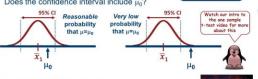


Review: one-sample t-test





Consider a sample of 10 penguin heights:

0.93, 1.18, 1.34, 1.21, 1.24, 0.97, 0.93, 1.17, 1.30, 0.83

Is the mean of the population they come from equal to 1.0 meters? With what degree of confidence do we make this conclusion?

First step, calculate sample mean and standard error

$$t_{calc} = \frac{\overline{x} - \mu_0}{SE} \quad \begin{array}{l} \overline{x} = 1.110 \\ s = 0.178637 \\ SE = 0.056490 \end{array}$$

Example #3 - clutch size

Consider a sample of 14 clutch sizes:

8, 9, 8, 5, 4, 7, 7, 8, 9, 10, 7, 5, 10, 7

Is the mean clutch size for these ducks equal to 9? With what degree of confidence do we make this conclusion?

First step, calculate sample mean and standard error

First step, calculate sample mean and standard error
$$t_{calc} = \frac{\overline{x} - \mu_0}{SE} \qquad \frac{\overline{x} = 7.429}{s = 1.827747} \qquad SE = \frac{s}{\sqrt{n}} = \frac{1.8277}{\sqrt{14}}$$

Example #5 - parasite load

Consider a sample of 8 parasite loads:

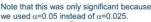
11, 12, 10, 14, 12, 8, 18, 15

Is the mean parasite load of the population more than 10 With what degree of confidence do we make this conclusion?

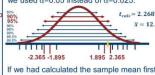
SE = 1.101946

First step, calculate sample mean and standard error

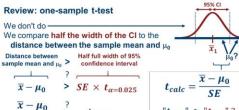
First step, calculate sample mean and standard error
$$\overline{x} - \mu_0$$
 $\overline{x} = 12.5$ s 3.11677



we used α =0.05 instead of α =0.025.

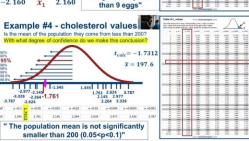


If we had calculated the sample mean first, and then decided on the direction, we would really be using the outer 10% of the area.



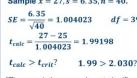




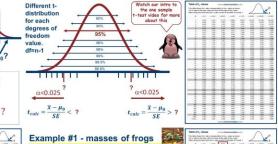


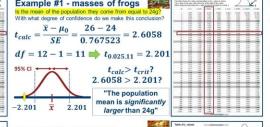
"The population mean

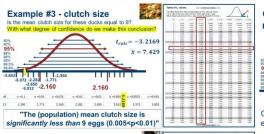


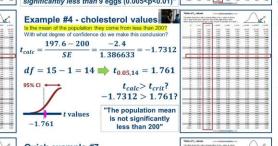


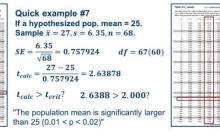






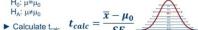






Review: one-sample t-test

► Create a null hypothesis and alternative hypothesis:



- ► Compare t_{calc} to various t_{crit} values (i.e., widths of Cls). 11111111
- ▶ Determine probability, p value, of seeing t_{calc} as extreme as we do.
- ► Decide to "reject H₀" or "fail to reject H₀" based on the p value
- H_0 : $\mu = \mu_0$ consistent with non-small p values. H_A: μ≠μ₀ would give us small p values.

Example #1 - masses of frogs

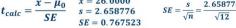
Consider a sample of 12 frog masses

24.0, 25.0, 29.0, 27.0, 23.0, 22.5, 24.3, 28.7, 23.8, 29.2, 30.0, 25.9

Is the mean of the population they come from equal to 24g?

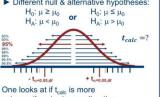
With what degree of confidence do we make this conclusion?

First step, calculate sample mean and standard error



One-tailed t-tests

► Different null & alternative hypotheses:



extreme than to in one direction



Consider a sample of 15 cholesterol values

Is the mean cholesterol value less than 200?

With what degree of confidence do we make this conclusion?

First step, calculate sample mean and standard error



Caution about one sample t-tests

- ▶ Technically, data should be normally distributed, but the CLT handles this for larger samples unless the data is very weird.
- ► Always report the p-value range (or exact p-value) and direction when reporting results.

Only do a one-tailed test under 2 conditions:

You only care about one direction.

2. You have an a priori reason to test in only one direction You CANNOT look at data to choose the direction

► Always remember the risk of a type I or type II error

Stats Examples.com