Correlation discussion

Methods of Correlation The correlation coefficient is the extent to which variation in the scores on one variable are associated with variation in the scores on another variable. Statistics offers a variety of methods by which a correlation can be established; since the data can be quite diverse in nature. Some often used techniques to establish linear correlation are: 1. Scatter-plot: the simplest method is to plot the scores on a graph to identify the extent of covariance between scores. The biggest problem with using only a scatter-plot is that while it does tell us of the direction of the relationship; it gives us no information about its strength and significance. 2. Pearson's Product Moment Correlation Coefficient: This is considered the strongest measure of correlation; and is sensitive to even small variations in data. It is also a base for predictive analysis. The biggest problem with this method is that it requires data that is either on an equal interval or ratio scale; and cannot be used with data on simpler scales. 3. Rank Order Correlation Coefficient: This method is computed with data on an ordinal scale; and with a reasonably large sample size the results are quite robust. While the technique is quite robust, it can get extremely cumbersome as the size of the data set increases. 4. Biserial Correlation Coefficient: If the data sets belong to two variables that are inherently continuous, but the data available on one has been reduced to two discrete categories; one needs to compute a Biserial correlation coefficient. This technique is not as robust; and should not be substituted for a stronger one. 5. Point – Biserial Correlation Coefficient: If a continuous variable needs to be correlated with a discrete dichotomous one; a Point – Biserial Correlation coefficient is computed. This technique is simple and important in fields of study where such occurrences are commonplace; but it is otherwise not too robust. 6. Tetrachoric

Correlation coefficient: If the available data for both continuous variables is reduced into dichotomous discrete measures; one needs to use the Tetrachoric coefficient. It is a very useful technique when one is forced to work with preexisting data; but it can give erroneous results when the data distribution is one sided. 7. Phi Correlation coefficient: When both variables to be measured are discrete dichotonomies; one uses a Phi coefficient. Although this technique is very useful in certain areas of study; it should only be used when none of the more robust techniques is applicable. There are many circumstances where correlation is used in research. For example; if the researcher wishes to test the relationship between the marks students get in a particular subject and their scores on an ability test; the researcher would use the Pearson Product Moment Correlation Coefficient. If only the relative standing of the students is available on one or both these variables, the Rank Order Correlation Coefficient can be used. A scatter plot can be used to emphasize the direction and strength of the relationship in both these cases. If a researcher wants to find the relationship between the students' scores on the final exam and their scores on one project – when the project scores are graded into a pass/fail; the researcher needs to use the Biserial Correlation Coefficient. On the other hand, if scores on both, the exam and the project were to be graded into pass-fail dichotonomies; the best technique would be the Tetrachoric Correlation Coefficient. If the researcher were studying the relationship between the amount of money a person spends on a trip to the grocery section of a shop and whether they agree or disagree with the organic foods campaign; the statistic of choice would be the Point-Biserial Correlation Coefficient. And lastly, if a researcher wished to study the relationship between having pets and agreement (or

disagreement) with a law to remove all street animals, they would need to use a Phi Coefficient. References: Guilford, J. P., Fruchter, B., (1978). Correlation. Fundamental Statistics in Psychology and Education. 6ed. Pp77-90. New York: McGraw-Hill Book Company. Guilford, J. P., Fruchter, B., (1978). Special correlation methods and problems. Fundamental Statistics in Psychology and Education. 6ed. 293-330. New York: McGraw-Hill Book Company. Howell, D. C., (2008). Correlation. Fundamental statistics for the behavioral sciences. 6ed. Pp. 170-209. United States: Thomson Wadsworth.