

You may work with one partner on this assignment, submitting one report with both names, provided that both students contribute substantially to the work. Word-processed reports are preferred to hand-written ones. Integrate computer output into your report as appropriate.

Feeling Motivated?

A psychology study investigated whether people display more creativity when they are thinking about intrinsic or extrinsic motivations. The subjects were 47 people with extensive experience with creative writing. They were randomly assigned to one of two groups: one group answered a survey about intrinsic motivations for writing (such as the pleasure of self-expression) and the other group answered a survey about extrinsic motivations (such as public recognition). Then all subjects were instructed to write a Haiku poem, and these poems were evaluated for creativity by a panel of judges. The researchers conjectured that subjects who were thinking about intrinsic motivations would display more creativity than subjects who were thinking about extrinsic motivations.

- Identify the explanatory and response variables. Also classify each as categorical or quantitative.
- Is this an observational study or a randomized experiment? Explain how you know.

The creativity scores from this study are below and also in the file `creativity.txt` (in “stacked” format) on our course webpage (under the “Data and Applets” link).

Extrinsic:

5.0	5.4	6.1	10.9	11.8	12.0	12.3	14.8	15.0
16.8	17.2	17.2	17.4	17.5	18.5	18.7	18.7	19.2
19.5	20.7	21.2	22.1	24.0				

Intrinsic:

12.0	12.0	12.9	13.6	16.6	17.2	17.5	18.2	19.1
19.3	19.8	20.3	20.5	20.6	21.3	21.6	22.1	22.2
22.6	23.1	24.0	24.3	26.7	29.7			

Enter these data into the Randomization Test applet. (The easiest way to do this is to click the “stacked format” button and then copy/paste from the txt file.)

- Examine the dotplots of the sample data produced by the applet. Submit a screen capture of these graphs, and comment on what they reveal about the researchers’ conjecture.
- Report the mean and median of the creativity scores for each group. Do these summary values indicate that the intrinsically motivated group did indeed display more creativity than the extrinsically motivated group?

e) Use the applet to simulate a randomization test for assessing whether the data provide statistically significant evidence that the type of motivation causes affects creativity score in the conjectured direction. Use the difference in group *means* as the relevant statistic. Submit a screen capture of the resulting dotplot, and answer four questions:

- i) Describe the null model that underlies this simulation analysis.
- ii) Explain what variable is displayed in the dotplot.
- iii) Describe what the dotplot reveals.
- iv) Report the approximate p-value.

f) Now conduct this simulation analysis based on the difference in group *medians*. Comment on how the dotplot differs from in part e), and report the approximate p-value.

g) Summarize your conclusion in the context of this study. Include an explanation of the reasoning process behind your conclusion. Be sure to address the issues of causation (i.e., is a cause-and-effect conclusion warranted?) and generalizability (i.e., how broadly can you legitimately generalize your conclusion?), as well as the issue of statistical significance.