**Is anchored putting better? The Finale.**



Many golfers started using longer putters (anchored putting), until it was recently banned. Are anchored putters actually better than traditional putters?

Today we will carry out an experiment to see if the long putter is better than the short putter. You must answer the first 10 questions before we are ready to collect the data.

1. “How far will each putt go with the long putter?” Is this a statistical question? Why?

2. Will we be doing an observational study or an experiment today? Explain.

3. What are some other confounding variables that might affect our results?

4. If we really just want to see if the long putter is better, why can’t we just have one group who all uses the long putter?

5. Describe how we could randomly assign the students in the class into two groups (long putter and short putter) using slips of paper.

6. Describe how we could randomly assign the students in the class into two groups (long putter and short putter) using a random number generator.

7. Why do we use random assignment to create the two groups?

8. What other variables will we try to keep the same for all the experimental units?

9. What are the two benefits of keeping these variables the same?

10. Draw an outline of the experiment we will be conducting today.

11. Data Collection!!

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | Distance from hole (inches) | | | | |  |  |  |  |  |  |  |
| Long Putter |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Short Putter |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

12. Let’s start by entering the data for the long putter only. Go to [www.tinyurl.com/SPAapplets](http://www.tinyurl.com/SPAapplets) and click *One Quantitative Variable*. Enter the distances from the hole for the long putter only. Click “Begin Analysis” and find the mean:\_\_\_\_\_\_

13. Under **Perform Inference**, choose “Simulate sample mean” from the drop down menu. Add 100 samples. What is the standard deviation (SD) of the Distribution of Simulated Mean? Use it to find the margin of error and then interpret the margin of error.

SD: \_\_\_\_\_\_\_ Margin of error:\_\_\_\_\_\_\_\_

Interpret:

14. Now change the Number of Groups to 2 and add the data for the short putter. Record the mean of each and find the difference.

Mean (short putter):\_\_\_\_\_\_\_\_\_\_\_ Mean (long putter):\_\_\_\_\_\_\_\_\_\_

Difference (short – long):\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

15. Under **Perform Inference**, choose “Simulate difference in two means” from the drop down menu. Add 50 samples. Sketch the dot plot below.

16. What percent of the dots are larger than the difference in means we got from our experiment? Is the difference statistically significant?

17. Did we use random sampling in this experiment? Did we use random assignment? What conclusion can we make?

18. Was this experiment conducted in an ethical manner? Explain.