Appendix A

Guides for Selecting Appropriate Descriptive and Inferential Statistics

To use these tables, determine whether you need to analyze data for one variable (use Table A.1), the relationship between two variables (use Table A.2), or the relationship among three or more variables (use Table A.3). Each of these tables is divided into two sections (a and b), a for descriptive statistics and b for inferential statistics. Follow the directions for the particular table that matches the type of data analysis you wish to perform. Note that these tables are intended only as a guide; they are not intended to be complete or definitive. Many descriptive and inferential statistics other than those covered in this text are available and may be more appropriate for a particular research/data analysis situation.

Table A.1	Selecting Appropriate Descriptive and Inferential Statistics and Other Analytic Strategies for Making Sense of Data on One Variable From a Sample or Population

Determine whether you need descriptive statistics (describing data and their distribution—use Table A.1a) or inferential statistics (generalizing or inferring from a random sample statistic to a corresponding population parameter and/or testing a univariate hypothesis—use Table A.1b) to analyze the data on one variable. Read the directions for that table.

Table A.1a	Descriptive Statistics for Univariate Analysis

To select some appropriate descriptive statistics and other analytic strategies for one variable, select the variable's level of measurement in the left column and then read the corresponding row of the table.

(Continued)

Table A.1a   Descriptive Statistics for Univariate Analysis (Continued)

Variable's Measurement Level	Tables/Graphs	Measures of Central Tendency, Dispersion, and Location
Nominal	Construct a frequency or percent distribution table or graph	Mode
Ordinal	Construct a frequency or percent distribution table, bar, or line graph (also cumulative distributions) and describe its shape (e.g., normality, skewness, kurtosis, etc.)	Mode Median Quantiles Range
Interval	Construct a frequency or percent distribution table, bar, or line graph (also cumulative distributions) and describe its shape (e.g., normality, skewness, kurtosis, etc.)	Mode Median Mean Range Standard deviation Variance Quantiles
Ratio	Construct a frequency or percent distribution table, bar, or line graph (also cumulative distributions) and describe its shape (e.g., normality, skewness, kurtosis, etc.)	Mode Median Mean Range Standard deviation Variance Quantiles

Table A.1b   Inferential Statistics for Univariate Analysis

To select some appropriate inferential statistics for testing univariate hypotheses (hypotheses about the distribution of the variable values of one variable) and population parameter estimation (random sampling assumed), select whether you are performing a distribution-related statistical test or parameter estimation (that determines the column of the table to use), select the variable's level of measurement (that determines the row of the table to use), and read the contents of the cell where the selected column and row intersect.

Levels of Measurement	Distribution-Related Statistical Test	Parameter Estimation
Nominal	Chi-square goodness-of-fit test	Point or interval estimate of population percents/proportions Margins of error
Ordinal	Chi-square goodness-of-fit test	Point or interval estimate of population percents/proportions Margins of error

(Continued)

Table A.1b   Inferential statistics for Univariate Analysis (Continued)

Levels of Measurement	Distribution-Related Statistical Test	Parameter Estimation
Interval	Chi-square goodness-of-fit test (grouped scores)	Point or interval estimate of population mean Margins of error
Ratio	Chi-square goodness-of-fit test (grouped scores)	Point or interval estimate of population mean Margins of error

Table A.2   Selecting Appropriate Descriptive and Inferential Statistics and Other Analytic Strategies for Testing Bivariate (two variable) Hypotheses (one dependent variable and one independent variable with two or more values)

Determine whether you will be using descriptive (Table A.2a) or inferential (Table A.2b) statistics. Follow the directions for that table.

Table A.2a   Descriptive Statistics for Testing Bivariate Hypotheses

To select some appropriate descriptive statistics and other analytic strategies for testing hypotheses about the relationship between two variables, select the level of measurement of the independent variable (that determines the column of the table to use), select the level of measurement of the dependent variable (that determines the row of the table to use), and read the contents of the cell where the selected column and row intersect.

Dependent Variable Levels of Measurement	Independent Variable Levels of Measurement			
	Nominal	Ordinal	Interval	Ratio
Nominal	Construct and percentage a contingency table Logistic regression Compare percents Read diagonals Compare modes	Construct and percentage a contingency table Logistic regression Compare percents Read diagonals Compare modes	Logistic regression	Logistic regression
Ordinal	Construct and percentage a contingency table Compare percents Read diagonals Compare medians and distribution shapes	Construct and percentage a contingency table Compare percents Read diagonals Spearman's ρ Construct a scattergram		

(Continued)

Table A.2a	Descriptive Statistics for Testing Bivariate Hypotheses (Continued)

Dependent Variable Levels of Measurement	Independent Variable Levels of Measurement			
	Nominal	**Ordinal**	**Interval**	**Ratio**
Interval	Compare means Compare medians Compare modes Compare distribution shapes	Construct a scattergram	Construct a scattergram Pearson's r Least squares regression	Construct a scattergram Pearson's r Least squares regression
Ratio	Compare means Compare medians Compare modes Compare distribution shapes	Construct a scattergram	Construct a scattergram Pearson's r Least squares regression	Construct a scattergram Pearson's r Least squares regression

Table A.2b	Inferential Statistics for Testing Bivariate Hypotheses

To select some inferential statistics to test bivariate hypotheses about populations using statistics from one or more random samples, select the level of measurement of the independent variable; for nominal or ordinal independent variables, select the number of values of the independent variable (that determines the column of the table to use); select the dependent variable's level of measurement (that determines the row of the table to use); and read the contents of the cell where the selected row and column intersect.

Dependent Variable Levels of Measurement	Independent Variable Levels of Measurement			
	Nominal	**Ordinal**	**Interval**	**Ratio**
	Number of Dependent Variable Values (Number of Samples)			
	2	**> 2**	**2**	**> 2**
Nominal	Test χ^2 for significance	Test χ^2 for significance	Test χ^2 for significance	Test χ^2 for significance
Ordinal	Test M-W U for statistical significance	Test K-W H for statistical significance	Test Spearman's ρ for statistical significance	Test Spearman's rho for statistical significance
Interval	Test Student's t for independent or dependent samples	Test ANOVA F for statistical significance (independent samples); Tukey's HSD	Test Pearson's r for statistical significance	Test Pearson's r for statistical significance
Ratio	Test Student's t for independent or dependent samples	Test ANOVA F for statistical significance (independent samples); Tukey's HSD	Test Pearson's r for statistical significance	Test Pearson's r for statistical significance

(Continued)

Table A.3 Selecting Appropriate Descriptive and Inferential Statistics for Making Sense of Data on the Relationships Among Three or More Variables

Determine whether you need descriptive (Table A.3a) or inferential (Table A.3b) statistics. Follow the direction for that table.

Table A.3a Descriptive Statistics for Multivariate Analysis

To select some appropriate descriptive statistics for making sense of multivariate data, select the measurement level of the independent variable (that determines the column to use), select the dependent variable's measurement level (that determines the row to use), and read the contents of the cell where the selected column and row intersect.

Dependent Variable Measurement Level	Independent Variable Measurement Level[a]			
	Nominal	**Ordinal**	**Interval**	**Ratio**
Nominal	Elaboration analysis	Elaboration analysis		
Two variable values only	Logistic regression	Logistic regression	Logistic regression	Logistic regression
Ordinal	Elaboration analysis	Elaboration analysis		
Interval			Multiple regression Multiple correlation Partial regression Partial correlation	Multiple regression Multiple correlation Partial regression Partial correlation
Ratio			Multiple regression Multiple correlation Partial regression Partial correlation	Multiple regression Multiple correlation Partial regression Partial correlation

a. In multivariate analysis, independent variables measured at different levels may be included in the same analysis with special procedures (e.g., nominal and ordinal level variables may be included as dummy variables and ordinal level variables are sometimes treated as interval or ratio level variables).

Table A.3b Inferential Statistics for Testing Multivariate (Three or More Variables) Hypotheses

To select some appropriate inferential statistics for testing multivariate hypotheses, select the measurement level for the independent variable (that determines the column of the table to use), select the measurement level of the dependent variable (that determines the row of the table to use), and read the contents of the cell where the selected column and row intersect.

Dependent Variable Measurement Level	Independent Variable Measurement Level[a]			
	Nominal	**Ordinal**	**Interval**	**Ratio**
Nominal Two variable values only	Test logistic regression for statistical significance	Test logistic regression for statistical significance	Test logistic regression for statistical significance	Test logistic regression for statistical significance
Ordinal Two variable values only	Test logistic regression for statistical significance	Test logistic regression for statistical significance	Test logistic regression for statistical significance	Test logistic regression for statistical significance
Interval			Test betas and coefficients of multiple determination for statistical significance	Test betas and coefficients of multiple determination for statistical significance
Ratio			Test betas and coefficients of multiple determination for statistical significance	Test betas and coefficients of multiple determination for statistical significance

a. In multivariate analysis, independent variables measured at different levels may be included in the same analysis with special procedures (e.g., nominal and ordinal level variables may be included as dummy variables and ordinal level variables are sometimes treated as interval or ratio level variables).