

SCALES OF MEASUREMENT

Overview

There are a number of ways of measuring things in psychology. Take a moment to think about how you might measure attitudes, anger, language development, attention, or neural processes. These are all research topics that require creative methodology to measure what you're trying to measure (or, in other words...have internal validity). Here, you'll get a brief introduction to four different scales of measurement that are used in a variety of psychological fields

Nominal

A nominal scale, as the name implies, is simply some placing of data into categories, without any order or structure. Nominal scales are used for labeling variables, without any quantitative value. This is basically a way of categorizing or grouping behavior, where the actual numbers are simply labels or identifiers. "Nominal" scales could simply be called "labels." Here are some examples, below. Notices that all of these scales are mutually exclusive (no overlap) and none of them have any numerical significance

What is your gender? <input checked="" type="radio"/> M – Male <input type="radio"/> F – Female	What is your hair color? <input checked="" type="radio"/> 1 – Brown <input type="radio"/> 2 – Black <input type="radio"/> 3 – Blonde <input type="radio"/> 4 – Gray <input type="radio"/> 5 – Other	Where do you live? <input checked="" type="radio"/> A – North of the equator <input type="radio"/> B – South of the equator <input type="radio"/> C – Neither: In the international space station
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Examples of Nominal Scales

Note: a sub-type of nominal scale with only two categories (e.g. male/female) is called “**dichotomous**.”

statistics

The statistics which can be used with nominal scales are in the non-parametric group. The most likely ones would be:

Mode

cross tabulation - with chi-square

Ordinal

The simplest ordinal scale is a ranking. With ordinal scales, it is the order of the values is what's important and significant, but the differences between each one is not really known. Take a look at the example below. In each case, we know that a #4 is better than a #3 or #2, but we don't know—and cannot quantify—how *much* better it is. For example,

is the difference between “OK” and “Unhappy” the same as the difference between “Very Happy” and “Happy?” We can’t say.

Ordinal scales are typically measures of non-numeric concepts like satisfaction, happiness, discomfort, etc

Advanced note: The best way to determine *central tendency* on a set of ordinal data is to use the mode or median; the mean cannot be defined from an ordinal set.

statistics

Median and mode

rank order correlation

non-parametric analysis of variance

Interval

Interval scales keep the same rank characteristic as ordinal scales, but interval scales also show the differences between each data point. Interval scales are numeric scales in which we know not only the order, but also the exact differences between the values. For example, the difference between 60 and 50 degrees is a measurable 10 degrees, as is the difference between 80 and 70 degrees. Time is another good example of an interval scale in which the increments are known, consistent, and measurable

and statistics

Mean and standard deviation

Correlation - r

Regression

Analysis of variance

Factor analysis

Ratio

A ratio scale is the top level of measurement and is not often available in social research.

The factor which clearly defines a ratio scale is that it has a true zero point.

The simplest example of a ratio scale is the measurement of length (disregarding any philosophical points about defining how we can identify zero length).

The best way to contrast interval and ratio scales is to look at temperature. The Centigrade scale has a zero point but it is an arbitrary one. The Fahrenheit scale has its equivalent point at -32o. (Physicists would probably argue that Absolute Zero is the zero point for temperature but this is a theoretical concept.) So, even though temperature looks as if it would be a ratio scale it is an interval scale. Currently, we cannot talk about *no temperature* - and this would be needed if it were a ratio scale.

and statistics

The same as for Interval data