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PROJECT

Test a Perceptual Phenomenon

A part of the Data Analyst Nanodegree Program

- [PROJECT REVIEW](#)
- [NOTES](#)

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Requires Changes

1 SPECIFICATION REQUIRES CHANGES

This project is on the right track and it is obvious that you put a lot of effort while completing it. Keep up your hard work, after fixing one more point in section five, your project will become perfect.

If we are strict with our judgments, please remember that this is our job as Reviewers to make sure you have portfolio ready projects.

Every part needs to make logical sense and I believe after fixing these issues, this project will do that exquisitely and adorn your portfolio.

Can't wait to see more work from you.

Good luck on your projects,

Stay Udacious! :)

Responses to Project Questions

Q1: Question response correctly identifies the independent and dependent variables in the experiment.

To be more specific, our independent variable is the word condition (word congruency); either being congruent or incongruent.

Or in other words, being whether the words shown are congruent with the ink colors or if they are incongruent with ink colors.

Q2a: Null and alternative hypotheses are clearly stated in words and mathematically. Symbols in the mathematical statement are defined.

Excellent!

This answer is very complete, null and alternative hypotheses are clearly stated in words and mathematically.

Q2b: A statistical test is proposed which will distinguish the proposed hypotheses. Any assumptions made by the statistical test are addressed.

Perfect job!

Paired t-test is the appropriate statistical test because of the unknown population parameters and the repeated measurements.

It is also possible to say that

- Due to having a small sample size ($n < 30$), a t-test is more suitable.
- T-test assumes population data to be approximately normally distributed.

"The probability distribution of T was first published in 1908 in a paper written by W. S. Gosset. In deriving the equation of this distribution, Gosset assumed that the samples were selected from a normal population. Although this would seem to be a very restrictive assumption, it can be shown that nonnormal populations possessing nearly bell-shaped distributions will still provide values of T that approximate the t-distribution very closely." (Walpole, R. and Myers, R. (2011). p. 248)

[http://50.30.47.15/ebook/IPE/Probability&Statistics_for_Engineers&Scientists\(9th_Edition\)_Walpole.pdf](http://50.30.47.15/ebook/IPE/Probability&Statistics_for_Engineers&Scientists(9th_Edition)_Walpole.pdf)

For further improvements, please refer to this link: [Test Assumptions](#)

Q3: Descriptive statistics, including at least one measure of centrality and one measure of variability, have been computed for the dataset's groups.

Great job!

Descriptive statistics are computed correctly.

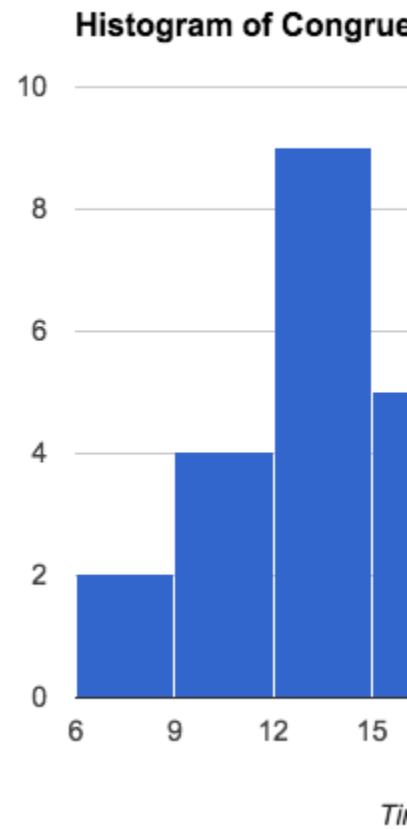
Q4: One or two visualizations have been created that show off the data, including comments on what can be observed in the plot or plots.

As stated in the previous review, a line plot is **not appropriate for this data set**.

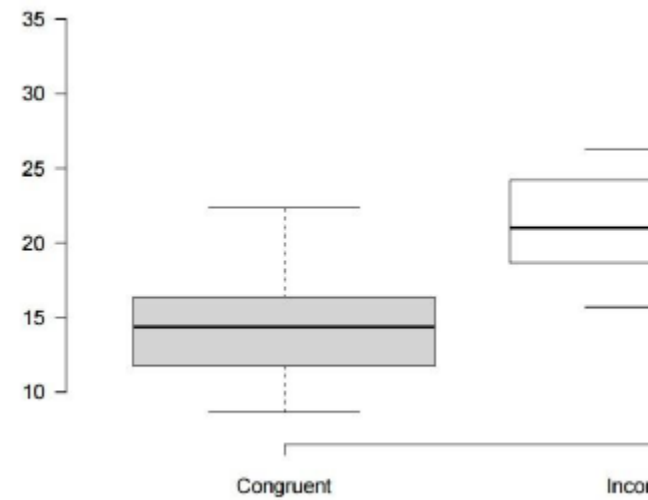
Connecting the data points with a line implies a sequential relationship between participants, but participants are independent of each other - the performance of one participant should not imply anything specific about the performance of the next.

Instead, a histogram or a boxplot will work better for this data set.
For instance:

- You may plot the data using histograms:



- Or using a boxplot:



and it will greatly improve the presentation of the report.

This doesn't affect meeting specifications here, it's just something to be made aware of.

This link may help: [Which chart or graph is right for you?](#)

Q5: 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.

All of the calculations are correct but please pay attention to the p-value.

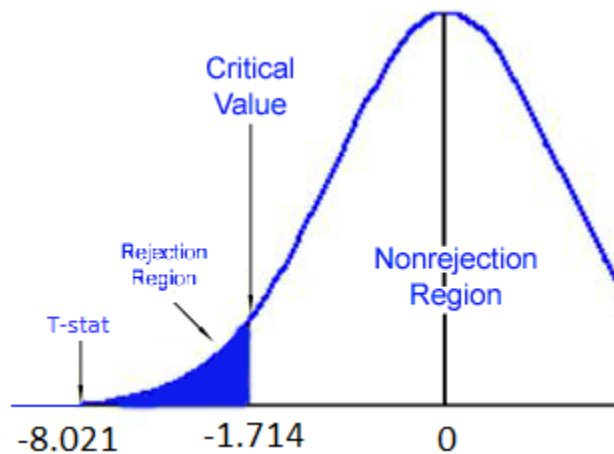
Please note that $2.0515\text{E-}08 = 2.0515 \times 10^{-8} = 0.000000020515$

This is called scientific notation and it is a special way of writing numbers that are too small and too big.

For more information: [E-Notation](#)

Since we have such a small p-value (0.000000020515), which is smaller than our alpha value (0.05), we should **reject** the null hypothesis ($H_0: \mu_1 = \mu_2$).

This image may help:



P-value (0.000000020515) is indeed the area under this curve for the range negative infinity to our test-statistic: $(-\infty, -8.021]$

and alpha (0.05) is the area under this curve for the range: $(-\infty, -1.714]$

(Total area under the curve is 1)

After reading these please update your answer, we should reject the null hypothesis because our test-statistic is in the critical region and our p-value is much smaller than our alpha value.

Afterward, please also include a more detailed interpretation.

For instance, by rejecting the null hypothesis, can we conclude that it takes significantly longer to complete the incongruent condition than the congruent condition?

Q6: 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.