

What is Statistics?

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"*What is statistics?*" This is a fair question to ask especially because it is so central to most scientific disciplines today. Statistics is a collection of mathematical techniques that help to analyze and present data. Statistics is also used in associated tasks such as designing experiments and surveys and planning the collection and analysis of data from these.

To understand what statistics is, it is important to look at the broad categories of problems that are tackled with the help of statistics. It also helps to understand why statistics is central to current scientific methodology.



The banner features the Explorable logo at the top center, with the text "EXPLORABLE" in a large, bold, sans-serif font and "Quiz Time!" in a smaller, cursive font below it. Below the logo are three square images, each with a caption underneath. The first image shows a pair of red roller skates on a wooden floor, with the caption "Quiz: Psychology 101 Part 2". The second image shows a fan of colorful pens, also with the caption "Quiz: Psychology 101 Part 2". The third image shows a Ferris wheel at sunset, with the caption "Quiz: Flags in Europe". In the bottom right corner of the banner, there is a link that says "See all quizzes =>".

Two Faced Coin: Same Word, Different Context

Statistics can also imply a second meaning, which is the computed quantity with the help of statistical methods. Thus, it could be said that the main statistics of a particular study are the median ^[1] age and income of the group. Thus statistics (singular: statistic) can imply a statistical parameter as well. However, these two usages usually occur in distinct contexts and though there is a scope for confusion, a careful study of the usage context should clear matters up.

Broad Usage, Same Concepts

Statistics can be applied to various different problems and situations but the underlying concepts all remain the same. Thus it is important to understand what statistics is [2], not only from an application point of view but also from an interpretation point of view. This is required because of the diverse applications of statistics, from social science experiments to studying quantum mechanical phenomena.

Statistics can be broadly classified into descriptive statistics and inferential statistics.

To understand statistics, one needs to study and understand the probability [3] theory. These are closely connected and inseparable in most cases. In fact, historically, the foundations of statistics were laid with the development of probability theory.

Ability of Draw Conclusions

The ideas of presenting data and drawing relevant inferences are central to the successful use of statistical theory. In the end, the statistical analysis should be able to tell us something concrete about the sample that we are studying. A number of errors [4] are possible in the interpretation of statistical results and a careful analysis needs to be made to prevent these errors.

In some rare cases, statistics can be used to draw conclusions [5] that appear to be statistically relevant but on careful examination, are not. When such practices are intentional, they can be hard to detect. One good example of such statistical misconduct is data dredging [6]. Therefore one should also be able to spot the scope and relevance of a statistical study and understand it in the context of the study within which it was intended.

Source URL: <https://staging.explorables.com/what-is-statistics>

Links

[1] <https://staging.explorables.com/calculate-median>

[2] <http://en.wikipedia.org/wiki/Statistics>

[3] <https://staging.explorables.com/experimental-probability>

[4] <https://staging.explorables.com/experimental-error>

[5] <https://staging.explorables.com/drawing-conclusions>

[6] <https://staging.explorables.com/data-dredging>