



Statistical Corner

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Question 1:

What is measurement scale?

Answer :

There are four types of measurement scale: nominal, ordinal, interval and ratio. Nominal measurements are categorical data without any ranking order, such as gender, blood type, marital status, and religion. Ordinal measurements, in contrast, are categorical data with a ranking order, such as education attainment (Primary=1, Secondary=2, College=3, Tertiary=4), and Risser sign (a 6 point Likert scale). Interval and ratio measurements are quantitative data. However, the zero value of ratio data is well-defined but that of interval data is not. For example, calendar time is interval unless we can determine the "start" of time.

Question 2:

Is it important to determine the measurement scale?

Answer:

Yes, in general. Although the way to analyse interval and ratio data is the same, the statistical methods for the analysis of nominal, ordinal, and interval/ratio data can be very much different. For example, we may use a t-test or Mann-Whitney U test to compare the blood pressure, a ratio variable, between two groups of subjects. However, to compare the education attainment, an ordinal variable, between two groups of subjects, we may use a chi-square test instead. Therefore, it is important to determine the measurement scale before deciding the method of analysis.

Question 3:

What are dependent and independent variables?

Answer:

A dependent variable is what you want to explain or predict while an independent variable is a predictor or factor of the dependent variable. For example, in a study of how women's behaviour during pregnancy influence the birth weight of their baby, mother's behaviour during pregnancy, including diet, smoking habits, receiving prenatal care or not, are independent variables, whereas birth weight is the dependent variable. However, not in all situations we have dependent and independent variables. For example when we are only interested in examining the association between physical and psychological abuses, neither physical nor psychological abuse is treated as a factor or predictor of the other and therefore they are not identified as dependent or independent variable.

Question 4:

Are we done after reporting the p-value from a statistical test?

Answer:

No, it is not sufficient to only report the p-value of a statistical test. We have to also report the size of effect or association together with its corresponding confidence interval. More importantly, we have to examine the assumption or requirement, if any, behind the statistical test. For examples, t-test and ordinary linear regression bear the normality assumption; chi-square test requires sufficiently large expected frequencies in all cells of the contingency table.