STAT S4201 001, Homework 1

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Problem 1: Ramsey 1.17

See `hw01.R` for code.

The observed difference between sample averages is 15.333, which, based on the 35 differences in the randomization distribution, corresponds to a two-sided p-value of 0.0867.

Problem 2: Ramsey 1.21

problem 2 (1.21)

(a) A Trial of Wound Irrigation in the Initial Management of Open Fracture Wounds

i. Link: http://www.nejm.org/doi/full/10.1056/NEJMoa1508502

ii. Study design and conclusions:
asdfasdf

iii. Categorize the study according to Display 1.5.
asdfasdf

iv. Determine whether inferential statements are limited to or go beyond the scope allowed in Display 1.5.
asdfasdf

(b) A Randomized, Controlled Trial of an Aerosolized Vaccine against Measles

i. Link: http://www.nejm.org/doi/full/10.1056/NEJMoa1407417

ii. Study design and conclusions:
asdfasdf

iii. Categorize the study according to Display 1.5.
asdfasdf

iv. Determine whether inferential statements are limited to or go beyond the scope allowed in Display 1.5.
asdfasdf

Problem 3: Ramsey 1.25 (b)

See Figure 1.

Problem 4: Use the data from Problem 3 to answer the following questions.

(a) Set up the null and alternative hypotheses to address the research question described.

- Test statistic $t = \bar{A} - \bar{B}$, where $\bar{A}$ and $\bar{B}$ are the average Zinc concentrations in the rats of group A and B, respectively.
- Null hypothesis: $t = 0$
- Alternative hypothesis: $t \neq 0$

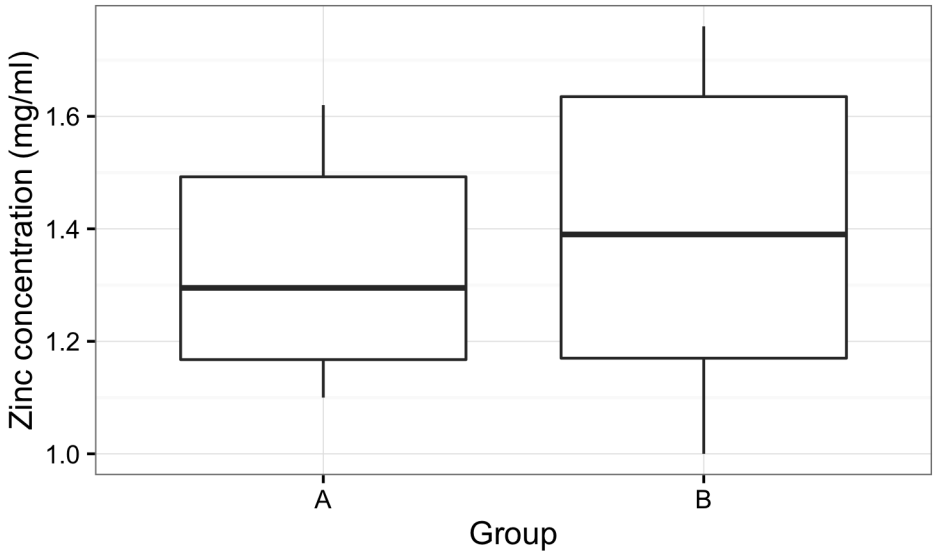

Figure 1: Zinc concentrations (in mg/ml) in the blood for two groups of rats. Group A received a calcium supplement and Group B did not.

(b) Use 1,000 simulations to perform a randomization test for testing the hypothesis in (a). What is your p-value?

The observed difference between sample averages is -0.07755, which, based on the 1,000 simulations in the randomization distribution, corresponds to a two-sided p-value of 0.261.

(c) Draw the reference distribution of your test statistic based on 1,000 simulations.

See Figure 2.

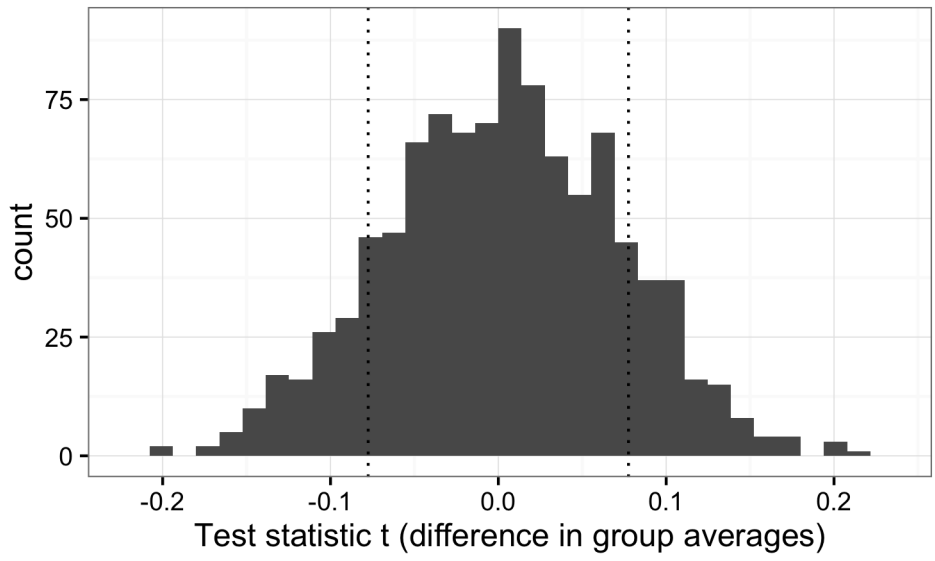

Figure 2: Reference distribution of t, based on 1,000 simulations.

(d) Write a brief summary of your findings and possible recommendations for the researchers.

problem 4d

Problem 5: Ramsey 2.12

Problem 6: Ramsey 2.14

Problem 7: Ramsey 2.16

Problem 8: Ramsey 2.23

Todo list