Psyc 250 – Statistics & Experimental Design

Correlation Exercise

Preparation: Log onto Woodle and download the "Class Data – February 09" dataset and the associated Syntax to create scale scores "Class Syntax – April 11". Run the syntax.

Goals: In addition to utilizing SPSS and statistics skills that you have developed already, by the end of this exercise you should be able to:

- Run a series of correlations in SPSS
- Present results from correlations in an APA formatted Table
- Interpret results

For this exercise, we will be exploring the potential relationships among biological sex, personality, and attitudes toward statistics

Survey of Attitudes Toward Statistics

Affect (SATSaff) – students' feelings concerning statistics (6 items); Higher scores indicate more positive feelings toward statistics

Cognitive Competence (SATScog) – students' attitudes about their intellectual knowledge and skills when applied to statistics (6 items); higher scores indicate a greater sense of cognitive competence (they feel that they will be able to apply their intellectual skills well to statistics)

Value (SATSval) – students' attitudes about the usefulness, relevance, and worth of statistics in personal and professional life (9 items); higher scores indicate a perception that statistics is very valuable

Difficulty (SATSdiff) – students' attitudes about the difficulty of statistics as a subject (7 items); higher scores indicate greater perceived difficulty

Interest (SATSint) – students' level of individual interest in statistics (4 items); higher scores indicate more interest

Effort (SATSeff) - amount of work the student expends to learn statistics (4 items); higher scores indicate that an individual expects to work harder to learn statistics

Personality Variables (all from the Big Five model of Personality; source: John et al, 2008)

Extraversion (Extra) – Energetic approach toward social and material world (sociability, activity, assertiveness, positive emotionality); higher scores – more extraverted

Agreeableness (Agree) – Prosocial and communal orientation toward others (altruism, tender-mindedness, trust, modesty); higher scores – more agreeable

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Conscientiousness (Consc) – Socially prescribed impulse control that facilitates task- and goal-directed behavior (thinking before acting, delaying gratification, following norms and rules, planning, organizing, prioritizing tasks); higher scores – more conscientious

Neuroticism (Neurot) – Negative emotionality (anxiousness, nervousness, sadness, tense); higher scores – more neurotic

Openness (Open) – Breadth, depth, originality, and complexity of individual's mental and experiential life; higher scores – more open

In-Class Exercise

Research Question: Are the different 'types' of Statistics attitudes correlated with each other, with personality variables, and with biological sex?

To answer these questions, we will examine a correlation matrix of all relevant variables. For this exercise, we will consider Biological Sex, the 6 SATS scales, and Conscientiousness and Neuroticism (9 total variables).

Prior to conducting any correlations, it is important to first check the main assumptions for correlation, particularly **univariate normality and outliers**. You can check for normality using skills developed thus far (i.e., Skew & Kurtosis). As for outliers, one definition of outliers discussed in class is an individual scores that is more than 3 standard deviations from the mean.

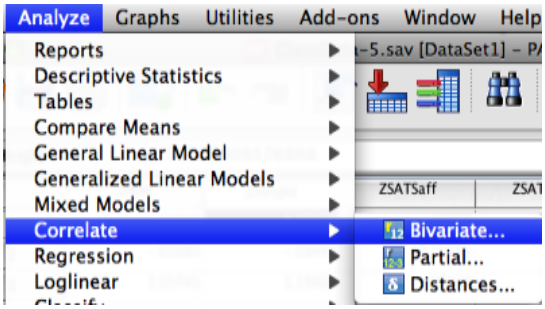
Using SPSS skills that you have developed already, examine the dataset for univariate normality and then univariate outliers on each of the six SATS scales, Conscientiousness, and Neuroticism. Delete any cases of univariate outliers. If you delete outliers, record the ID number of the participant(s) deleted, and then check the variables for univariate normality again.

<u>Concept Check:</u>

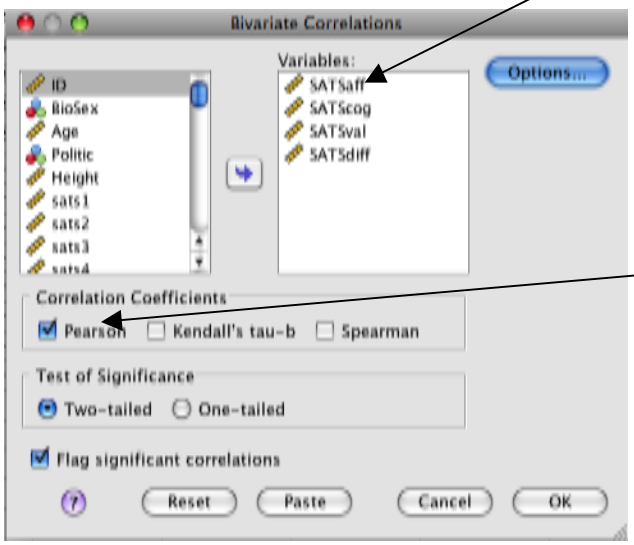
1. Are all variables normally distributed? (Yes or no…do NOT record values)
    a. If "No", what scales are non-normal?
2. Record the ID number of cases that were identified as outliers.
3. For scales that had an outlier, what happened to the values for univariate normality after the outlier was deleted?
4. Why does it not make sense to examine outliers or normality for Biological Sex?

To actually run the correlations…

[Analyze] → [Correlate] → [Bivariate]



…which will open the window on the next page…



Select variables of interest. Notice that there is no determination of the IV or DV --- this is because in a correlation, the resulting *r*-value will be the same regardless.

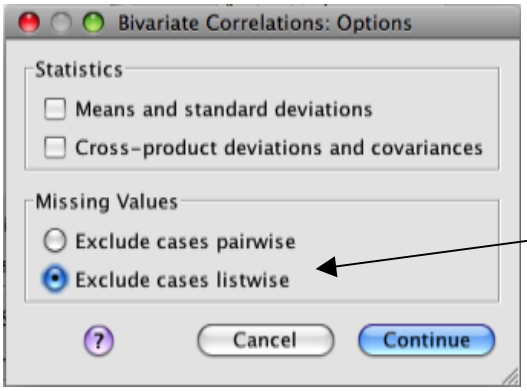
Correlation Coefficients

Here we are selecting "Pearson" because all variables are "Scale" or Interval Ratio. If we had ordinal data, we would select "Spearman". (Notice that the "Phi" option is not available here --- we will discuss relations among nominal variables later this semester).

Test of Significance

We almost always use "Two-tailed".

***I usually like to keep the "Flag significant correlations" box checked as well.



If you click the "Options" button above, you will be presented with this window. It is **strongly recommended** that you change the default setting of "Missing Values" from pairwise to listwise.

As a learning exercise, run the correlation both ways --- what do you notice?

Listwise ensures that all results for this analysis will have the same sample size.

Now click Continue then OK, and the correlation matrix will be displayed in the OUTPUT window.

*****You should know enough about SPSS outputs to be able to interpret these results.**

- What patterns do you notice in the data? Are the variables associated with each other? Are the associations significant? What do they mean?

Correlation Matrix

As discussed in class, correlations are often presented in the form of a correlation matrix. SPSS actually creates such a matrix automatically, though the style that is offered is not consistent with APA format. Therefore, you will need to create your APA-formatted Tables separately, and you can use the Acock Tables resource to assist:

http://people.oregonstate.edu/~acock/tables/

***Some key points:

- Include a relevant Title and Table Number
- Variable names are listed only once in the far left column, and they are NOT the same names in your SPSS database (use terms that will make sense to readers)
- Across the top row, only numbers are provided
- All correlation coefficients are **centered on the decimal point**.
- Round to TWO DECIMAL PLACES!!!
- Flag significant correlations according to standard conventions, with a Table note to define the conventions (**p* < .05, **p* < .01, etc.).
- Define any non-standard abbreviations in the Table Note.
- Most Matrices will be half-empty (it is redundant to report correlations twice)
    - Some matrices are not half-empty, yet still don't have redundant information
        - Authors may wish to report correlations for different groups separately, such as correlations among key variables for males AND females
        - When this happens, there is usually a note that says "Correlations above the diagonal are for females, and correlations below the diagonal are for males."

Practice and Concept Checks

5. Create an APA formatted correlation matrix that includes the following variables:
    a. Biological Sex
    b. The Six SATS variables
    c. Two Personality Variables: Conscientiousness and Neuroticism
6. What would your Null Hypothesis be for the correlation between SATS-Effort and Conscientiousness? (words and notation)
7. Give a brief interpretation of the results. You don't need to follow the APA Template from class for write-ups because your results are presented in an APA Table. However, do offer a brief summary of the results (words, no numbers). What did you find?
8. Are any of the correlations between SATS variables and personality variables close to significance? If so, what could we do to try to make these values significant?