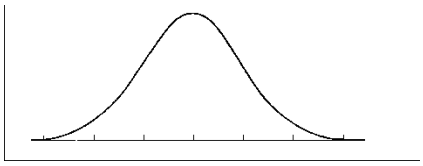
3. Using a graphing calculator, calculate a measure of central tendency (for each group?) and measure of dispersion (standard errors) after removing outliers.

$$\text{Use SE} = \left(\frac{S_x}{\sqrt{n}} \right) \text{ or } \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

4. Clearly and accurately state the results which reflect the research hypotheses.

5. Clearly and accurately create a bar graph.

6. Determine if your data is normally distributed:



MEANS

a) Open Excel → Type Data into List(s)

b) Determine the Skewness Value and Kurtosis Value:

Formulas → Insert Function (SKEW or KURT)

c) Calculate the Standard Error (SE) of skewness and kurtosis:

SE of skewness = $\sqrt{\frac{6}{n}}$ where n = your sample size

SE of kurtosis = $\sqrt{\frac{24}{n}}$ where n= your sample size

d) Calculate a normal interval for each:

Interval = (-2SE, 2SE)

If both your skewness/kurtosis values fall within this interval, then it is reasonable to assume that your data for means is normally distributed

PROPORTIONS

a) Determine if:

$n_1\hat{p}_1 > 10$ $n_2\hat{p}_2 > 10$

$n_1(1-\hat{p}_1) > 10$ $n_2(1-\hat{p}_2) > 10$

b) Verify that N > 10n

If both conditions are met, then it is reasonable to assume that your data for proportions is normally distributed

APPENDIX

DEFINITIONS

Skewness is a measure of asymmetry. Zero indicates a perfect symmetry; the normal distribution has a skewness of zero. Positive skewness indicates that the "tail" of the distribution is more stretched on the side above the mean. Negative skewness indicates that the tail of the distribution is more stretched on the side below the mean.

Kurtosis characterizes the relative peakedness of flatness of a distribution compared with the normal distribution; the normal distribution has a kurtosis of zero. Positive kurtosis indicates a relatively peaked distribution. Negative kurtosis indicates a relatively flat distribution.

FORMULAS USED BY EXCEL:

$$\text{Skewness} = \frac{n}{(n-1)(n-2)} \sum\left(\frac{x_i - xbar}{s}\right)^3$$

$$\text{Kurtosis} = \left(\frac{n(n+1)}{(n-1)(n-2)(n-3)} \sum\left(\frac{x_i - xbar}{s}\right)^4\right) - \frac{3(n-1)^2}{(n-2)(n-3)}$$

OTHER FORMULAS USED:

$$\text{Skewness} = \frac{\sum (x_i - xbar)^3}{(n-1)s^3}$$

$$\text{Kurtosis} = \frac{\sum (x_i - xbar)^4}{(n-1)s^4} - 3$$

REFERENCES

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Yates, Daniel S., Moore, David S. and Starnes, Daren S. (2003). *The Practice of Statistics*. New York: W. H. Freeman and Company.