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The Effects of Helicobacter Pylori on Cognition: A report

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Introduction

Last year we applied for an ORCA grant for our study of the effects of Helicobacter Pylori on Cognition. Helicobacter Pylori is a bacterium that causes ulcers in the stomach. It has also been implied to cause decreased cognitive functioning. (Berrett, Erickson, Brown, Hedges, 2016) Due to this, it is necessary to discover how Helicobacter Pylori effects cognition and how we can tell through EEG whether someone has Helicobacter Pylori.

We stated that the purpose of this project was to create a system that discriminates data of Helicobacter Pylori infection versus those without the infection. Over the last year, the lab has been working on gathering data on those with infections. We also had a change in location where we are now collecting data in Dr. McPherson’s lab, located in the Taylor Building.

Methods

The lab was able to create a test that can be run on one computer while another computer collects the data. This test consists of the n-back test, which tests recall, and the Sternberg test, which tests memory load. We had planned on using some equipment we had in our lab, be we could not get everything working in sync. There were problems with getting the two computers connected and we had difficulties with the equipment we had purchased. This put us behind schedule. Over the summer our group was able to contact Dr. McPherson, who has been kind enough to let us use his lab and has allowed us to use his EEG equipment.

We have been collecting data with said equipment for a few months now and should be done collecting data sometime early next semester. As planned, we are using the test we created, which is comprised of the n-back and Sternberg tasks, which the participants complete while in their two sessions in the lab. We have come to an agreement to help Dr. McPherson buy items in his lab that need restocking. This is where some of the money we have received for this project is going.

When participants enter the lab, they fill out consent forms, as well as some surveys. One of the consent forms is consent to be a research subject, the other is consent for a blood draw. Participants may choose at any time not to have the blood draw performed, with no negative consequences. Participants who consent to having their blood drawn receive $12 in compensation and a granola bar, which is bought using lab funds. Their blood is drawn by two certified phlebotomists who schedule appointments to draw blood from the participants. These blood samples will later be analyzed to see if they contain Helicobacter Pylori.

Once the forms are filled out, the participants comb their hair to remove dead skin cells on their scalps in order to remove any particles that may interfere with the EEG cap’s ability to detect brain activity. The EEG cap is then placed on their head and the electrodes are filled with a conductive gel. This gel allows the EEG cap to sense the participants’ brain activity.
Participants are then placed in a soundproof room and the EEG cap is connected to the computer system. Final adjustments to the cap are made and earplugs that are connected to a microphone in the main lab are inserted into their ears. These earplugs block outside sound while allowing for communication between the participant and research assistant. The n-back and Sternberg tests are then run and the EEG records the participants' brain activity.

Results

As of now, we have run over 75 participants. We need at least 45 more participants to get an acceptable size of participants who consent to having their blood drawn. Because we have not yet gathered data from all our participants, we have not yet begun analyzing and comparing the data we have received from our participants thus far. The data we have collected so far has been of good quality and we plan on finishing the collection of the data we need early next semester. We still believe that we will find a significant difference in the cognition of those who are infected with Helicobacter Pylori and those who are not.

Discussion

As mentioned before, we have not yet begun analysis of the data. Once we begin analysis of the data we have collected, we will use these blood samples to help us discover whether these infectious diseases have an impact on reaction time and memory load. We anticipate being able to begin analysis early next semester. We believe that when we analyze the data, we will find there is a significant difference in performance between those with Helicobacter Pylori and those without the infection. We also believe this analysis will bring greater understanding of the effects of Helicobacter Pylori and its interactions with other infectious diseases on cognition. (Gale, Erickson, Brown, Hedges, 2015) Even though we fallen behind schedule, we will still find the information we are looking for and begin working on our research paper by early spring of 2019.

Unfortunately, we fell behind schedule because of technical issues in our own lab. This was not the fault of any member of the lab, but because we tried something the equipment in our lab could not support. However, once Dr. McPherson granted us use of his lab, we were able to see that our test worked well and that the data we have been gathering is good quality data that will be useful when the time for data analysis comes.

Conclusion

Overall, we have been achieving those things we had stated in our proposal last year. We have fallen behind schedule. However, we believe that we are still progressing at a pace that will allow us to finish this project and begin writing our research paper by early spring of 2019. We plan on submitting our research paper to a scientific journal by the end of summer 2019. Even though we have fallen behind schedule, we can still see the importance of this project and intend to see it all the way through.

Scholarly Sources

