**ESP Study**

There have been many debates on whether humans have the power of extrasensory perception (ESP) abilities. In 2011, an article written by a psychologist at Cornell University was published that found evidence that people have a type of ESP ability[[1]](#footnote-1) (also see an article on ABC News [http://abcnews.go.com/Technology/extrasensory-perception-scientific-journal-esp-paper-published-cornell/story?id=12556754 - .T-uCyY43OUw](http://abcnews.go.com/Technology/extrasensory-perception-scientific-journal-esp-paper-published-cornell/story?id=12556754#.T-uCyY43OUw)).

You will be investigating this claim by collecting data about you to answer the following research question:

**Research Question:** Do you have extrasensory perception abilities (ESP)?

Task: You will be making 20 predictions to see whether or not you can correctly guess the color of a card that you cannot see.

1. What are the null and alternative hypotheses for this study?

H0:

Ha:

1. Record your number of correct guesses below.

1. Does your point estimate suggest that you have ESP? Explain.
2. Based on the results expected under the null hypothesis, for each of the proportions of correct matches (0 to 1), state whether you think that outcome is likely or unlikely.

0.0:

0.1:

0.2:

0.3:

0.4:

0.5:

0.6:

0.7:

0.8:

0.9:

1.0:

**CONSTRUCTING A RANDOMIZATION TEST**

1. How can you physically construct one randomization sample? (Hint: Think about whether you will use with or without replacement. Think about using a random device that operates under the null hypothesis.)
2. What would you record as your randomization statistic?

Using the process you described in question 5, carry out 5 randomization samples, each time recording the statistic that you described in question 6.

|  |  |
| --- | --- |
| Randomization Sample Number | Randomization Statistic: |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |

Record your statistics on the dotplot on the board.

1. Sketch the plot below.
2. Where is this distribution centered? Explain why it makes sense that the distribution is centered at this value.
3. Based on the results expected under the null hypothesis, do you think that your result from question 2 is a likely or unlikely result? Explain.
4. What does this suggest about the null hypothesis? Explain.
5. What is the probability of obtaining the observed result (from question 2) or more extreme under the null hypothesis? What is this probability called in statistics?
6. Provide an answer to the research question, using the value you found in question 11 to provide evidence of statistical significance.
7. Describe the process you used to conduct a randomization test. Be sure to include what aspects you have to think about in order to conduct the randomization test (e.g., hypotheses, type of study, etc.).

**EXTENSIONS**

1. Will the probability you found in question 11 be the same if you generated more randomization samples? If not, will the conclusions most likely be the same?

1. Bem, D. J. (2011). Feeling the Future: Experimental evidence for anomalous retroactive influences on cognition and affect. *Journal of Personality and Social Psychology*, 100, 407-425. [↑](#footnote-ref-1)