Experimental Method

**Experiment:** How caffeine affects memory in teenagers (17-18)

**Hypothesis:** If senior students consume two 8oz cups of caffeinated coffee (190 mg) then they will display improved memory when compared to students that do not consume caffeinated coffee.

**Sample**: The population we will be choosing from is the senior group at Lane Tech. Out of the total population of 1,000 students, we will choose 200 students randomly.

* Students who will be tested with caffeine will drink two 8oz cups of coffee (190 mg) of caffeine.
* Memory will be tested by how fast the participants complete a memory matching game in seconds.
* We will randomly sample our population of students. We will input the names of all the seniors at Lane in a computer and have the computer choose 200 students at random.
* After the 200 students are randomly selected, we will again put their names in a computer and have it choose 100 students for the control group and 100 for the experimental group.
* The control group will drink two cups of decaffeinated coffee. Both groups won’t know which group they are assigned to
* Confounding variables may include: time of day, participants’ coffee tolerance, and intelligence level.
* In order to get rid of the confounding variable of time of day, both groups will perform the experiment at the same time (right after school ends) and random assignment should decrease all other confounding variables.
* We will be conducting a double-blind test. Our group of three will not know which group is which and will rely on a fourth person to track the groups.
* In order to better gather data, the experiment will be repeated two more times for a total of three trials
* In order to pass inspection from the IRB, we will first inform the students of the nature of the research. We will tell them that they will be testing the effects of caffeine on memory. We will then randomly choose from the students that said that they would participate in our study.
* Additionally, we will keep the identities of all the participants anonymous. There is little risk in this experiment besides maybe burning your mouth if the coffee given is hot. At the end of the three trials, we will tell the students the results of the experiment and how it will be applied to future research.
* In our experiment, we hypothesized that the time taken to complete the memory game will be lower for the students that had caffeine. In order to compare the two groups, we will average the time taken for the experimental and control groups and compare it. The time for the control group should be higher than the time for the experimental group. Besides calculating the mean, we will also calculate the median in case the data are skewed positively or negatively for each group.
* Standard deviation for the groups will also be calculated as well as the z score to see which group did better from a standardized score perspective. Again, the experimental group should perform better than the control group.
* In order to see if the results are significant and that they can be applied to a larger population, we will perform a chi square test in order to find a p value for our data. If the p value is less than 0.05, then our data is significant and can be used on a larger population.