Mini Project 1 Report
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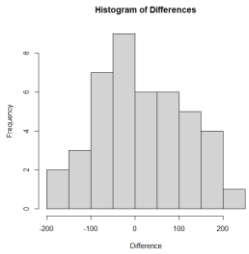
We designed an experiment to answer the question: Are dominant arms stronger than non-dominant arms. An example of why this may be of interest is in sports. Should players throw with their dominant versus non-dominant arms? How would that affect training? This could also be of interest to those who perform manual labor that requires a lot of strength in terms of which arm they should rely on.

To collect data for this experiment, each member of our group threw a pool noodle once with their dominant arm and once with their non-dominant arm. Everyone in the group threw from the same spot and holding the middle of the pool noodle. We measured the straight-line distance from the throwing line to where the front end of the pool noodle first hit the ground (as apposed to measuring diagonally to the actual spot the noodle touched the ground). We randomized which arm each person threw with first by tossing a coin for each person with heads meaning dominant arm first and tails non-dominant arm. It was also windy, and the pool noodle was exposed to water and dirt.

Our data was combined with that of other groups for analysis. Some of these other groups conducted their experiment using the same randomization and measurement processes as we did, while others used random number generators to determine which arm people threw with first or measured directly to where the noodle landed, even if this meant measuring diagonally.

After conducting a t-test on the differences between the measurements (in inches) for dominant and non-dominant arms, we got a p-value of 0.2783, so we failed to reject the null hypothesis that the true mean of the differences is equal to 0 (using α=0.05). So we cannot conclude dominant arms are stronger than non-dominant arms.



There were several problems with data collection for this experiment. The wind affected the distance the noodle was thrown and the direction in which it landed. A pool noodle was not the right instrument for this experiment. We should have used something that would have been less affected by the wind or conducted the experiment somewhere such as a gymnasium without wind. Additionally, due to the snow, the pool noodle got dirt and water on it, increasing its mass and potentially affecting people's throwing. Further, not all groups conducted their experiments the same way, so there are differences in how the distance was measured, though the paired nature of the data might have helped mitigate this issue.