☰   Q SEARCH

DATA SCIENCE

Your Guide to Qualitative and Quantitative Data Analysis Methods

BY MANU BHATIA - SEPTEMBER 5, 2018 - 7 MINS READ

What is the first thing that comes to mind when we see data? The first instinct is to find

example, if a clothing brand is trying to identify the latest trends among young women, the brand will first reach out to young women and ask them questions relevant to the research objective. After collecting this information, the brand will analyze that data to

identify patterns — for example, it may discover that most young women would like to see more variety of jeans.

Data analysis is how researchers go from a mass of data to meaningful insights. There are many different data analysis methods, depending on the type of research. Here are a few methods you can use to analyze quantitative and qualitative data.

It's difficult to analyze bad data. Make sure you're collecting high-quality data with our blog "4 Data Collection Techniques: Which One's Right for You?".

Analyzing Quantitative Data

Data Preparation

The first stage of analyzing data is data preparation, where the aim is to convert raw data into something meaningful and readable. It includes four steps:

Step 1: Data Validation

The purpose of data validation is to find out, as far as possible, whether the data collection was done as per the pre-set standards and without any bias. It is a four-step process, which includes…

- **Fraud**, to infer whether each respondent was actually interviewed or not.

- **Screening**, to make sure that respondents were chosen as per the research criteria.

- **Procedure**, to check whether the data collection procedure was duly followed.

- **Completeness**, to ensure that the interviewer asked the respondent all the questions, rather than just a few required ones.

To do this, researchers would need to pick a random sample of completed surveys and validate the collected data. (Note that this can be time-consuming for surveys with lots of responses.) For example, imagine a survey with 200 respondents split into 2 cities. The researcher can pick a sample of 20 random respondents from each city. After this, the researcher can reach out to them through email or phone and check their responses to a certain set of questions.

Check out 18 data validations that will prevent bad data from slipping into your data set in the first place.

The 4-Step Process for Quantitative Data Validation

Fraud — Infer whether each respondent was actually interviewed or not

Screening — Make sure that respondents were chosen as per the research criteria

Procedure — Check whether the data collection procedure was duly followed

Completeness — Ensure that the interviewer asked the respondent all the questions, rather than just a few required ones

Step 2: Data Editing

Typically, large data sets include errors. For example, respondents may fill fields incorrectly or skip them accidentally. To make sure that there are no such errors, the researcher should conduct basic data checks, check for outliers, and edit the raw research data to identify and clear out any data points that may hamper the accuracy of the results.

For example, an error could be fields that were left empty by respondents. While editing the data, it is important to make sure to remove or fill all the empty fields. (Here are 4 methods to deal with missing data.)

Step 3: Data Coding

This is one of the most important steps in data preparation. It refers to grouping and assigning values to responses from the survey.

For example, if a researcher has interviewed 1,000 people and now wants to find the average age of the respondents, the researcher will create age buckets and categorize the age of each of the respondent as per these codes. (For example, respondents between 13-15 years old would have their age coded as 0, 16-18 as 1, 18-20 as 2, etc.)

Then during analysis, the researcher can deal with simplified age brackets, rather than a massive range of individual ages.

Quantitative Data Analysis Methods

After these steps, the data is ready for analysis. The two most commonly used quantitative data analysis methods are descriptive statistics and inferential statistics.

Descriptive Statistics

Typically descriptive statistics (also known as descriptive analysis) is the first level of analysis. It helps researchers summarize the data and find patterns. A few commonly used descriptive statistics are:

- **Mean**: numerical average of a set of values.

- **Median**: midpoint of a set of numerical values.

- **Mode**: most common value among a set of values.

- **Percentage**: used to express how a value or group of respondents within the data relates to a larger group of respondents.

- **Frequency**: the number of times a value is found.

- **Range**: the highest and lowest value in a set of values.

Descriptive statistics provide absolute numbers. However, they do not explain the rationale or reasoning behind those numbers. Before applying descriptive statistics, it's important to think about which one is best suited for your research question and what you want to show. For example, a percentage is a good way to show the gender distribution of respondents.

Descriptive statistics are most helpful when the research is limited to the sample and does not need to be generalized to a larger population. For example, if you are comparing the percentage of children vaccinated in two different villages, then descriptive statistics is enough.

Since descriptive analysis is mostly used for analyzing single variable, it is often called univariate analysis.

Quantitative Data Analysis Methods

Descriptive Analysis

The first level of analysis, this helps researchers find absolute numbers to summarize individual variables and find patterns.

A few examples are...

· **Mean:** numerical average
· **Median:** midpoint
· **Mode:** most common value
· **Percentage:** ratio as a fraction of 100
· **Frequency:** number of occurrences
· **Range:** highest and lowest values

Inferential Analysis

These complex analyses show the relationships between multiple variables to generalize results and make predictions.

A few examples are...

· **Correlation:** describes the relationship between 2 variables
· **Regression:** shows or predicts the relationship between 2 variables
· **Analysis of variance:** tests the extent to which 2+ groups differ

Analyzing Qualitative Data

Qualitative data analysis works a little differently from quantitative data, primarily because qualitative data is made up of words, observations, images, and even symbols. Deriving absolute meaning from such data is nearly impossible; hence, it is mostly used for exploratory research. While in quantitative research there is a clear distinction between the data preparation and data analysis stage, analysis for qualitative research often begins as soon as the data is available.

Data Preparation and Basic Data Analysis

Analysis and preparation happen in parallel and include the following steps:

1. **Getting familiar with the data**: Since most qualitative data is just words, the researcher should start by reading the data several times to get familiar with it and start looking for basic observations or patterns. This also includes transcribing the data.

2. **Revisiting research objectives**: Here, the researcher revisits the research objective and identifies the questions that can be answered through the collected data.

3. **Developing a framework**: Also known as coding or indexing, here the researcher identifies broad ideas, concepts, behaviors, or phrases and assigns codes to them. For example, coding age, gender, socio-economic status, and even concepts such as the positive or negative response to a question. Coding is helpful in structuring and labeling the data.

4. **Identifying patterns and connections**: Once the data is coded, the research can start identifying themes, looking for the most common responses to questions, identifying data or patterns that can answer research questions, and finding areas that can be explored further.

Qualitative Data Preparation and Analysis

Get familiar with the data
Start by reading the data several times to get familiar with it and start looking for basic observations or patterns. This also includes transcribing the data.

Revisit research objectives
Revisit the research objective and identify the questions that can be answered through the collected data.

Develop a framework
Identify broad ideas, concepts, behaviors, or phrases and assigns codes to them. This is helpful for structuring and labeling the data.

Identify patterns and connections
Start identifying themes, looking for the most common responses to questions, identifying data or patterns that can answer research questions, and finding areas that can be explored further.

Qualitative Data Analysis Methods

Several methods are available to analyze qualitative data. The most commonly used data analysis methods are:

- **Content analysis**: This is one of the most common methods to analyze qualitative data. It is used to analyze documented information in the form of texts, media, or even physical items. When to use this method depends on the research questions. Content analysis is usually used to analyze responses from interviewees.

- **Narrative analysis**: This method is used to analyze content from various sources, such as interviews of respondents, observations from the field, or surveys. It focuses on using the stories and experiences shared by people to answer the research questions.

- **Discourse analysis**: Like narrative analysis, discourse analysis is used to analyze interactions with people. However, it focuses on analyzing the social context in which the communication between the researcher and the respondent occurred. Discourse analysis also looks at the respondent's day-to-day environment and uses that information during analysis.

- **Grounded theory**: This refers to using qualitative data to explain why a certain phenomenon happened. It does this by studying a variety of similar cases in different settings and using the data to derive causal explanations. Researchers may alter the explanations or create new ones as they study more cases until they arrive at an explanation that fits all cases.

These methods are the ones used most commonly. However, other data analysis methods, such as conversational analysis, are also available.

Data analysis is perhaps the most important component of research. Weak analysis produces inaccurate results that not only hamper the authenticity of the research but also make the findings unusable. It's imperative to choose your data analysis methods carefully to ensure that your findings are insightful and actionable.