

Some Basics of Data Analysis

Different research methods produce different kinds of data that lend themselves to different types of analyses. The analysis techniques you use should be determined by the types of data you're analyzing. And conversely, of course, the data you seek to collect should be determined by the types of analyses you plan to perform. You'll find a basic understanding of data terms helpful as you plan and present your analyses.

For instance, *quantitative data* and *qualitative data* are two major data types and can represent two different approaches to data collection. In brief, quantitative data are measured in numbers (quantity) while qualitative data are described in words (quality). In both the hard sciences and the social sciences, data analysis is grounded in good research design and the rigorous use of appropriate analytic methods. Statistics is the bedrock method for analyzing quantitative and many types of qualitative data. However, research focusing on observations of behaviors (including user research, psychology, and anthropology) collects and analyzes qualitative data in ways that go beyond statistical analysis, to include interpretive techniques and coding approaches.

Key terms and data types are presented below.

Statistical Terms

- **Variable** - a characteristic of the thing you are studying
 - Quantitative Variable - data represented by a number; "quantity" (e.g. Age, Success Rate, Satisfaction Score)
 - Qualitative Variable - non-numeric data; data described in words; "quality"
 - In hard sciences, data that are represented by a category (e.g. Gender, Blood Type, Geographic Location)
 - In social sciences, data that are descriptive (e.g. resulting from unstructured observations, open ended interviews)
- **Value** - a specific measurement of a variable
- **Observation** - a case; a individual respondent; the "n". This is not to be confused with, say, a field note on your observations of texting behavior at a coffee shop; such a note would be a value (e.g. 10) of a variable (texts per hour) for an observation (1 person).

Data Types

- **Categorical** - data that can be sorted into groups. Using statistical methods, qualitative data can be analyzed using categorical data types. Using social science analysis methods, they can be analyzed by deriving themes and patterns, and then analyzed statistically. *Bar charts and pie graphs are two ways to graph categorical data.*
 - Nominal - data classified into mutually exclusive categories (e.g. Gender, Geographic Location, Blood Type). Data can be analyzed using nominal scales by assigning it into labeled groups. Nominal data can be counted, but not ordered, because there is no natural order among the different values (consider blood type).

- Ordinal - the rank order of something (e.g. Degree of Liking a Cookie on a scale of 1 to 5). You can count and order ordinal data, but you can't measure it, since the difference between 1 and 2 on this scale is not necessarily the same as the difference between 4 and 5.
- **Numerical** - data that can be measured and placed in ascending or descending order. Quantitative data are analyzed using numerical data types. *Scatter plots and line graphs are two ways to graph numerical data.*
 - Discrete - data in which the values are finite, distinct, and separate (e.g. Bricks in a Wall, People on a Bus). You can count discrete data.
 - Continuous - data for which the units of measurement are ranged in an infinite, continuous interval (e.g. Height, Weight, Salary). You can count, order, and measure continuous data.

Below are a few key approaches to analyzing qualitative data in the social sciences. These approaches use statistical methods but also go beyond them in ways that permit the rigorous analysis of behavioral observations.

Social Science Data Analysis

- **Interpretive techniques** - based on expert review, comparisons, or other processes, interpreting the data through impressions.
- **Coding** - classifying data into nominal or ordinal categories (see Categorical data types as described above).
- **Recursive abstraction** - clustering of findings into summary groups, which then are further clustered and summarized, finally arriving at compact summaries. (This technique is used, for instance, in contextual inquiry.)