primary scales of measurement

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Scales in marketing are similar to the trusty ruler. They are used to measure things. But unlike a ruler, which is much like another ruler, different scales are used by marketers to measure different things. It is crucial when using market research to look at data and understand the scale as well as some properties that led to the data that one is viewing.

Scales can be of the following types: nominal, ordinal, interval, and ratio based. The order described also shows the increasing data content as one goes from nominal up to ratio. At the low end of the scale, is a nominal scale that comes from the Latin word nomeni, which means "name." The most common example of a nominal scale is the number on a football jersev. Marketers use nominal scale in a number of ways. For example, we could describe the consumer's favorite brand of cereal, and that would represent nominal data. We could indicate the consumer's preferred store where he/she would buy a product. That too would be nominal. There are a lot of statistics that we are used to using such as the average, which are no longer meaningful when we have nominal data. Let us say five consumers bought Cheerios, three consumers bought Frosted Flakes, and two consumers bought Grape-Nuts. The average brand that the group bought makes no sense. Rather some statistic that indicates the norm is the *mode* – which is the most frequently occurring value. In our cereal example, we would say the mode is Cheerios since it is the most frequently occurring value. Nominal data can also be analyzed in terms of the relationship between two or more nominal variables. For example, one might want to know if the preferred breakfast cereal is related to gender, another nominal variable. A common method used by marketing researchers is CROSS-TABULATION which reports joint frequency; association can be tested using the chi-square test statistic to indicate if there is such a relationship between two nominal variables.

If we have asked the consumer to rank order his/her preference for stores we would have

an ordinal scale. Ordinal scales contain more content than do nominal scales because it says that something ranked 1 is higher (or lower) in attribute than something that is ranked number 2 and 2 is more (or less) than something ranked 3. Ordinal scale, as the name implies, indicates something about order. (as indicated 1 could be high - such as weight, or low - such as lightness). With ordinal data, there is no implication of the distance between the data. Like a running race, the difference between first and second place might not be the same as the difference between 40th and 41st place. Theoretically, we can report the mode on ordinal data, assuming it is not place in a race (where everybody has a unique value and all places qualify as the mode). Quite often, we summarize the central tendency with ordinal data in terms of the median in which half of the numbers fall above and half below. We can also associate two or more ordinal variables using cross classification, but the techniques available are a little more powerful because the data are more powerful and we can use things like the Spearman rank order correlation coefficient to indicate a relationship between two or more variables.

The data content increases considerably as we go from ordinal data to interval data. In interval data the difference between 1 and 2, which is 1, is the same as the difference between 41 and 42. Given this property, some of the very familiar statistics that we are used to, such as the mean (average) now becomes a relevant measure of centrality. If we are willing to assign interval data into categories (e.g., 1-5, 5-15, 16- and up) we can still use cross tabulation to check association between two variables. However, the new power inherent in the data allows a whole new series of analyses where we look at association between variables using some form of correlation (see PRODUCT MOMENT CORRELATION).

With interval data the difference between 22 and 27 is the same as the difference between 5 and 10. So, what do ratio data have that interval data do not? With ratio data, the value of 0 has a meaning in it that means nil, or nothing. Clearly, with the Fahrenheit scale a temperature of 0 does not mean 0 or nothing. The number of boxes of Cheerios consumed in a year would be a good example of a ratio scale. For all but the

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2 primary scales of measurement

most esoteric considerations such as a geometric or harmonic mean, ratio scales do not really provide much by way of practical value than interval scales.

Scales selected are important because they define the properties of the measurements that dictate the analyses that are possible subsequent to data collection. Where possible, marketers should try to collect interval data unless only ordinal data or nominal data fit the situation.

Much of marketing is all about association between variables, where we might then make causal inferences. Many techniques exist that relate mixes of nominal, ordinal, and interval scaled data. For example, if we have an intervally scaled dependent variable that we think is dependent on one or more nominally scaled independent variables, we might use MULTIPLE REGRESSION, a correlation technique, by converting nominally scaled data into dummy variables.

Bibliography

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