**COM 968-32: Statistics for Social Research I**

**(Fall 2024, Sub term A)**

**Assignment No. 1**

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**Assignment #1: Discussion Questions-A Tool for Understanding**

Answer the following questions in short answer format. These questions are designed to help you understand the practical application of statistics in social research. Be prepared to discuss them with your classmates in the virtual residency or the discussion forum. Your active participation in these discussions is encouraged and essential for a comprehensive understanding of the subject. Your insights and contributions are valuable and integral to the learning process. It's your responsibility to actively engage in these discussions, as your unique perspectives enrich our collective understanding.

1) Describe each level of measurement from the acrostic NOIR (nominal, ordinal, interval, ratio). These theoretical concepts and practical tools can be confidently applied in real research scenarios. How can you parse the dependent variable on the categorical (nominal) variables as independent variables?

2) How can independent variables effectively become groups for comparing the means of the dependent variable? This is not just a theoretical question but a practical one that helps you understand the crucial role of independent variables in statistical analysis.

3) Why are independent/dependent variables typically only used in quasi-experimental designs and not in correlational designs?

4) Navigate to OGS’s Practical Statistics for Social Research (PSSR) tool. Click on “Example Datasets” and load the “Independent t-Test: Ethical Decision-Making” dataset. Describe the dichotomous independent variable for the two groups and the dependent variable. This is an excellent example of a quasi-experimental research design because it allows us to understand the ethical decision-making process in a controlled setting. Which levels of measurement are the independent variable and the dependent variable? This exercise will help you apply your understanding of NOIR levels of measurement to a real research scenario.

**Assignment #1: Discussion Questions-A Tool for Understanding**

**1)** Describe each level of measurement from the acrostic NOIR (nominal, ordinal, interval, ratio). Generally, any continuous variable (ordinal, interval, or ratio) can be used as a dependent variable. How can you parse the dependent variable on the categorical (nominal) variables as independent variables?

**Nominal** refers to names or labels to which items or data are identified. Nominal data is a variable in statistics that describes a category, name, or label without a natural order. It's also known as categorical data and is the most apparent level of measurement. Nominal data is made up of mutually exclusive categories that can't be ordered in a meaningful way. For example, you can't say that gray hair is "better than" brown hair because they're both categories of hair color. Here are some examples of nominal data: Transportation: A person's preferred mode of transportation, such as car, bus, train, or bicycle. Hair color: A person's hair color, such as brown, blonde, black, or red. Political preferences: It shows how employees feel about their company, work, and workplace environment; performance reviews; questions about staff's career goals and expectations.

**Ordinal** data refers to order,  a definite, statistical data type in which the variables have natural, ordered categories, and the distances between the categories are unknown. In the context of social research, ordinal data could be the job satisfaction levels in a company, the rating of political candidates in a survey, or the assessment of students' academic performance.

**Interval statistics** is a type of statistics that uses data sets to describe a sample population. Interval data is a numerical level of measurement that uses consistent intervals to show order, direction, and the exact difference in value. Interval data can include negative values and doesn't have a true zero, meaning the zero point is random and subjective. For example, a temperature of zero degrees Fahrenheit doesn't mean no temperature; instead, it is 10 degrees less than 1.

**Ratio** data is quantitative data that measures variables on a continuous scale with equal distances between each value and a meaningful zero. In social research, an excellent example of ratio data could be income levels, where the zero point (no income) is meaningful, and the distances between income levels are equal.

How can you parse the dependent variable on the categorical (nominal) variables as independent variables:

A dependent variable can be categorical and have multiple levels. These levels may be ordinal or not (briefly, they are ordinal if they have a definite order—e.g., none, some, a lot). If the dependent variable is ordinal, one choice is ordinal logistic regression.

**2)** How can independent variables effectively become groups for comparing the means of the dependent variable?

Covariance analysis (ANACOVA) can be used to analyze such comparisons. It is conducted when you want to know the relationship between an independent and dependent variable while considering the effect of other variables (i.e., covariates). Comparing **exercise** to physical health, **Education** to knowledge, **hunger** to eating, and **thirst** to drink. The independent variables are the emboldened words (the causatives) and have become group variables for comparing the means of the dependent variables (the resultant effects), which are not emboldened.

**3)** Why are independent/dependent variables typically only used in quasi-experimental designs and not in correlational designs?

Although the **independent variable** is manipulated, participants are not randomly assigned to conditions or orders of conditions (Cook et al., 1979). Because the **independent variable** is manipulated before the **dependent variable** is measured, **quasi-experimental** research eliminates the directionality problem.

**4)** Navigate to OGS’s Practical Statistics for Social Research (PSSR) tool. Click on “Example Datasets” and load the “Independent t-Test: Ethical Decision-Making” dataset. Describe the dichotomous independent variable for the two groups and the dependent variable. This is an excellent example of a quasi-experimental research design because it allows us to understand the ethical decision-making process in a controlled setting. Which levels of measurement are the independent variable and the dependent variable? This exercise will help you apply your understanding of NOIR levels of measurement to a real research scenario:

**Step One: Input Data and Choose Options**

|  |  |  |
| --- | --- | --- |
| **Sample Label A  Religious Participants** |  | **Sample Label B  Non-Religious Participants** |
| Row 12  of n = 16 |  | Row 1  of n = 20 |
| Independent Samples Sample 1 Specifies Groups |  | Dependent Variable Label(s):  Show Moderating Variable |

Load Examples:

The T-test, Step One is culled from the PSSR (See OGS Resource tool) and it shows

1) Religious Participants as independent samples or variables in the left column and

2) Non-religious Participants as a sample of dependent variables in the right column:

and they depict two groups of variables that reflect characteristics of dichotomous variables.

A dichotomous variable is a variable that only takes on two possible values. The two sample Labels A and B comprise Independent and dependent variables. They are dichotomous variables because the Religious Variable has two sets of values in columns:

* A = n = 16.
* B = n = 20.

Some examples of dichotomous variables include Gender: Male or Female, Coin Flip: Heads or Tails, Property Type: Residential or Commercial, Athlete Status: professional or Amateur, and Exam Results: Pass or Fail. These types of variables occur all the time in practice.

Which levels of measurement are the independent variable and the dependent variable?

The independent variable (IV) is the variable that controls the other (it is referred to as the subjective or the causative function). They are nominal and ordinal and may have intervals or a range of variables.

Meanwhile, the dependent variable (DV) depends on the independent variable and is measurable (it’s the objective function or effect).

The independent and dependent variables are the two main variables in a science experiment. A variable is anything you can observe, measure, and record.