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Practice: Constructing a Confidence Interval

You are studying the strength of a material. You measure the strength of 25 randomly selected samples. The sample mean is 53, and the standard deviation is 4. You will construct a 95% confidence interval for the mean strength.

1. Use the Distribution Calculator in JMP to find the *t* value that will be used to construct this interval. To find this script, go to **Help**, **Sample Data**, **Teaching Scripts**, **Interactive Teaching Modules**.

   What is the *t* value?

   Hint: Under **Distribution Characteristics**, change **Distribution** to **t**, **DF** to **24**, and **Type of Calculation** to **Input probability and calculate values**. In the Calculations section, change the **Percentile** option to **Central probability** and **Input Probability** to **0.95**.

   The *t* value is 2.064.

2. Use the following formula to construct a 95% confidence interval for the mean.

$$\bar{X} - t_{1-\alpha/2,n-1} S_n , \bar{X} + t_{1-\alpha/2,n-1} S_n$$

   What is the confidence interval?

   Hint: Use the Confidence Interval for One Mean calculator to check your work. To find this script, go to **Help**, **Sample Data**, **Calculators**. In the pop-up box, select **Summary Statistics**. Change the interval type to **t**, and enter the appropriate values in the fields provided. The *t* value is listed as **t multiplier**.

   The 95% confidence interval is 51.35 to 54.65.

3. Interpret this confidence interval. How would you explain this confidence interval to a colleague or manager?

   You are 95% confident that the true mean strength is between 51.35 and 54.65.

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