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Tips for Distinguishing Nominal and Ordinal Scale Data

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ABSTRACT

In community empowerment research, categorical variables both in the form of nominal and ordinal scales are often involved. The purpose of these tips is to provide information on how to distinguish nominal and ordinal variables, so that data interpretation errors do not occur. In principle, to distinguish nominal and ordinal variables, the first step is to ensure that there is a dichotomy which means variables at nominal scale; if there are more than two categories, a second step is taken, namely to ensure that there are differences in degree between categories which means the variables are ordinal scale.
Keywords: categorical variable, nominal scale; ordinal scale; distinguishing

INTRODUCTION

Nowadays, researches on community empowerment are increasingly being encouraged in order to make society independent in all aspects of their life, including health, education, economy, religion, industry, and so on. In community empowerment research, categorical variables both in the form of nominal and ordinal scales are often involved, for example gender, education level, age, economic level, occupation, knowledge level, attitude, motivation, interest, intention, self-efficacy, social support, involvement. social, social capital, commitment, family involvement, skills, loyalty, and so on.

In general, at the descriptive analysis stage the researchers were able to describe categorical variables like this, namely in the form of frequencies and percentages [(1-3)], which were presented in tables and diagrams, such as bar charts or digram pies. However, at the stage of using the statistical analytic method in order to test the hypothesis, sometimes there is a selection of the hypothesis testing tool used. Therefore, on this occasion we share tips on how to ensure that the variables we are studying are of nominal or ordinal scales, so that there are no errors in data interpretation due to errors in determining the data scale and data analysis methods.

HOW TO DISTINGUISH NOMINAL AND ORDINAL SCALE DATA?

In research methodology or basic statistics, it is usually discussed the types of quantitative research data. In general, data can be classified into two groups, namely numerical data and categorical data. In general, numerical data consists of 2 groups, namely interval scale data and ratio scale data, although there is also numeric data with ordinal scale. Meanwhile, categorical data consisted of 2 groups, namely nominal scale data and ordinal scale data [(1, 2)]. Henceforth, we only discuss nominal scale data and ordinal scale data which are categorical data.

In the categorical data framework, one main thing that distinguishes nominal and ordinal data is the degree difference between one category and another. If there is no degree difference between categories, then the data is on a nominal scale; whereas if there is a difference in degree between categories, then the data is on an ordinal scale [(1, 2)].

However, there is one thing that is sometimes not understood by researchers, which is worth noting and always remembering, namely about the dichotomous category. Categories that are dichotomous, for example rich and poor, high motivation and low motivation, accept and reject, competent and incompetent, skilled and unskilled, and so on, cannot be considered to have different degrees between categories. Even though on the face of it, it seems that rich are higher than poor, competent is higher than incompetent, but the dichotomy is more appropriate to be considered as the distinction between one pole and the other. Thus, all variables with dichotomous categories are nominal variables [(2)].

Based on the explanation above, it is clear that the difference in degree between categories only applies to variables consisting of more than two categories. If a categoric variable is known to consist of more than two categories, then the researcher can ascertain whether the variable is ordinal or nominal in scale, by looking at whether or not there is a degree difference between categories.

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In the previous section, it has been explained that the existence of a level between categories is a feature of the ordinal scale variables. It should be noted that for ordinal scales, the distances between categories are not the same. To make it easier, let's look at some of the following examples (Table 1).

Table 1. Examples of variables with nominal and ordinal scales

No	Variable	Category	Explanation	Scale
1	Gender	• Male • Female	Dichotomy → Levels: none	Nominal
2	Religion	• Islam • Christian • Catholic • Hindu • Buddha • Konghucu	Levels: none	Nominal
3	Motivation	• High • Low	Dichotomy → Levels: none	Nominal
4	Motivation	• High • Moderate • Low	Levels: there	Ordinal
5	Competence	• Competent • Incompetent	Dichotomy → Levels: none	Nominal
6	Attitude	• Favourable • Netral • Unfavourable	Levels: there	Ordinal
7	Attitude	• Favourable • Netral	Dichotomy → Levels: none	Nominal
8	Job	• Farmer • Trader • Soldier • Teacher • Researcher • Nurse	Levels: none	Nominal

The examples in numbers 1, 3, 5 and 7 only have 2 categories (dichotomy) so it is clear that these variables are of a nominal scale. The variables in examples 2 and 8 have more than two categories, but there is no difference in degree between categories, in the sense that all categories have the same degree, so it can be concluded that the two variables are nominal in scale. Meanwhile, the variables in examples 4 and 6 have more than two categories, and there are differences in degrees between categories, so it can be concluded that the two variables are on an ordinal scale.

In research practice, sometimes researchers have previously determined that an ordinal scale variable, for example: motivation with three categories, namely high motivation, moderate motivation and low motivation. However, after the data collection was completed, it turned out that there were only two categories, namely high motivation and moderate motivation, meaning that none of the respondents had low motivation. In cases like this, the category has been reduced to two, thus turning into a dichotomy. Thus, this variable is of a nominal scale.

After it was confirmed that the variables were either nominal or ordinal in scale, then the researcher re-evaluated the appropriate analysis method. For example, at the planning stage of a research on community empowerment, a researcher wants to examine the correlation between motivation to become a health cadre and competence as a surveyor of breeding places for Aedes mosquitoes. In this case, motivation consists of 3 categories, namely high motivation, moderate motivation and low motivation; while competence consists of four categories, namely very competent, competent, less competent and incompetent. Thus it is clear that the two variables have an ordinal scale, so the researcher plans to use the Kendal Tau correlation test in order to test the hypothesis. After the data was collected, it turned out that for the data on motivation there were only two categories, namely high motivation and moderate motivation; Meanwhile, for data on competence, there are

only two categories, namely competent and less competent. Thus, the two variables turned into nominal variables, so that the Kendal Tau correlation test was no longer appropriate. In such a case, the researcher must select an appropriate correlation test such as the Chi-square test or Fisher's exact test as an alternative.

CONCLUSION

Untuk membedakan variabel nominal dan ordinal, langkah pertama adalah memastikan adanya dikotomi yang berarti variabel berskala nominal; jika ada lebih dari dua kategori, dilakukan langkah kedua yaitu memastikan adanya perbedaan jenjang antar kategori yang menunjukkan bahwa variabel berskala ordinal.

REFERENCES

1. Nugroho HSW. Biostatistika untuk Mahasiswa Diploma 3 Kebidanan. Ponorogo: FORIKES; 2013.
2. Nugroho HSW, Sulikah, Handayani TE, Santosa BJ, Suharto A. Metode Penelitian dan Statistika Dasar untuk Mahasiswa Bidan. Madiun: Radius; 2014.
3. Nugroho HSW. Descriptive Data Analysis for Categorical Data (Analisis Data Secara Deskriptif untuk Data Kategorik). Ponorogo: FORIKES; 2014.