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[Home](#) > Branches of Statistics

Branches of Statistics

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Descriptive Statistics and Inferential Statistics

Every student of statistics should know about the different branches of statistics to correctly understand statistics from a more holistic point of view. Often, the kind of job or work one is involved in hides the other aspects of statistics, but it is very important to know the overall idea behind statistical analysis to fully appreciate its importance and beauty.

The two main branches of statistics are descriptive statistics and inferential statistics. Both of these are employed in scientific analysis of data and both are equally important for the student of statistics.

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Descriptive Statistics

Descriptive statistics ^[1] deals with the presentation and collection of data. This is usually the first part of a statistical analysis. It is usually not as simple as it sounds, and the statistician needs to be aware of designing experiments, choosing the right focus group and avoid biases ^[2] that are so easy to creep into the experiment ^[3].

Different areas of study require different kinds of analysis using descriptive statistics. For example, a physicist studying turbulence in the laboratory needs the average quantities that

vary over small intervals of time. The nature of this problem requires that physical quantities be averaged from a host of data collected through the experiment.

Inferential Statistics

Inferential statistics [4], as the name suggests, involves drawing the right conclusions from the statistical analysis that has been performed using descriptive statistics. In the end, it is the inferences that make studies important and this aspect is dealt with in inferential statistics.

Most predictions [5] of the future and generalizations [6] about a population by studying a smaller sample come under the purview of inferential statistics. Most social sciences experiments deal with studying a small sample population [7] that helps determine how the population in general behaves. By designing the right experiment, the researcher is able to draw conclusions [8] relevant to his study.

While drawing conclusions, one needs to be very careful so as not to draw the wrong [9] or biased [2] conclusions. Even though this appears like a science, there are ways in which one can manipulate studies and results [10] through various means. For example, data dredging [11] is increasingly becoming a problem as computers hold loads of information and it is easy, either intentionally or unintentionally, to use the wrong inferential methods.

Both descriptive and inferential statistics go hand in hand and one cannot exist without the other. Good scientific methodology [12] needs to be followed in both these steps of statistical analysis and both these branches of statistics are equally important for a researcher.

Source URL: <https://explorable.com/branches-of-statistics>

Links

- [1] <https://explorable.com/descriptive-statistics>
- [2] <https://explorable.com/research-bias>
- [3] <https://explorable.com/conducting-an-experiment>
- [4] <https://explorable.com/inferential-statistics>
- [5] <https://explorable.com/prediction-in-research>
- [6] <https://explorable.com/what-is-generalization>
- [7] <https://explorable.com/sample-group>
- [8] <https://explorable.com/drawing-conclusions>
- [9] <https://explorable.com/type-i-error>
- [10] <https://explorable.com/science-fraud>
- [11] <https://explorable.com/data-dredging>
- [12] <https://explorable.com/research-methodology>