ScWK 298
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Review Outline for Quantitative Analysis

I. Basic variable definitions

A. "Variable"—a characteristic or property that can vary

B. "Constant"—a characteristic or property that does not vary (i.e. criterion for inclusion in your sample, such as "young adult women who reported being abused as children")

C. "Attributes" –the values, categories, or scale units of a variable

II. Types of Variables

A. Dependent (a.k.a. the "outcome" for treatment evaluation studies)

B. Independent

1. In evaluation studies, the intervention (a.k.a "group assignment") is always the primary IV

2. Control variables—variables that, if not "held constant," would serve as a rival hypothesis effect on the DV

C. *Note:* descriptive quantitative studies, such as those mainly counting people or services, do not have independent or dependent variables (i.e. there are no bivariate or multi-variate analyses). Examples: a) the number of people using homeless shelters; b) the number and types of services used by those with severe mental illness.

III. Levels of Measurement—this is key to deciding your statistical test

A. Continuous (a.k.a. "scale" variable in SPSS)

1. Ratio

2. Interval

B. Categorical

1. Nominal

a) Dichotomous variable—only two attributes

b) Dummy variable (also a dichotomous variable)

c) Non-ordered polytomous variable ("Polytomous" means more than two

attributes)

2. Ordinal (or, ordered polytomous variable)

Test yourself:

Variable	**Continuous or categorical?**	**Specific level of measure…**
Counts of people		
Percentage of sample who are Latino		
Gender		
Reunifying with family, 0 = no; 1 = yes		
"How satisfied were you with services, on a scale of 1 (very dissatisfied) to 5 (very satisfied)?		
Total score on a 100-point depression scale		
Ethnicity (Afr-Amer, Cauc, Latino, Asian/PI, Other)		

IV. Hypothesis testing—"Eight Steps":

A. Identify your independent variable(s)

B. Identify your dependent variable

C. State the Null Hypothesis. Choose:

1. One-tailed, or

2. Two-talied

D. State the Alternative Hypothesis (same as in your research question section) Choose (congruent with Null):

1. One-tailed, or

2. Two-talied

E. Identify appropriate statistical test and alpha level , a.k.a. "rejection level" or "significance level" (e.g. $\alpha = .05$)

F. Review results (SPSS output)

G. Describe results and decision to reject or not reject Null. Here's the logic:

1. If statistically significant, then there is low probability (.05) that our results are due to chance alone, meaning that there is a good chance there is a relationship between the IV and DV, and we can reject the Null Hypothesis

2. If not statistically significant, we cannot reject Null.

3. Note: in Results section, no need to use words "The null hypothesis is rejected…" Just say whether or not results are statistically significant at the $p < .05$ level, (or, statistically significant, p = actual p value)

H. Discuss results and implications

V. Univariate Analysis—generally doesn't require statistical test

A. Continuous variables

1. Mean and standard deviation

2. Range

3. Median (suitable for "income"—or any other variable highly sensitive to outliers from the mean)

B. Categorical variables

1. Frequency (count) and percentage of total sample for each attribute

VI. Bivariate Analysis (Statistical tests to be reported are shown in parentheses)

A. Chi-square Test of Association (X^2 and p value)

1. Two or more variables

2. IV and DV are categorical

B. Independent groups t-test (t statistic and p value)

1. Comparing means of two different, non-related groups (such as experimental vs. control)

2. DV is continuous (e.g. mean) and IV is categorical ("group assignment")

C. One-way ANOVA (*F* ratio statistic, *p* value, and *post-hoc* test results, either Tukey, Bonferroni, or Sheffé)

1. Comparing means for more than two groups. IV is polytomous (example: comparing three treatment groups or three or more ordinal attributes)

2. DV is continuous

D. Dependent groups *t*-test (*t* statistic and *p* value)

1. Comparing means of same group over time, such as in a one-group pretest posttest design

2. DV is continuous (e.g. mean) and IV is simply the pretest "group" observation and posttest "group" observation

E. Pearson's Correlation (Pearson *r* and *p* value)

1. Comparing two means

2. DV is continuous and IV is continuous

3. Bivariate linear regression with continuous variables (really just correlation with a regression coefficient)

VII. Multivariate Analysis

A. Two-way ANOVA (*F* ratio statistic, *p* value, and *post-hoc* test)

1. Comparing means for two or more IVs

2. DV is continuous and IVs are categorical

3. *Note:* Multivariate linear regression is often used instead

B. Multivariate Linear Regression (*F* ratio statistic, adjusted R^2, standardized *beta* coefficient, *p* value)

1. DV is continuous.

2. More than one IV. IVs can be either continuous or categorical or a combination. For IVs that are categorical, they must be recoded as dummy variables.

C. Logistic Regression (X^2 "Omnibus test", exponentiated *beta* (odds ratio), *p* value of exponentiated *beta*)

1. DV is categorical (usually dichotomous, but there are forms of logistic regression for an ordinal or polytomous DV, which uses multinomial logistic regression)

2. More than one IV, and can be a combination of continuous or categorical (dummy coded) variables