

# What is the relationship between statistics, prediction, and explanation?

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Statistics, prediction, and explanation are all interconnected concepts that play a crucial role in data analysis and decision making. Statistics involves collecting, organizing, analyzing, and interpreting data to understand patterns and trends within a population. Prediction uses statistical methods to make informed guesses about future outcomes based on the patterns and trends identified in the data. Explanation, on the other hand, involves using statistical evidence to provide a logical and coherent understanding of why certain patterns and trends exist. Therefore, the relationship between statistics, prediction, and explanation is that statistics is the foundation for both prediction and explanation, as it provides the necessary data and evidence to support and validate both processes. Without proper statistical analysis, predictions may be inaccurate and explanations may lack credibility. Overall, these three concepts work together to provide a comprehensive understanding of data and its potential implications.

## Statistics - Prediction and Explanation

Some types of statistical methods are focused on predicting what will happen.

Other types of statistical methods are focused on explaining how things are connected.

### Prediction

Some statistical methods are not focused on explaining how things are connected. Only the accuracy of prediction is important.

Many statistical methods are successful at predicting without giving insight into how things are connected.

Some types of machine learning let computers do the hard work, but the way they predict is difficult to understand. These approaches can also be vulnerable to mistakes if the circumstances change, since the way they work is less clear.

**Note:** Predictions about future events are called **forecasts**. Not all predictions are about the future.

Some predictions can be about something else that is unknown, even if it is not in the future.

### Explanation

Different statistical methods are often used for explaining how things are connected. These statistical methods may not make good predictions.

These statistical methods often explain only small parts of the whole situation. But, if you only want to know how a few things are connected, the rest might not matter.

If these methods accurately explains how all the relevant things are connected, they will also be good at prediction. But managing to explain every detail is often challenging.

Some times we are specifically interested in figuring out if one thing causes another. This is called **causal inference**.

If we are looking at complicated situations, many things are connected. To figure out what causes what, we need to untangle every way these things are connected.

**Note:** Making conclusions about causality should be done carefully.

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