PSYC 7710 Lab

Lab 2 Activity

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Directions:

A. Load the speed_acc dataset from the rtdists package in R. Call ?speed_acc in the R console to get more information on the data set.
B. Answer the questions that follow as they pertain to the speed_acc dataset, and save the code you used in an R script.
C. You have until the end of lab to complete.
D. Set the seed at 42 before **EACH** random draw.
E. Ask me programming questions as needed!

Questions:

1. What is your hypothesis about the **rt** variable under the speed vs. accuracy **condition**?
2. Create a data frame named *my_data* that only includes the **id**, **condition**, and **rt** columns, with only the rows from the first four participants and trials not labelled as outliers **OR** errors (see ?speed_acc for outlier and error labels). Print the dimensions of *my_data*.
3. Compute the 95% confidence interval around the mean **rt** using equations from class for **id** 1, 2, and 3 separately.
4. Compute the 95% confidence interval around the mean **rt** using a custom bootstrap resampling function for **id** 1, 2, and 3 separately. Use 10,000 iterations.
5. Generate a line plot with the parameter estimates and confidence intervals as error bars from question 3. Do the same for results from question 4. Align these two plots on the same row.
6. Do the equation based confidence intervals and bootstrapped confidence intervals look substantially different or do they overlap considerably?
7. Overlay two histograms from **id** 1's data. One histogram should display a bootstrap distribution of mean **rt** under the speed condition, and the other histogram should display a bootstrap distribution of mean **rt** under the accuracy condition. Plot vertical lines at the 2.5% and 97.5% quantiles for both histograms.
8. Based on this exploratory plot from question 7, do you think there is evidence that participant 1 responded faster when instructed to respond quickly? Explain your reasoning.
9. Repeat question 7 for **id** 4. Which participant was faster under the speed **condition**, **id** 1 or **id** 4? The accuracy **condition**?
10. **BONUS**: Compute a mean-difference 95% confidence interval for **id** 4 using bootstrapping. You will need to bootstrap the mean difference between the **rt** under the speed and accuracy **condition**. Use 10,000 iterations. Compare your results to the 95% confidence intervals output from the t.test function in base R. Which interval is more narrow, the bootstrapped interval or the t-test interval? Do the bonus question again, but with **accuracy** instead of **rt**. To get **accuracy**, you will have to create a new column (see ?speed_acc for information on existing columns).