

How Many Subjects Do You Need for Statistical Power Analysis in Research?

Statistical power is the probability of finding a statistically significant result when there is a real effect. It is important to have sufficient statistical power in your research study in order to be able to detect the effects that you are interested in. The number of subjects that you need for your study will depend on a number of factors, including the effect size, the significance level, and the power that you want to achieve.

Effect Size

The effect size is a measure of the magnitude of the effect that you are interested in detecting. It is typically expressed as a standardized mean difference, which is a measure of the difference between the means of two groups in units of standard deviation. The larger the effect size, the easier it will be to detect.



How Many Subjects?: Statistical Power Analysis in

Research by Joe Posnanski

★★★★☆ 4.2 out of 5

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Screen Reader : Supported
Enhanced typesetting : Enabled
Print length : 160 pages



Significance Level

The significance level is the probability of finding a statistically significant result when there is no real effect. It is typically set at 0.05, which means that there is a 5% chance of finding a statistically significant result when there is no real effect.

Power

Power is the probability of finding a statistically significant result when there is a real effect. It is typically set at 0.80, which means that there is an 80% chance of finding a statistically significant result when there is a real effect.

Calculating the Sample Size

The number of subjects that you need for your study can be calculated using the following formula:

$$n = (Z^2 * s^2) / d^2$$

where:

* n is the number of subjects * Z is the z-score corresponding to the desired power * s is the standard deviation of the population * d is the effect size

The z-score corresponding to the desired power can be found using a z-table. The standard deviation of the population can be estimated from previous research or from a pilot study. The effect size can be estimated based on the magnitude of the effect that you are interested in detecting.

Example

Suppose that you are interested in detecting a medium effect size ($d = 0.5$) with a power of 0.80 and a significance level of 0.05. The standard

deviation of the population is estimated to be 10.

Using the formula above, we can calculate the number of subjects that we need:

$$n = (1.96^2 * 10^2) / 0.5^2 = 768$$

Therefore, we would need to recruit 768 subjects for our study in order to have an 80% chance of detecting a medium effect size with a significance level of 0.05.

The number of subjects that you need for your research study will depend on a number of factors, including the effect size, the significance level, and the power that you want to achieve. By using the formula above, you can calculate the number of subjects that you need to ensure that your study has sufficient statistical power.



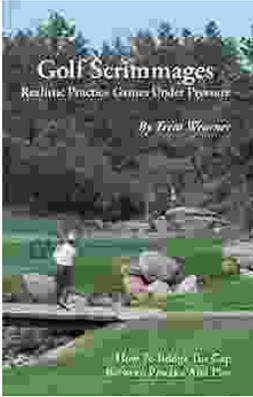
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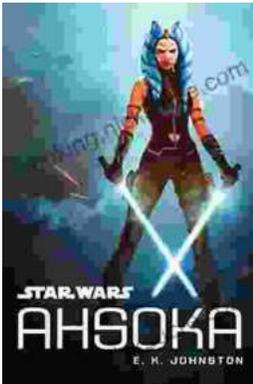
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