7.2 The Confidence Interval Approach to Hypothesis Testing

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Goals

1. Test one sample means using the confidence interval approach.

- A confidence interval gives us a range of *plausible* values for μ.
  - If the null value is in the interval, then μ_0 is a plausible value for μ.
  - If the null value is *not* in the interval, then μ_0 is *not* a plausible value for μ.

Steps

1. State null and alternative hypotheses.
2. Decide on significance level α. Check assumptions (decide which confidence interval setting to use).
3. Find the critical value.
4. Compute confidence interval.
5. If the null value is *not* in the confidence interval, reject the null hypothesis. Otherwise, do not reject.
6. Interpret results in the context of the problem.

Example

Is the average mercury level in dolphin muscles different from $2.5\mu g/g$? Test at the 0.05 level of significance. A random sample of 19 dolphins resulted in a mean of $4.4\mu g/g$ and a standard deviation of $2.3\mu g/g$.

Checkpoint

The General Social Survey (GSS) collected responses from 1,154 US residents. One of the questions on the survey is "After an average workday, about how many hours do you have to relax or pursue activities that you enjoy?". The average time spent relaxing was 3.68 hours, with a standard deviation of 2.6 hours.

A company claims people have 4 hours per day to relax. Test the company's claim at the 0.05 level of significance.