UDACITY

Test a Perceptual Phenomenon

Student Notes | Project Review | Project History

✓ Meets Specifications

Question 1: Identify variables in the experiment

SPECIFICATION

Question response correctly identifies the independent and dependent variables in the experiment.

✓ MEETS SPECIFICATION

Reviewer Comments

Hello again! I was your previous reviewer. Thank you for the great feedback. It was a pleasure. Let's look at **Question 2 and 5** specifically.

Question 2: Establish a hypothesis and statistical test

SPECIFICATION

An appropriate hypothesis test has been stated along with an appropriate statistical test to apply to collected data, with appropriate justification.

✓ MEETS SPECIFICATION

Reviewer Comments

✓ **Null and Alternative Hypotheses stated without ambiguity to the variables they represent**
✓ **Statistical Test is Correct**
✓ **Justification has been provided for the Statistical Test**

Great work here. You have chosen the correct T-test and justified it properly. Great work using μ to denote the population parameter. I have attached an alternate wording for the answers. I found that seeing another perspective can often help attain a more wholesome picture of the concepts. I hope it is helpful in future analyses.

Complete Answers

Null:

The null hypothesis is that the congruent and incongruent samples come from the same general

population – meaning even though we are observing a difference in the sample means there is actually no difference in response times between the conditions of the experiment for the population and what we are witnessing is by chance. *One-tail* will go even further and state that the Incongruent population has a lower mean time than the Congruent population.

Two-Tail

$$H_0 : \mu_{congruent} - \mu_{incongruent} = 0$$

One Tail

$$H_0 : \mu_{congruent} - \mu_{incongruent} \geq 0$$

Or

Two-Tail

$$H_0 : \mu_{congruent} = \mu_{incongruent}$$

One-Tail

$$H_1 : \mu_{congruent} \geq \mu_{incongruent}$$

Alternative:

One-Tailed

The alternative hypothesis is that the population_mean(incongruent) is greater than the population_mean(congruent) – meaning that they come from different populations and that the incongruent condition actually does increase response times - the difference in sample means we are witnessing is representative of the general population.

$$H_1 : \mu_{congruent} - \mu_{incongruent} < 0$$

Or

$$H_1 : \mu_{congruent} < \mu_{incongruent}$$

Two-Tailed (similar to the one-tailed but not assuming which is larger (or smaller))

The alternative hypothesis is that there is a difference between the population_means of the congruent and incongruent, however, we are not assuming which is larger or smaller - the difference in sample means we are witnessing is representative of the general population in that they are different, but we are not making the assumption of directionality.

$$H_1 : \mu_{congruent} - \mu_{incongruent} \neq 0$$

Or

$$H_1 : \mu_{congruent} \neq \mu_{incongruent}$$

Statistical Test

Since **(1)** we do not know the population standard deviation, **(2)** our sample size < 30, and **(3)** the samples from one trial is used in the second trial (same participant is used to test the effect of the conditions - repeated measure), we will use the **Dependent T-test** for paired samples.

- Notice how the statements of the hypotheses are making sure to convey they reference an assumption about the population **not** the samples since we do not need to make a guess about the samples - we have access to them.
- Also, notice how the justification of the Dependent T-test includes not only the T-test is applicable (#1, #2) but also why the specific T-test (Dependent) is specifically applicable (#3).

Wording the statements like this accurately conveys to the reader you have a firm understanding of the concepts without any uncertainties. Overall, I believe you do know these concepts and I also know it can be hard to articulate them on paper. Being able to explain these concepts to someone else is really good practice and can sometimes mean the difference between memorizing the material and understanding the material.

Question 3: Report descriptive statistics

SPECIFICATION

Descriptive statistics, including at least one measure of centrality and one measure of variability, have been computed for the dataset's groups.

✓ MEETS SPECIFICATION

Reviewer Comments

✔ Measurements of centrality are correct

✔ Measurements of Variability are correct

You have correctly reported measurements of centrality and variability. Great work!

Question 4: Plot the data

SPECIFICATION

One or two visualizations have been created that show off the data, including comments on what can be observed in the plot or plots.

✓ MEETS SPECIFICATION

Reviewer Comments

Great work using bar plots instead of a line graph.

Question 5: Perform the statistical test and interpret your results

SPECIFICATION

A statistical test has been correctly performed and reported, including test statistic, p-value, and test result. The test results are interpreted in terms of the experimental task performed.

✓ MEETS SPECIFICATION

Reviewer Comments

Great work on performing, reporting, and interpreting the correct T-test. This along with **Question 2** is the most difficult area of this project for more, but you have done amazingly. Congratulations!

Question 6: Digging deeper and extending the investigation

SPECIFICATION

Hypotheses regarding the reasons for the effect observed are presented. An extension or related experiment to the performed Stroop task is provided, that may produce similar effects.

✓ MEETS SPECIFICATION

Additional Reviewer Comments

Next, Large Data Analysis and Our First Prediction Algorithm

Congratulations on completing the course. Next we will be getting deeper into the Python Programming language and doing another sort of statistical test. Remember the level of clarity you have given in this project for that one. The reviews will be held to a similar level of scrutiny. But there is an exciting addition to the statistical analysis. We will be getting into our first Machine Learning and Prediction algorithm! These techniques are at the core of self-driving cars and facial recognition. It is really cool and I hope you like it too. Good luck!

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