Inferential Statistics [1]

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Inferential statistics, unlike descriptive statistics [4], is the attempt to apply the conclusions that have been obtained from one experimental study to more general populations. This means inferential statistics tries to answer questions about populations and samples that have not been tested in the given experiment.

If you conduct a survey [5], the goal is to apply the conclusions to a more general population, assuming the sample size [6] is large enough and the sample representative enough of the broader public. This is important because studies and experiments need to state and conclude something about general populations and not just about the sample that was studied.

For example, suppose there is a training program that claims to improve test scores and an experimenter wants to verify the claims. She starts with two groups, one taking the training program and the other not (the control [7]). She measures the test scores in the beginning and at the end, making sure that the starting test scores are, on an average, the same for both test groups. The researcher finds that the test scores for those who take the training are indeed higher now, and this difference is statistically significant [8]. She rejects her null hypothesis. Merely stating the results for the two groups in terms of average score difference and representing this in the form of graphs is descriptive statistics [4]. But if she concludes that the training program is effective in improving test scores (in general, and for all people), then this is inferential statistics.

It's tempting to assume that descriptive statistics alone signals the end of an experiment, or to fail to draw a distinction between the results of descriptive statistical tests and your analysis. Statistics are powerful tools, but it's the analysis provided afterwards by inferential statistics that explicitly makes claims about what those results mean, why, and in what context. Remember that inference involves moving focus from smaller and more specific to larger and more general.

It should be noted that inferential statistics [9] always talks in terms of probability [10], but this can be made highly reliable by designing the right experimental conditions. The inferences are almost always an estimate with a confidence interval [11]. There are however some cases where there is simply a rejection of a hypothesis [12] that is involved, which is the case if the experiment is designed [13] to refute some claim.

Several models are available in inferential statistics that help in the process of analysis. These models need to be chosen with care, since an error in assuming one model might give faulty

conclusions about the experiment.

For example data might be assumed to be described by a probability density with some variables [14] that need to be determined in the experiment. However, there are some cases when such an assumption cannot be made, which usually occurs during experiments involving sampling of a human population in social science experiments. Therefore one needs to take all precautions in order to arrive at the right conclusions through inferential statistics.

Links
[1] https://explorable.com/inferential-statistics
[2] https://explorable.com/users/siddharth
[3] https://explorable.com/users/Lyndsay%20T%20Wilson
[4] https://explorable.com/descriptive-statistics
[5] https://explorable.com/survey-research-design
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