
Lecture 13: Confidence Intervals

In-Class Activities

Answer the following questions in an RMarkdown document and discuss it with the people around you (no need to write the problem down, just give it a header (## Problem 1, etc.):

- 1. Confidence Interval for a Mean when σ is Known:** Suppose a sample of 40 people has an average height of 165 cm. Assume the population standard deviation is known to be 8 cm.
 - a) Construct a 90% confidence interval for the population mean height.
 - b) Construct a 95% confidence interval for the population mean height.
 - c) State which interval is wider and explain why.
 - d) Write one sentence interpreting the 95% confidence interval in context.
- 2. Confidence Interval for a Mean when σ is Unknown:** Using the `births` dataset in the `openintro` library, answer the following questions
 - a) Construct a 90% confidence interval for the mean birth weight.
 - b) Construct a 95% confidence interval for the mean birth weight.
 - c) Construct a 99% confidence interval for the mean birth weight.
 - d) Use `t.test()` to verify your intervals.
- 3. Confidence Interval for a Proportion:** Using the `exam_grades` dataset in the `openintro` library, construct confidence intervals for the proportions.
 - a) Construct a 90% confidence interval for the proportion of female students.
 - b) Construct a 95% confidence interval for the proportion of female students.
 - c) Construct a 99% confidence interval for the proportion of female students.
 - d) Explain what the 95% confidence interval means in context.
- 4. Confidence Intervals Within Groups:** Using the `births` dataset in the `openintro` library,
 - a) Construct a 95% confidence interval for the mean birth weight for babies born to smoking mothers and for babies born to non-smoking mothers.
 - b) Construct a 95% confidence interval for the proportion of male babies within each smoking group.
 - c) Create one visualization for the grouped means and one visualization for the grouped proportions using points and error bars.
 - d) Briefly describe what the plots suggest about the groups.