

LEARNING CHECK

Let's drive home the conceptual logic of the independent samples t test with a few examples:

For the first two questions, calculate the t test statistic, plugging in the following data from the conceptual formula for the independent samples t test:

1. Mean of Group A = 50

Mean of Group B = 35

Standard error of the difference between the means = 7.50

A:

$$t = \frac{50 - 35}{7.50}$$
$$t = \frac{15}{7.5}$$
$$t = 2.00$$

2. Mean of Group C = 20

Mean of Group D = 15

Standard error of the difference between the means = 4

A:

$$t = \frac{20 - 15}{4}$$
$$t = \frac{5}{4}$$
$$t = 1.25$$

3. As the sample size increases, all else being equal, will the value of the t test statistic increase or decrease? Why?

A: The t test statistic will increase in value because as the sample becomes larger, it will better represent the population from which it was drawn. Therefore, our results have a better chance of being generalized from the sample to the population. Mathematically speaking, a larger sample size decreases the denominator of the t test statistic formula (i.e., it decreases the standard error of the difference between the means), making the t test statistic bigger.

4. What is the difference between a standard deviation and a standard error of the difference between the means?

A: The standard deviation is a measure of variability for one group of data. The standard error of the difference between the means is a pooled measure of variability for two groups of data.