

8.2 A Single Population Mean using the Student t Distribution

Section 8.2 A Single Population Mean using the Student t Distribution

Learning Objective:

In this section, you will:

- Apply and interpret point estimates and confidence intervals
- Construct and interpret confidence intervals for population means

Estimating a population mean (μ), when σ is NOT known

Critical Values - If σ is not known, instead of a normal distribution, we use a student t distribution to find the t-score. $t_{\alpha/2}$ is the t-score that separates an area of $\alpha/2$ in the right tail of the student t distribution.

In addition to the t-score, we need to consider the **degrees of freedom, $n - 1$** . The number of degrees of freedom is abbreviated by df. **$df = n - 1$** .

Example 1: Find the critical value, $t_{\alpha/2}$, for a sample size of 10, and corresponding to a 99% confidence level.

Calculating the confidence interval for population mean (μ) when σ is NOT known

Using the Graphing calculator TI-84: STAT, TESTS, 8:TInterval (Data or Stats)

TInterval (Stats, \bar{x} , s , n , CL) or Enter data L1, TInterval (Data, L1, 1, CL)

Example 2: Suppose you do a study of acupuncture to determine how effective it is in relieving pain.

You measure sensory rates for 15 subjects with the results given. Use the sample data to construct a 95% confidence interval for the mean sensory rate for the population (assumed normal) from which you took the data. 8.6; 9.4; 7.9; 6.8; 8.3; 7.3; 9.2; 9.6; 8.7; 11.4; 10.3; 5.4; 8.1; 5.5; 6.9

1

Notes 8.2

Example 3: A sample of 106 body temperatures has a mean of 98.2 degrees Fahrenheit a standard deviation of 0.62 degrees Fahrenheit. Construct a 95% confidence interval estimate of the mean body temperature of all healthy humans. Does the common use of 98.6 degrees Fahrenheit seem to a reasonable estimate of the mean body temperature?

For more information and examples see online textbook OpenStax Introductory Statistics pages 456-460.

“Introduction to Statistics” by OpenStax, used is licensed under a [Creative Commons Attribution License 4.0 license](https://creativecommons.org/licenses/by/4.0/)

8.2 A Single Population Mean using the Student t Distribution is shared under a [not declared](#) license and was authored, remixed, and/or curated by LibreTexts.