Practice Exam

Practice Quiz, 21 questions

21/21 points (100%)

✔ Congratulations! You passed!

Next Item

✔ 1 / 1 points

1.
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

Correct!

- The alternative hypothesis is likely to be true; the degree of belief we should have in the data

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✔ 1 / 1 points

2.
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

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Correct! *P*-values are uniformly distributed when the null hypothesis is true.

- 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)

✔ 1 / 1 points

3.

A Type 1 error is _____, and the Type 1 error rate is determined by _____.

- Drawing an incorrect conclusion about the present or absence of an effect; the power of your study
- ✔ Finding a significant result, when there is a no true effect; the alpha level

Type 1 error: finding something when there is nothing. It's determined by the alpha level.

This answer is correct

- Not finding a significant result, when there is a true effect; the alpha level
- Finding a significant result, when there is a true effect; the power of your study

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✔ 1 / 1 points

4.

You performed 6 studies, only 4 of them had a significant result. The likelihood ratio of this happening assuming H0 versus assuming H1 tells you _____. If you assume you had around 80% power, this likelihood ratio will probably show that _____.

- The likelihood of H0 being true, and the likelihood of H1 being true; it is not unlikely to have some significant effects, even if H0 is false
-

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The likelihood of the data, assuming H0 is true; it is unlikely to get 4 significant results out of 6

How much more or less likely H0 is, compared to H1; it is likely to have some non-significant effects, even if H1 is true

Correct!

If 4 significant studies out of 6 is likely to happen if H0 is true; it is unlikely to get 4 significant results out of 6, assuming H0 is false

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1 / 1 points

5.

We compare model A (the effect is 0) to model B (the effect is 1) and find a Bayes Factor of 10 which means _____; the effect size is estimated with a certain 95% credible interval, this interval _____.

The prior probability of model A is 10 times larger than that of model B; contains the true value of the mean 95% of the time

The posterior probability of model A is 10 to 1; contains the true value of the mean 95% of the time

The data favors model A 10 times more than model B; contains 95% of the most probable data

Correct!

The likelihood of model A is equal to that B plus 10; contains 95% of the most probable data

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1 / 1 points

6.

After finding a single statistically significant p-value we can conclude that _____, but it would be incorrect to conclude that _____.

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- 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

The data is surprising if we assume there is no effect; the null hypothesis is likely to be false

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✓ 1 / 1 points

7.
When H0 is true, the probability that at least 1 out of a X findings is a Type 1 error is equal to _____, this probability _____ when you look at your data and collect more data if a test is not significant.

- The alpha times X; increases, unless you perform a correction
- ✓ 1- (1 - alpha) to the power of X; increases, unless you perform a correction

Correct!

- 1- (1 - alpha) to the power of X; remains equal because the alpha decides the error rate of individual studies
- 1- (1 - alpha) times X; remains equal because the alpha decides the error rate of individual studies

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✓ 1 / 1 points

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8.

You did a pilot study which found an effect size of 0.4, and p < 0.05. You decide to repeat the study with a power of 80% and an alpha of 5%. In the second study, assuming H0 is true, the probability of a type 1 error is _____. Assuming H0 is false, the probability of a type 2 error is ____.

- 5%; 20%
- (1 - 0.05) ^ 2; depends on the power of the pilot study
- 2.5%; 10%
- (1 - 0.05) ^ 2; 20%

5%; 20%

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1 / 1 points

9.

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.

Correct!

- 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%.

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1 / 1

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points

10.

An example of a standardized effect size is _____; these are useful for _____.

- Minutes; a-priori power analysis
- Cohen's d; comparing the effect size across studies using different measures

Correct!

- Meters; calculating less biased effect size estimates
- Eta-Squared; controlling Type 1 error rates

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1 / 1 points

11.

If the difference between means is 2, and the standard deviation is 3, the Cohen's d is _____ which is _____ according to the rule of thumb.

- 3/2 = 1.5; small
- 3/2 = 1.5; medium
- 2/3 = 0.667; large
- 2/3 = 0.667; medium

Correct!

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1 / 1 points

12.

In an ANOVA with multiple predictors, a partial eta-squared gives _____ ?

- Proportion of total variance explained by the variable

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The bias-adjusted effect size for the study

The unique variance explained by only one factor

Correct!

The power of the study

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1 / 1 points

13.

You analyze your data in two ways. With Frequentist statistics you find an mean effect size of 3, with a 95% confidence interval of 1 to 5. With Bayesian methods you find a mean of 2.75, with a 95% credible interval of 1.5 to 4. Which conclusions can you make?

Both intervals give you estimates for the most probable values of the true mean.

The confidence interval gives you the values you believe are most likely based only on the data, the credible interval gives you the most probable values given the data and your prior

Both procedures give intervals which contain the true value 95% of the time, but credible intervals are more accurate

The confidence interval contains the true value 95% of the time, the credible interval contains the 95% most likely values

Correct!

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1 / 1 points

14.

What are the benefits of performing a study with a larger sample size, compared to doing the same study with a smaller sample size?

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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

Correct!

Same Type 1 error rates, lower Type II error rates, same accuracy of estimates

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1 / 1 points

15.

You performed a p-curve analysis and found a skewed distribution of p-values with much more small p-values (around 0.01) than high p-values (around 0.04). What does this mean?

This distribution is typical for when there is no true effect.

This distribution is typical for when there is a true effect.

Correct!

This distribution suggests the presence of p-hacking.

This distribution indicates there is publication bias.

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1 / 1 points

16.

You predict that your intervention will significantly increase participants' performance on a test, this is an example of _____. You find a significant result and conclude your theory is true, this is an example of _____.

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- A progressive research line; affirming the consequent
- A falsifiable prediction; denying the consequent
- A degenerative research line; denying the consequent
- A falsifiable prediction; affirming the consequent

Correct!

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1 / 1 points

17.

When participants are randomly allocated to a control or experimental condition, the hypothesis that the groups differ before the study is _____, and the hypothesis that they will differ after the intervention is _____.

- unlikely; not a plausible or interesting hypothesis
- unlikely; a plausible and possibly interesting hypothesis

Correct!

- likely; a plausible and possibly interesting hypothesis
- likely; not a plausible or interesting hypothesis

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1 / 1 points

18.

For confirmatory analyses it is problematic to _____; for exploratory analyses it is *not* problematic to _____.

- Test a hypothesis on the same dataset used to generate the hypothesis; explore a dataset to generate new hypotheses

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Correct!

- Test a hypothesis on the same dataset used to generate the hypothesis; calculate a *p*-value and use an alpha level of 0.05 for each test.
- Use a different alpha level than 0.05; explore a dataset to generate new hypotheses
- Use a different alpha level than 0.05; calculate a *p*-value and use an alpha level of 0.05 for each test.

✔ 1 / 1 points

19.

The main goal of a direct replications is _____; the main reason(s) why succesful replication rates are low is _____.

- Test whether the original finding was a Type 1 error; scientific fraud
- ◯ Test whether the original finding was a Type 1 error; low power, flexible data analyses, and publication bias

Correct!

- Test the reliability of the theory; scientific fraud
- Test the reliability of the theory; low power, flexible data analysis, and publication bias

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✔ 1 / 1 points

20.

How do we know there is publication bias in favor of significant results? Why is it unreasonable to expect articles with 4 experiments that aim for 80% power to exclusively show significant results?

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- We can't be sure there is publication bias; because of the Type 1 error rate will eventually get a non-significant result.
- It's impossible that 91.5% of findings in psychology confirm the hypothesis; the type 1 error rate makes that unlikely in the long run
- Researchers have admitted to not submitting all their results for publication; it is impossible that all hypotheses a researcher examines are true
- ✓ It's unlikely that the observed drop in the *p*-value distribution for *p*-values higher than 0.05 in the published literature occurs by chance; If all four studies examine a true effect the probability of only significant results is power*power*power*power.

Correct!

✓ 1 / 1 points

21.
The Dutch Government wants 100% of scientific articles to be Open Access in 2024. What is the main advantage of open access that lead the government to aim for 100% Open Access in 2024?

- Dutch researchers will get cited more often, which increases their prestige.
- ✓ Anyone in the world who wants to read scientific articles can do so, without having to pay to access the article.

Correct!

- Publishers will earn more money, because universities pay when a scientific article is published.
- Open Access has no advantages; It's just politics.

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