**Levels of Measurement in Social Science Research**

Empirical research in the social sciences requires both accurate and reliable measures. Collection of data takes many forms in the social sciences including measurement of perceptions, cognitions, opinions, and other latent constructs that can’t be measured directly. When it comes to quantification of people, perceptions, and events, there are 4 main types of measurement.

One mistake many social science researchers make is collecting data at a lower level than is necessary. As it turns out, it is always possible to transform data from a higher level to a lower level but never the other way around. Before you collect data for a research study, consider carefully which of the 4 types of data you are collecting and how you will use them once you have them.

1. **Nominal Scale**

The nominal scale (also called dummy coding) simply places people, events, perceptions, etc. into categories based on some common trait. Some data are naturally suited to the nominal scale such as males vs. females, redheads vs. blondes vs. brunettes, and African American vs. Asian. The nominal scale forms the basis for such analyses as Analysis of Variance (ANOVA) because those analyses require that some category is compared to at least one other category.

The nominal scale is the lowest form of measurement because it doesn’t capture information about the focal object other than whether the object belongs or doesn’t belong to a category; either you are a smoker or not a smoker, you attended college or you didn’t, a subject has some experience with computers, an average amount of experience with computers, or extensive experience with computers. No data is captured that can place the measured object on any kind of scale say, for example, on a continuum from one to ten. Coding of nominal scale data can be accomplished using numbers, letters, labels, or any symbol that represents a category into which an object can either belong or not belong.

A Nominal Scale is a measurement scale, in which numbers serve as “tags” or “labels” only, to identify or classify an object. A nominal scale measurement normally deals only with non-numeric [(quantitative)](https://www.questionpro.com/blog/qualitative-data/) variables or where numbers have no value.

Below is an example of Nominal [level of measurement](https://www.questionpro.com/blog/nominal-ordinal-interval-ratio/).

Please select the degree of discomfort of the disease:

* 1-Mild
* 2-Moderate
* 3-Severe

In this particular example, 1=Mild, 2=Moderate, and 3=Severe. Here numbers are simply used as tags and have no value.

**2. Ordinal Scale**

The ordinal scale has at least one major advantage over the nominal scale. The ordinal scale contains all of the information captured in the nominal scale but it also ranks data from lowest to highest. Rather than simply categorize data by placing an object either into or not into a category, ordinal data give you some idea of where data lie in relation to each other.

For example, suppose you are conducting a study on cigarette smoking and you capture how many packs of cigarettes three smokers consume in a day. It turns out that the first subject smokes one pack a day, the second smokes two packs a day, and the third smokes ten packs a day. Using an ordinal scale, your data would look like this.

1. Ten packs a day smoker
2. Two packs a day smoker
3. One pack a day smoker

The ordinal scale rank orders the subjects by how many packs of cigarettes they smoke in one day. Notice, however, that although you can use the ordinal scale to rank the subjects, there is some important data missing; the first smoker occupies a rank the same distance from the second smoker as the second smoker occupies a rank the same distance from the third smoker. Consequently, no information exists in the ordinal scale to indicate the distance one smoker is from the others except for the ranking. Richer than nominal scaling, ordinal scaling still suffers from some information loss in the data.

Ordinal Scale Examples

This scale not only assigns values to the variables but also measures the rank or order of the variables, such as:

* Grades
* Satisfaction
* Happiness

How satisfied are you with our services?

* 1- Very Unsatisfied
* 2- Unsatisfied
* 3- Neural
* 4- Satisfied
* 5- Very Satisfied

**3. Interval Scale**

Unlike the nominal scale that simply places objects into or out of a category or the ordinal scale that rank orders objects, the interval scale indicates the distance one object is from another. In the social sciences, there is a famous example often taught to students on this distinction.

Suppose you are near the shore of a lake and you see three tree stumps sticking out of the water. Using the water as a reference point, it would be easy to measure which stump rises highest out of the water. In this way, you can create a relative measure of the height of the stumps from the surface of the water. For example, the first stump may breach the water by twenty-four centimeters, the second by twenty-six centimeters, and the third by twenty-eight centimeters. Unlike the nominal and ordinal scales, you can make relative distance measurements among objects using the interval scale.

However, the distance the stumps extend out of the water gives you no indication of how long the stumps actually are. It’s possible that the bottom of the lake is irregular making the tallest stump look tallest only in relation to the water. Using interval scaling, you have no indication of the absolute length of the stumps. Still, the interval scale contains richer information that the two lower levels of scaling.

Interval Scale Examples

* There are situations where attitude scales are considered to be interval scales.
* Apart from the temperature scale, time is also a very common example of interval scale as the values are already established, constant and measurable.
* Calendar years and time also fall under this category of measurement scales.
* [Likert scale](https://www.questionpro.com/blog/what-is-likert-scale/), [Net Promoter Score](https://www.questionpro.com/features/net-promoter-score.html), [Semantic Differential Scale](https://www.questionpro.com/semantic-differential-scale.html), Bipolar Matrix Table etc. are the most-used interval scale examples.

The following questions fall under the Interval Scale category:

* What is your family income?
* What is the temperature in your city?

**4. Ratio Scale**

The scale that contains the richest information about an object is ratio scaling. The ratio scale contains all of the information of the previous three levels plus it contains an absolute zero point. To use the example above, the ratio scale allows you to measure the stumps from the bottom of the lake; the bottom of the lake represents the absolute zero point.

The distinction between interval and ratio scales is an important one in the social sciences. Although both can capture continuous data, you have to be careful not to assume that the lowest possible score in your data collection automatically represents an absolute zero point.

Take extraversion captured using a psychometrically sound survey instrument. The items that capture this construct may range from zero to ten on the survey but there is no guarantee that a score of zero on the survey places a subject at the absolute zero point on the extraversion construct. Yes, you know that a subject with a score of eight on the scale is more extraverted than someone with a score of seven, but those numbers only exist for comparison between each other, not in comparison to some absolute score of zero extraversion.

The following questions fall under the Ratio Scale category:

* What is your daughter’s current height?
  + Less than 5 feet.
  + 5 feet 1 inch – 5 feet 5 inches
  + 5 feet 6 inches- 6 feet
  + More than 6 feet
* What is your weight in kilograms?
  + Less than 50 kilograms
  + 51- 70 kilograms
  + 71- 90 kilograms
  + 91-110 kilograms
  + More than 110 kilograms

**Conclusion**

The four levels of measurement discussed above have an important impact on how you collect data and how you analyze them later. Collect at the wrong level, and you will end of having to adjust your research, your design, and your analyses. Make sure you consider carefully the level at which you collect your data, especially in light of what statistical procedures you intend to use once you have the data in hand.