

Applied Statistics

Name

Professor

Institution

Date

Question 1: Difference between an independent variable and a dependent variable

Applied statistics involves a lot of experiments. A variable – a factor which cannot be manipulated or controlled – is the factor being experimented on and usually exists as independent or dependent. An independent variable better known as an experimental or predictor variable is a variable subject to experimental manipulation to allow the observation of the effect on a dependent variable (Field, 2013).

To define dependent variables in a simple way, consider the following situation. A teacher asks 20 students to do a physics test. The teachers want to identify the source of differential performance in students (some perform well, some don't). In this case, the teacher has no idea what the answer is, but suspects that it might be because of two reasons: Some students are more intelligent than others by nature and/or some students usually revise for their test. So the 20 students begin the test simultaneously under the similar environmental conditions (Field, 2013).

Dependent variable: Test mark which is measured from 0-100

Independent variable: revision time (in hours) and intelligence (in IQ score)

From this example, it can be seen that the dependent variable (test mark) enormously depends on the independent variable (revision time) and intelligence. Revision time and intelligence are independent variables the student with more revision time can be as good as that with a high IQ.

Question 2: Discuss the different levels of measurement

There are 4 levels of measurement:

Nominal: Nominal measurement is the first level. Numbers and words can be utilized in data classification. The classification of gender as F for female and M for male is a nominal measurement (Peck, Olsen & Devore, 2011).

Ordinal: This is the second level of measurement. It usually displays some ordered relationship between the numbers of items. In an examination, the student with the highest marks is ranked the first, followed by the second highest. The one with the lowest score will automatically rank the last. Ordinal level of measurement depicts a reason why some numbers are arranged in order.

Interval: This level classifies and orders the measurements (works like nominal and ordinal combined). The distances between each interval on the scale are equal along the scale from the low interval to high interval. In a clinical thermometer for example, the distance between 35°C and 37°C is the same as the distance between 38°C and 40°C (Field, 2013).

Ratio: Here, “the divisions between the points on the scale have an equivalent distance between them, and the rankings assigned to the items are according to their size.”

Question 3: What is measurement error?

The error of measurement can be defined as the difference between a subject’s measurement and the true value. For example when one measures the length of a metal rod out in the sun is going to get a higher reading than someone measuring the rod in a controlled metrology room (Dalgaard, 2008).

Question 4: What is randomization and why is it important? Randomization is a sampling method in which all members of a set have an equal chance of being chosen. Randomization eradicates bias by offering all members an equal chance to be selected. Without randomization, an experiment is assumed to be unreliable and invalid (Dalgaard, 2008).

Question 5: Discuss reliability and validity: In statistics, reliability stands for consistency. If one conducts repeated experiments and achieves similar results, the experiment is reliable. An experiment is valid if it does measure what it is supposed to measure. If a test is carried out to determine the source of differential performance in students and it comes out that a person with high IQ who commits a lot of time for revision gets low marks in exams, the test is invalid. Validity is similar to feasibility as far as statistics is concerned (Field, 2013).

References

Dalgaard, P. (2008). Introductory Statistics with R. New York, NY: Springer Science & Business

Media

Field, A. (2013). Discovering Statistics Using IBM Statistics + SPSS V22, 4th Edition.

Thousand Oaks, CA: Sage.

Peck, R, Olsen, C & Devore, LJ. (2011). Introduction to Statistics and Data Analysis. Boston,

MA: Cengage Learning.

www.primeassignment.com