**What is it Like Majoring in Statistics? – What You Should Know**

Ever wondered what it is like **majoring in statistics**? Then you are lucky because I can’t think of a better time to major in statistics with the amount of data we are generating every single day.

Statistics as a major seems intimidating at first and a lot of people are scared of it. In this blog post I am trying to remove the anxiety that comes with math and statistics and I will also provide some insight into my statistics undergraduate degree experience.

So, let’s get started and have a look what we are going to cover:

* **What** is statistics?
* **Who** should be majoring in statistics?
* Is statistics a **hard degree**?
* How much **math** is involved in a statistics degree?
* Job prospects as a stats major



**What Is Statistics?**

When people think about majoring in statistics they think about **probability** and maybe **combinatorics**. Questions like “[What is the probability of rolling two sixes in a row with a dice](https://www.quora.com/What-is-the-probability-of-rolling-two-sixes-in-a-row)” or “[How many possibilities are there to arrange three different colored balls](http://home.avvanta.com/~math/permutations2.html)” seems intimidating when you have never heard such questions before. However, they are very easy and become a routine after a while. Moreover, they are not the kinds of questions you’ll be doing for most of your degree. Actually, these kinds of questions will only appear for 2 months during your introductory statistics course. Consequently, if you don’t like probability it is okay. You won’t see a lot of it and it becomes easy after a while.

Having stated the fact that statistics is not only probability it is to clarify now what else there is to it. Side note: Probability is part of every statistics degree however, it is a branch of mathematics. The main branches of statistics, and what you will learn in university, are **descriptive statistics** and **inferential statistics**.

**Descriptive Statistics**

When majoring in statistics, you'll learn about [descriptive statistics](http://statisticsbyjim.com/basics/descriptive-inferential-statistics/). For descriptive statistics, you’ll learn what words like mean, median, or mode mean. Then you’ll continue with standard deviations, variances, and distributions. Terms that can describe data and its form. In my opinion, descriptive statistics is being taught **very boringly** in university. No one really enjoys learning about the different type of plots (histogram, bar plot, scatter plot etc.) in school. Universities are doing a pretty poor job conveying to people the importance of descriptive statistics. Especially, when you are a fresh graduate straight out of college, chances are you won’t use the latest **deep learning packages** and you won’t implement fancy **machine learning models**. You won’t do predictions and there is no need for you to think about the bias-variance trade-off, cross validation or overfitting.

You will start with doing **descriptive statistics**. Creating **summary statistics tables** and doing an **exploratory data analysis** are fun and very important. You can act as a detective and explore relationships between variables in your data set. You can test which variables will possibly work in your model and what variables most likely won’t contribute to the final model based on visualizations. What are the main findings that you can extract from data? Which graphs and tables **describe** the relationship between response variable and predictors best? How can you design an experiment that is free from bias? These questions are very interesting and fun. Unfortunately, a university won’t teach you these skills and it is up to you to gain these skills outside of school. Most of the time you’ll learn about **inferential statistics**.

**Inferential Statistics**

[Inferential Statistics](http://statisticsbyjim.com/basics/descriptive-inferential-statistics/) is what you do most of the time during your undergraduate degree. You will use **samples** to make inferences about the population. Very early (in your introductory course) you will learn about hypothesis tests and confidence intervals. Then it continues with linear regression and logistic regression. Maybe you want to take more electives in statistical learning/machine learning. Other courses I took were about supervised and unsupervised learning, multivariate statistical analysis, and discrete data analysis. All these courses deal with hands on data projects where you can make inference from sample data about the population.

Most students are very excited about these courses. And they are exciting! However, when you work your first job you probably won’t be responsible for any inference. Moreover, the data sets in school are very clean with no missing values. At your future job you’ll probably notice very soon that making inference with half of your observations missing is no fun. It is only at that time where you’ll appreciate clean and tidy data and the critical foundation of descriptive statistics for the inferential statistics.



**Who Should Major in Statistics?**

After having clarified what statistics is and that it is not only about probability and combinatorics we can pinpoint who will like statistics. Questions you can ask yourself are:

* **Do you like math?** No? Don’t worry! As we saw in previous paragraphs probability theory is only a small portion of a statistics degree. Descriptive statistic does not need a lot of math. Everyone can do it without any mathematics. Inferential statistic needs a little more math. However, only to understand the theory behind machine learning algorithms and other inferences. If you want to do it without math you can. You won’t be the leading Data Scientist of your team but you can come far without a lot of math as well in your degree and future jobs.
* The bigger question is: Are you a **good detective?** Statistics is a lot about descriptive statistics and recognizing trends in data. Moreover, reporting them is also a very valuable skill to master.
* Are you **patient?** Sometimes, being a detective gets frustrating. Why does the data behave the way it does? Simpsons Paradox! You might not find the answer immediately and it might take hours until you discover meaningful insights.
* Are you **even more patient?** Collecting data, setting up the experiment, and dealing with missing values is a pain in the butt and takes sooo soo so long. Moreover, jumping right into model building without any patience for data preparation won’t end well and your results might be garbage.
* Ever wanted to be a **psychic** and wanted to have a look into the **crystal ball**? Then you are good to go. Statistics often deals with predictions. Which credit card behaviour will lead to fraud? Living in Canada British Columbia, an important question might be where will the next forest fire occur? All of these questions and many more can be answered with the help of statistics.



If any of the questions above speak to you and I have piqued your interest then you can go ahead and major in stats 😊

**Is Statistics a Hard Degree?**

Answering the question is probably harder than doing the degree. In general, however, I would say the answer is yes and it depends. The most struggles I had with the degree was the theoretical statistics classes such as the introductory course (I+II), mathematical statistics, and statistical theory (both upper division classes). Moreover, Calc III was pretty intermediate and my analysis classes I+II almost literally killed me. The good news is that the analysis classes are not part of the requirements of a statistics degree so you’ll be fine. 4-5 though classes and about 3-4/10-12 trimesters of struggles are not too bad. Push through and you’ll get there.

**How Much Math is Involved in a Statistics Degree?**

You must take Calc I-III and linear algebra. These courses are a requirement when you are majoring in statistics. You won’t have to deal with too many theoretical courses. Most of the courses are not very mathematical. Sure, you might have to calculate an odds ratio (don’t worry it is easy) or multiply matrices. But all in all, there are no complicated things and most of the time it is common sense.

**Job Prospects - Is Majoring in Statistics Worth It?**

That’s the best part of your degree. You can work literally everywhere. When I applied for [my internship](http://thatdatatho.com/2018/05/21/switching-economics-major-statistics-major/) during my undergraduate degree, I applied to lululemon, a health research company, a Canadian bank, and a company in the agricultural business. There are so many different areas where statistics and data analysis skills are needed that it won’t ever be boring.



In addition to that, as already mentioned in the introductory paragraph, there is so much data that is being generated every day. This means that there is high demand for qualified and hard-working people. I remember my teacher telling me that during his PhD, he worked for a cell phone company in 2011 and his task was to let a phone fall on the ground and then report where it got damaged. Data collection at its best. That was when he decided that the industry is not for him. Consequently, he is in academia, researching and teaching now.

A similar story was told by another professor of mine. She said that she decided during her internship that she does not like the industry. Consequently, she also went into academia.

I personally can imagine that statistics was once a boring field. However, in recent years it has picked up a lot and even starters can work on interesting projects. I am currently doing an internship as a Data Scientist and I constantly work with interesting data and projects. Consequently, if you want job security and fun majoring in statistics is definitely the right choice!

I hope you have enjoyed this blog post and that you know now if statistics is for you or not.

If you have any more questions, let me know in the comments below.

Also, if you are still undecided are have more questions about majoring in statistics, here are some further readings

* [A great interview about the statistics major](http://www.bytemining.com/2012/03/my-interview-about-the-statistics-major/)
* [How to find a job in Statistics](https://chemicalstatistician.wordpress.com/2014/01/13/how-to-find-a-job-in-statistics-advice-for-students-and-recent-graduates/)

If you tend to love mathematics and want to play around with data after graduation you can read

* [How to become a Data Scientist with a mathematics degree](https://tdhopper.com/blog/how-i-became-a-data-scientist/)

If you have liked this blog post about majoring in statistics, you might also like my posts about

* [Why I switched from an economics major to a statistics major](http://thatdatatho.com/2018/05/21/switching-economics-major-statistics-major/)
* [My first ever internship in Data Science](http://thatdatatho.com/2018/07/23/data-science-internship/)
* [My statistical learning class in university vs. the statistical learning class offered online for free from Stanford](http://thatdatatho.com/2018/02/05/online-or-in-class-stanfords-statistical-learning-online-vs-university/)