

## Final Assignment

### Introduction to statistics for psychology



- 1- Explain what a statistically significant result means
- 2- Why do we use adjusted forms of t-tests during the post hoc tests we conduct after an ANOVA
- 3- How does the standardized coefficient (Beta) in a linear regression differ from the correlation coefficient?
- 4- To test whether a new type of therapy can reduce depression we are going to split people up into two groups. We will have the members of one group participate take part in the therapy program for 5 weeks while we will use the 2<sup>nd</sup> group as a control group and will not have them undertake any therapy, we will then measure the depression scores of both groups. Which of the following tests should we use:
  - a. One Sample t-test
  - b. Dependent samples t-test
  - c. Correlation
  - d. Independent samples t-test
- 5- We want to test whether a model made up of people's social anxiety levels, amount of sleep, and IQ scores would be good at predicting people's level of self-confidence. Which of the following tests should we use:
  - a. Correlation
  - b. Linear Regression
  - c. ANOVA

- 6- If the correlation between motivation and physical health (both measured on scales from 1-10) was 0.9 ( $R^2 = 0.81$ ) and the correlation between motivation and number of friends on social media was 0.3 ( $R^2 = 0.09$ ) then the strength of the relationship between physical health and motivation is:
- Three times as strong as the relationship between motivation and no. of friends on social media
  - Nine times as strong as the relationship between motivation and no. of friends on social media
- 7- We hypothesized that solo singers, choir singers, soloist musicians, and ensemble musicians each experience different levels of stress before performing on stage. We signed up a few musicians from each of the 4 groups mentioned and measured their stress levels before their live performances. Which of the following should we use to test out our hypothesis:
- One-sample t-test
  - Linear Regression
  - ANOVA

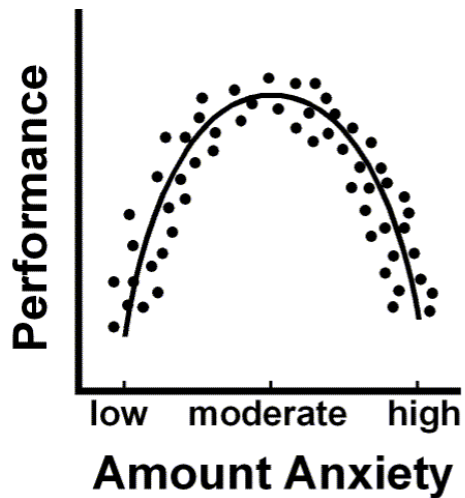
(7%)

**You'll find all the files you need to solve the following questions in the "Final" folder**

- 8- ("Self Esteem Final" file) We wanted to test whether there was a relationship between people's self-esteem and their sense of accomplishment. Perform a correlation test and find the following:
- Whether the test is 1 or 2 tailed
  - Correlation coefficient ( $r$ )
  - The p-value
  - Whether the evidence "Supports the test hypothesis" or we "Fail to reject the null hypothesis"

**(5%)**

- 9- ("Self Esteem Final" file) There were more variables measured in the file we used for the previous question so we wanted to test whether we could create a model that could predict people's self-esteem based on their sense of accomplishment, their relationship quality, and their perceived level of intelligence (All measured on a scale of 1-10 one being the lowest and 10 being the highest). Perform a linear regression test to test out our hypothesis and find and/or answer the following questions
- The R-squared of the model
  - The p-value of the model
  - The names and Beta values of every variable with a statistically significant effect on the model's accuracy.
  - A statistically significant model with an R-squared of 0.9 is:
    - More effective than the one mentioned above
    - Less effective than the one mentioned above
  - Can we use a linear regression or correlation test with the data in the figure below?
    - Yes
    - No



(8%)

10- (“Age groups & panic attacks Final” file) We wanted to test whether a person’s age group has an effect on the number of panic attacks that a person experiences. We recruited a number of patients and split them into 3 groups (before high school, high school, and adults). We asked each group to count the number of panic attacks they received over the following month and we recorded that data. Perform an ANOVA to test out our hypothesis and find the following:

- a. The name of the independent variable
- b. The name of the dependent variable
- c. The F-score
- d. The degrees of freedom within groups
- e. The degrees of freedom between groups
- f. The p-value (if greater than 5% then ignore question g)
- g. Conduct a post-hoc Tukey test and mention which groups have a statistically significant difference between them.

(7%)

- 11- (“Alexandria Final” file) We wanted to test whether people living in coastal cities had lower depression scores than people living in cities that lie far away from the sea. We had the mean level of depression (**scale 1-10, 1 being the lowest score and 10 the highest**) of all people living in Cairo (M=8.5, Non costal city) and we measured the depression levels of a group of people living in Alexandria (Costal city). Perform the appropriate t-test to test out our hypothesis and find the following values or answer the following questions:
- T-score
  - P-value
  - Whether the evidence “Supports the test hypothesis” or we “Fail to reject the null hypothesis”

(3%)

**(Bonus grade applies to the final assignment only, i.e. scoring 32/30 will be the same as scoring 30/30)**

**Bonus:**

- Give an example where we’d have to use a chi-square test. Explain why we could only have used the chi-square test in this situation and not any of the other tests taken in this course

(2%)