**Assignment #1: Discussion Questions**

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Levels of measurement strongly correlate with statistical analysis of a variable. The four main measuring levels are nominal, ordinal, interval, and ratio. Any variable analysis requires understanding these levels, especially to separate dependent and independent variables. Nominal measurement is lowest. It categorizes variables without hierarchy. Qualitative variables reflect unique categories, hence comparisons are pointless without equality or inequality. These include gender, ethnicity, and politics. Categorical analysis classifies variables by attributes rather than ranks, using nominal variables. By categorizing data and comparing means with a dependent variable, nominal (categorical) independent variables can be enhanced.
Ordinal variables rank yet have irregular intervals. Survey responses include "strongly agree," "agree," "disagree," and "strongly disagree." Despite ordinal variables revealing hierarchy, classifications vary. If the dependent variable is ordinal and the independent variable is continuous, we may compare the two groups using rank-based methods. Take caution when drawing conclusions from this data because ranking gaps are inconsistent. Interval measurement covers variables with a continuous range but no 0 point. Typical examples include temperature (C or F). The difference between ten and twenty degrees Celsius is the same as thirty and forty degrees Celsius, but zero degrees Celsius does not mean there is no heat. Ratio computations need interval data, which measures difference but has no zero. Logic contradicts the assertion that 20 degrees Celsius is "twice as hot" as 10 degrees Celsius. T-tests, analysis of variance, and correlation typically regard interval variables as continuous.

The highest measurement is ratio analysis. Adding a real zero gives interval data all its features. At this scale, ratios like "twice as much" or "half as long" can be calculated. Ratios include age, weight, height, and income. Quantifying proportional differences between values is one of several statistical tests made possible by a real zero. Ratio data is best for dependent variables since it permits exact group comparison and analysis. Classifying independent variables for continuous dependent variables is necessary. Using ordinal or nominal categorical independent variables lets you compare dependent variable means. In contrast to income, gender is a nominal variable that may be utilized as an independent variable. We may compare the means of continuous dependent variable data points by grouping them by independent variable. Categorical independent variables let you compare groupings (like male and female mean wages).
Independent and dependent variables are prevalent in quasi-experimental designs but rare in correlational ones. When variable manipulation is impossible, quasi-experimental research examines their interactions. The researcher usually controls the result and can change the other variable. Even with a variety of experimental conditions or groups drawn from categorical data, quasi-experimental designs are difficult to prove causation due to the non-random group assignment. You may also employ correlational designs without altering variables. They watch the variables interact naturally rather than classifying or arranging them. To compare the two groups' dependent and independent variables, we may use the OGS Practical Statistics for Social Research (PSSR) tool's "Independent t-Test: Ethical Decision-Making" dataset. Although ethical decision-making is a binary variable with two values—yes or no—its score on the scale is continuous, likely an interval or ratio variable. By splitting the sample in half using a binary independent variable, we may compare the means of the ethical and unethical groups. This study was quasi-experimental since the researcher separated people into two groups based on fundamental differences rather than random assignment. However, the quasi-experimental technique lets one study how prior group classifications affect ethical decision-making tests.

This poll divides respondents into two groups based on their agreement with ethical decision-making issues, hence its independent variable ("ethical decision-making: yes or no") employs nominal data. The dependent variable, which evaluates ethical decision-making, might be an interval or ratio if the scale is continuous. The independent t-test may compare two groups' means when the dependent variable is continuous and the independent variable is categorical. This case study emphasizes the need of utilizing suitable statistical tests in a quasi-experimental design with matching measurement levels and variables.