Statistics for Social Research I

David D. Reedy

Omega Graduate School

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Professor

Dr. Sean Taladay

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? 2. How can independent variables effectively become groups for comparing the means of the dependent variable? 3. Why are independent/dependent variables typically only used in quasi-experimental designs and not in correlational designs? 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. Why is this a good example of a quasi-experimental research design? Which levels of measurement are the independent variable and the dependent variable?

# Question 1

Question: 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 data is the simplest form of measurement where data is organized into distinct groups or labels that do not have a specific order. The categories are mutually exclusive and do not have inherent order or ranking between the categories. A common example would be gender. Ordinal data also involves data that can be organized in distinct groups but in this case there is a meaningful order or ranking. With ordinal data, the intervals between the categories are not necessarily equal. For example, placement in a road race indicates who comes in first to last but completion times are not evenly spaced. Interval data is like ordinal data except the intervals are equal. A key to remember with interval data is there is no true zero point, or no absence of the quality measured and represented. Temperature is an example. Ratio data is similar to interval data in that the intervals are equal but ratio has a true zero point, that is it is possible for the quality being observed and measured to be absent. Income would be an example.

When dealing with categorical/nominal variables as independent variables you can still analyze their relationship with a dependent variable, even if the dependent variable is also categorical. The purpose here is to determine if there is a significant association between two categorical variables. And example might be testing whether gender (nominal) is associated with preference for a particular marketed product (also nominal).

# Question 2

Question: How can independent variables effectively become groups for comparing the means of the dependent variable?

This typically involves grouping data based on categories or levels of the independent variable(s) and then analyzing the differences in the dependent variable across these groups. For example if I wanted to study the effects of a several weight loss programs I would group participants based on the diet they followed and then compare the mean weight loss across these groups assuming random selection of participants.

# Question 3

Why are independent/dependent variables typically only used in quasi-experimental designs and not in correlational designs? 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. Why is this a good example of a quasi-experimental research design? Which levels of measurement are the independent variable and the dependent variable?

Independent and dependent variables are typically used in quasi-experimental designs because these designs involve some form of manipulation or intervention to explore cause-and-effect relationships. In contrast, correlational designs only observe existing relationships between variables without manipulation to determine if an association is supported. So terms like "independent" and "dependent" do not apply since causality is not being tested for the variable(s) of interest.

In the study 16 religious participants and 20 non-religious participants were examined to see if there is a difference in ethical decision making between religious and non-religious participants. The dichotomous independent variable in this case is whether a the participant identifies as religious or non-religious. The participant must be one or the other. This is nominal or categorical data. The dependent variable is the measure of ethical behavior or awareness in a particular situation or scenario. This is ordinal data in that the results do have order but likely do not specify the exact difference or interval between the various ranks.

This is an example of a quasi-experimental design because participants are not randomly assigned to the “religious” or “non-religious” group but are defined based on preexisting conditions. Thus, the study compares two pre-existing groups. Also, the differences between the two groups occurs naturally and is simply being observed, measured and interpreted vs manipulating an independent variable such as evaluating a group that is given a class in ethics vs. one that is not with participants randomly selected and assigned randomly to each group.

WORKS CITED