

**Answers to Study Questions
for
Chapter 15**

**(Don't forget that the companion website also has multiple choice questions for each chapter that you can take for practice. You will find them here:
http://www.southalabama.edu/coe/bset/johnson/dr_johnson/2mcq.htm)**

15.1. What is the difference between descriptive statistics and inferential statistics?

The field of descriptive statistics focuses on describing, summarizing, or explaining a set of data. Inferential statistics goes beyond the immediate data and infers the characteristics of populations based on samples.

15.2. List the three steps in constructing a frequency distribution.

1. List each unique number in ascending order in column one.
2. Count the number of times each number listed occurs and place the results in column two.
3. (Optional) Construct a third column by converting column two into percentages and placing them in column three.

15.3. What types of graphical representations of data were discussed in the chapter?

1. Bar graphs
2. Histograms
3. Line graphs
4. Scatterplots.

15.4. Which graphical representation is used to examine the correlation between two quantitative variables?

A scatterplot (also called a scatter graph). It is traditional to let the X axis (the horizontal axis) represent the independent/predictor variable and let the Y axis (the vertical axis) represent the dependent/outcome variable.

15.5. What is a measure of central tendency, and what are the common measures of central tendency?

A measure of central tendency is the single numerical value considered most *typical* of the values of a quantitative variable. The most common measures of central tendency are the mode (i.e., the most frequently occurring number), the median (i.e., the middle point or fiftieth percentile), and the mean (i.e., the arithmetic average).

15.6. When is the median preferred over the mean?

When the numbers are highly skewed (i.e., non-normally distributed).

15.7. If the mean is much greater than the median, are the data skewed to the right or skewed to the left?

The two general rules are 1) If the mean is less than the median, the data are skewed to the left, and 2) If the mean is greater than the median, the data are skewed to the right. Therefore, if the mean is much greater than the median the data are probably skewed to the right.

15.8. What is a measure of variability, and what are the common measures of variability?

A measure of variability is a numerical index that provides information about how spread out or how much variation is present.

15.9. How are the variance and standard deviation mathematically related?

The standard deviation is simply the square root of the variance. Hence, to get the standard deviation, first get the variance as shown on page 448, put that obtained number into your calculator, and then hit the square root key ($\sqrt{\quad}$).

15.10. If a set of data is normally distributed, how many of the cases fall within one standard deviation? How many fall within two standard deviations? How many fall within three standard deviations?

The answer is nicely summarized in the “68, 95, 99.7 percent rule.” That is, if the data are normally distributed, 68 percent of the cases will fall within one standard deviation, 95 percent of the cases will fall within two standard deviations, and 99.7 percent of the cases will fall within three standard deviations of the mean.

15.11. What is a measure of relative standing, and what are the common measures of relative standing?

A measure of relative standing is a measure that provides information about where a score falls in relation to the other scores in the distribution of data. Some examples are *percentile ranks* and *standard scores*.

15.12. How do you calculate a z-score?

Subtract the mean from the raw score that you are given and then divide that result by the standard deviation. This formula is shown at the bottom of page 452.

15.13. What are some of the different ways to examine the relationships among variables?

- Correlation coefficients
- Comparing group means
- Scatterplots
- Line graphs
- Contingency tables
- Regression analysis.

15.14. If you calculate the percentages in a contingency table down, then should you make your comparisons down the columns or across the rows?

The rules are

- 1) If the percentages are calculated down the columns, compare across the rows, and
- 2) If the percentages are calculated across the rows, compare down the columns.

Therefore, in the above question you would make your comparisons across the rows.

15.15. What is the difference between simple regression and multiple regression?

Simple regression is based on one quantitative dependent variable and one independent variable. On the other hand, multiple regression is based on one quantitative dependent variable and *more than one* independent variable.

- (Note that the purpose of regression analysis is to use independent variables in predicting or explaining dependent variables.)

15.16. How is the regression coefficient interpreted in simple regression?

The basic or unstandardized regression coefficient is interpreted as the predicted change in Y (i.e., the DV) given a one unit change in X (i.e., the IV). It is in the same units as the dependent variable.

- Note that there is another form of the regression coefficient that is important but not discussed in the chapter: the standardized regression coefficient. The standardized coefficient varies from -1.00 to $+1.00$ just like a simple correlation coefficient;
- If the regression coefficient is in standardized units, then in simple regression the regression coefficient is the same thing as the correlation coefficient.

15.17. How is the regression coefficient interpreted in multiple regression?

In this case the unstandardized multiple regression coefficient is interpreted as the predicted change in Y (i.e., the DV) given a one unit change in X (i.e., the IV) while controlling for the other independent variables included in the equation.

- The regression coefficient in multiple regression is called the partial regression coefficient because the effects of the other independent variables have been statistically removed or taken out (“partialled out”) of the relationship.
- If the standardized partial regression coefficient is being used, the coefficients can be compared for an indicator of the relative importance of the independent variables (i.e., the coefficient with the largest absolute value is the most important variable, the second is the second most important, and so on.)