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Honors Contract Completion

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For this honors contract, I did an extensive data analysis for a project that I am working on with Dr. Kady Schneiter. This project is concerned with better understanding factors that lead to a successful statistical education. Specifically, we are exploring the relationship between a student’s mindset and attitude towards statistics and their performance or success in the class. Data for this project was obtained by administering a survey to students in several undergraduate statistics courses. I performed an initial exploratory data analysis on these data to understand what data we had an any initial obvious data features. I went on to perform a more focused analysis to try to find answer to our research question.

Performing this analysis led to some unanticipated difficulties, as well as some unanticipated rewards. First, I appreciated how much freedom I had with the analysis for this project. Because it wasn’t associated with a particular unit in a course, I was free to use any appropriate method that I had learned in the course of my education. I tried many different methods, some of which worked, some of which didn’t. Not having requirements to use a specific method led me to be more creative, and to think about other ways that I could try to analyze and understand these data. However, with this freedom came a price; at times I found that I had a lack of focus and direction. I realized I was jumping from method to method, from question to question, and was working in circles without making any apparent progress. After a while I was able to find a groove and make more steady progress. Meeting with Dr. Schneiter was instrumental in this process. As we met she made valuable suggestions that helped me maintain my focus on the research questions of interest. She helped by recommending that I research a particular method to see if it would be useful in analyzing our data. She also suggested that I do some research to find papers that had data like ours. The topic of the data didn’t need to be the same, but if the researchers had collected their data in a similar way as we had, I could get some ideas from the methods they had used to analyze their data.

The experience that I had analyzing these data will be very valuable in my future work as a graduate student, intern, and in a future career. This summer I have the opportunity to work as an intern at Orbital ATK. I will be able to work with some experienced statisticians on some interesting problems. My internship will be similar to my experience with this project in that there will be no required method that we use to analyze the data. I am confident that the internship will extend the experience that this project has given me, and will help me continue to gain experience determining the most effective way to analyze data. This project taught that deciding how to appropriately analyze data is one of the most important aspects of being a statistician. Anyone can learn the code to run a simple t-test or chi-square test on a data set. However, the value comes in knowing when certain tests are more appropriate or effective than others.

We did find some interesting things in these data. My findings are briefly outlined in the accompanying document. Overall, we found that students with a growth mindset towards statistics tend to do better than those with a fixed mindset. We also found that students with positive attitudes towards learning and using statistics tend to do better in the course that those with negative attitudes.