

Some questions by Daniel Lakens

What have you learned throughout the workshop? Answer the following questions.

1. An observed 95% confidence interval says that 95% of the estimates from future studies will fall inside the observed interval.
 - True
 - False

2. Let's suppose that a research article indicates a value of $p = .001$ in the results section ($\alpha = .05$).
The p -value of a statistical test is the probability of the observed result or a more extreme result, assuming the null hypothesis is true.

- True
- False

You have found the probability of the null hypothesis being true ($p = .001$).

- True
- False

The null hypothesis has been shown to be false.

- True
- False

3. The specific 95% confidence interval observed in a study has a 95% chance of containing the true effect size.
 - True
 - False

4. In Frequentist statistics, a p -value lower than the alpha level can be interpreted as meaning _____. This differs from Bayesian statistics, which focuses on _____.
 - That the null hypothesis is unlikely; the likelihood of the data, given a certain hypothesis
 - The data is surprising, assuming the alternative hypothesis is true; the probability of the hypothesis, given the data
 - The null hypothesis can be rejected with a certain long-term error rate; the amount of relative evidence for a hypothesis
 - The alternative hypothesis is likely to be true; the degree of belief we should have in the data

5. When the null-hypothesis is true, the probability of finding a specific p -value is _____.
 - Equal to the p -value (e.g. a p of 0.06 has a 6% probability).
 - The same for all p -values
 - Higher for lower p -values (e.g., 0.01) than for higher p -values (e.g., 0.04)
 - Higher for higher p -values (e.g., 0.04) than for lower p -values (e.g., 0.01)

6. After finding a single statistically significant p-value we can conclude that _____, but it would be incorrect to conclude that _____.
- The data is surprising if we assume there is no effect; the null hypothesis is likely to be false
 - The null hypothesis is likely to be false; the alternative hypothesis is true
 - The data favors the the alternative hypothesis; the null hypothesis is likely to be false
 - The data is surprising assuming the null hypothesis is true; the data is not surprising assuming the alternative hypothesis is true
7. A researcher reports two significant findings testing the same hypothesis, using an alpha of 5%. The researcher predicted one finding before doing the study, but the other finding was observed during exploratory analyses where many tests were performed. Which statement is correct?
- Because the researcher performed two analyses, the alpha level should be divided by two for each test to bring the overall error rate back to 5%
 - Because the second hypothesis was not predicted, the overall error rate is inflated by an unknown amount.
 - The predicted finding is confirmatory, the unexpected finding is exploratory. The error rate for each finding is maintained at 5%.
 - The exploratory finding has increased the Type 1 error rate to 10%.
8. What are the benefits of performing a study with a larger sample size, compared to doing the same study with a smaller sample size?
- Lower Type 1 error rates, lower Type II error rates, same accuracy of estimates
 - Lower Type 1 error rates, lower Type II error rates, higher accuracy of estimates
 - Same Type 1 error rates, lower Type II error rates, higher accuracy of estimates
 - Same Type 1 error rates, lower Type II error rates, same accuracy of estimates