

AS1 (Assignment 1, Unit 4) Logic of Hypothesis Testing

Please write "true" if the statement is true and "false" if the statement is false in the space provided:

- F** 1. A statistical hypothesis test tests the researcher's hypothesis rather than the null hypothesis
- T** 2. In most research situations, the goal is to not reject the researcher's hypothesis
- F** 3. A decision to reject the null hypothesis means that the data do not provide evidence of a treatment effect: the independent variable did not have an effect on the dependent variable
- F** 4. If the data provide convincing evidence that the treatment does have an effect, then the correct statistical decision is to fail to reject the null hypothesis
- T** 5. For a hypothesis test, the critical region is defined as the set of test statistics that are very unlikely (very low probability) of being obtained if the null hypothesis is true
- T** 6. If the obtained sample data (test statistic value) is inside the critical region, then we have provided support for the researcher's hypothesis
- T** 7. When the Z-test statistic, obtained from the sample data, falls inside the critical region, we reject the null hypothesis
- T** 8. If the obtained sample data (test statistic value) are not in the critical region, the correct statistical decision is "fail to reject the null hypothesis."
- T** 9. If you fail to reject the null hypothesis, it means that the data provide sufficient evidence to say that the treatment has no effect: the independent variable had no effect on the dependent variable
- F** 10. Whenever the statistical decision is to reject the null hypothesis, there is a probability that the decision is incorrect and this probability is known as Type II error
- F** 11. The probability of committing a Type II error is equal to alpha
- F** 12. A Type I error occurs when a treatment actually does have an effect but the effect fails to show up in a research study
- F** 13. One way to reduce the risk of Type I error, saying there is an effect when in fact there is not an effect, is to lower the alpha level from .05 to .01
- F** 14. Type I error is to fail to reject a null hypothesis that is actually true
- T** 15. In a research report, the term "statistically significant" is used to indicate that the null hypothesis was rejected
- T** 16. In a research report, the notation $p < .05$ is used when the null hypothesis is rejected and the IV is shown to have a significant effect using an alpha level = .05

- T** ___ 17. Alpha (α) is the probability of committing a Type I error
- T** ___ 18. In a Type I error, the experimenter concludes that there is evidence for an effect when in fact an effect does not exist
- T** ___ 19. Changing the level of significance from .05 to .01 decreases the risk of Type I error
- T** ___ 20. When a researcher report demonstrates a significant treatment effect at the .05 alpha level, you can be less confident that the effect is real than if the researcher had reported a significant effect with an alpha level of only .01
- T** ___ 21. There is always a possibility that the decision in a hypothesis test is incorrect
- T** ___ 22. To be more confident that a treatment actually does have a real effect, a researcher should use a smaller value for alpha
- F** ___ 23. The following hypothesis: "Nicotine should increase memory ability" requires a one-tail, directional test with the entire critical region located on the left side of the distribution
- F** ___ 24. The following hypothesis: "Nicotine should decrease memory ability" requires a one-tail, directional test with the entire critical region located on the right side of the distribution
- F** ___ 25. The following hypothesis: "Nicotine will have an effect on memory" requires a one-tail, directional test with the critical region divided between both tails of the distribution
- T** ___ 26. In the following hypothesis: "Nicotine will have an effect on memory," the dependent variable is memory
- T** ___ 27. In the following hypothesis: "Nicotine will have an effect on memory," the independent variable is nicotine
- T** ___ 28. Researchers collect data by measuring the dependent variable in their studies
- T** ___ 29. Independent variables are the variables that researchers manipulate in their studies
- T** ___ 30. In a directional (one-tail) hypothesis test, the entire critical region is located in either one of the other tail of the distribution, but not in both tails of the distribution
- T** ___ 31. The reason for computing Cohen's d is to measure the size of an effect
- F** ___ 32. Cohen's d measures the effect size whenever the decision is to "fail to reject the null hypothesis"
- T** ___ 33. Standard error is the discrepancy or difference, on average, that you should expect between your sample mean (M) and the population mean (μ)
- T** ___ 34. All hypotheses tests analyze (or compare) two main differences. These differences are the differences between or among means due to the IV, and difference between or among means due to chance.

35. What mean differences are you comparing when you compute a Z-test statistic?

_____ **You are comparing the differences of between the population mean and sample mean.**

36. Name the four steps of a hypothesis test:

1. **Name the Hypothesis**

2. **Set a Critical Region**

3. **Do the Math**

4. **Make a Decision**