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Answer Form Assignment 1 : Which p-values can you expect?

8/8 得分（100%)

太棒了！

重新測試

課程主頁

1 / 1 分

1.

Since the statistical power is the probability of observing a statistically significant result, if there is a true effect, we can also see the power in the figure itself. Where?

- ○ We can calculate the number of *p*-values larger than 0.5, and divide them by the number of simulations.
- ● We can calculate the number of *p*-values in the first bar (which contains all 'significant' *p*-values from 0.00 to 0.05) and divide the *p*-values in this bar by the total number of simulations.

正確回答

- ○ We can calculate the difference between *p*-values above 0.5 minus the *p*-values below 0.5, and divide this number by the total number of simulations.
- ○ We can calculate the difference between *p*-values above 0.5 minus the *p*-values below 0.05, and divide this number by the number of simulations.

1 / 1 分

2.

Change the sample size in line 10 from n<-26 to n<-51. Run the simulation by selecting all lines and pressing CTRL+Enter. What is the power in the simulation now that we have increased the sample size from 26 people to 51 people?

- 55%
- 60%
- 80%

正確回答

- 95%

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1 / 1 分

3.

If you look at the distribution of *p*-values, what do you notice?

- The *p*-value distribution is exactly the same as with 50% power.
- The *p*-value distribution is much steeper than with 50% power.

正確回答

- The *p*-value distribution is much flatter than with 50% power.
- The *p*-value distribution is much more normally distributed than with 50% power

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1 / 1 分

4.

What would happen when there is no true difference between our simulated samples and the average IQ score? In this situation, we have no probability to observe an effect, so you might say we have '0 power'. Some people prefer to say power is not defined when there is no true effect. I tend to agree, but we can casually refer to this as 0 power. Change the mean IQ score in the sample to 100 (set M<-106 to M<-100 in line 9) There is now no difference between the average IQ score, and the mean IQ in our simulated sample. Run the script again. What do you notice?

- ○ The *p*-value distribution is exactly the same as with 50% power.
- ○ The *p*-value distribution is much steeper than with 50% power.
- ● The *p*-value distribution is basically completely flat (ignoring some minor variation due to random noise in the simulation).

  正確回答

- ○ The *p*-value distribution is normally distributed.

✔ 1 / 1 分

5.

Look at the leftmost bar in the plot, and look at the frequency of *p*-values in this bar What is the formal name for this bar?

- ○ The power (or true positives)
- ○ The true negatives
- ● The Type 1 error (or false positives)

  正確回答

- ○ The Type 2 error (or false negatives)

✔ 1 / 1 分

6.

The plot from the last simulation tells you we have 90.5% power. This is the power if we use an alpha of 5%. But we can also use an alpha of 1%. What is the statistical power we have in the simulated studies when we would use an alpha of 1%, looking at the graph? Pick the answer closest to the answer from your simulations.

- ±90%
- ±75%

正確回答

- ±50%
- ±5%

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1 / 1 分

7.

When you know you have very high (e.g., 98%) power for the smallest effect size you care about, and you observe a *p*-value of 0.045, what is the correct conclusion?

- The effect is significant, and provides strong support for the alternative hypothesis.
- The effect is significant, but it is without any doubt a Type 1 error.
- With high power, you should use an alpha level that is smaller than 0.05, and therefore, this effect can not be considered significant.
- The effect is significant, but it is more likely that the null-hypothesis is true, than that the alternative hypothesis is true.

正確回答

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1 / 1 分

8.

Play around with the sample size and the mean IQ in the group (lines 9 and 10, and thus, with the statistical power in the simulated studies). Look at the simulation result for the bar that contains *p*-values between 0.04 and 0.05. The red line indicates how many *p*-values would be found in this bar if the null-hypothesis was true (and is always at 1%). At the very best, how much more likely is a *p*-value between 0.04 and 0.05 to come from a *p*-value distribution representing a true effect, than it is to come from a *p*-value distribution when there is no effect? You can answer this question by seeing how much higher the bar of *p*-values between 0.04 and 0.05 can become. If at best the bar in the simulation is five times as high at the red line (so the bar shows 5% of *p*-values end up between 0.04 and 0.05, while the red line remains at 1%), then at best *p*-values between 0.04 and 0.05 are five times as likely when there is a true effect than when there is no true effect.

- ○ At best, *p*-values between 0.04 and 0.05 are equally likely under the alternative hypothesis, than under the null hypothesis.
- ● At best, *p*-values between 0.04 and 0.05 are approximately 4 times more likely under the alternative hypothesis, than under the null hypothesis.

正確回答

- ○ At best, *p*-values between 0.04 and 0.05 are ±10 times more likely under the alternative hypothesis, than under the null hypothesis.
- ○ At best, *p*-values between 0.04 and 0.05 are ±30 times more likely under the alternative hypothesis, than under the null hypothesis.