Lecture 5a: Practice Problem Solutions

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1. In a high school in the United States, a dietary counseling is being tested to measure the program’s long-term impact on student’s fat intake. Of the three hundred students at the school, 150 are randomized to receive five one-hour sessions of dietary counseling; the other 150 students receive no counseling.

- Six months after the last counseling sessions, all students are asked to keep a food diary for one week. Each student’s average fat intake in grams, is calculated at the end of this week. The results of this exercise are as follows:
Practice Problems

- Intervention group
  - $\bar{x}_1 = 54.8$ grams, $s_1 = 28.1$ grams, $n_1 = 146$

- Control group
  - $\bar{x}_2 = 62.8$ grams, $s_2 = 34.7$ grams, $n_2 = 142$

  (Please note—follow up sample sizes differ slightly from initial sample size because of loss to follow up)

- The public-health question of interest is whether there is a difference in mean fat intake between the two groups, six months after the intervention ended. You are going to help answer this question:
  - Construct a 95% CI for the population mean difference in daily fat intake for the intervention group as compared to the control group.
To create a 95% CI for \( \mu_2 - \mu_1 \):

\[
(\bar{x}_2 - \bar{x}_1) \pm 2 \times S\hat{E}(\bar{x}_2 - \bar{x}_1)
\]

\[
(62.8 - 54.8) \pm 2 \times S\hat{E}(\bar{x}_2 - \bar{x}_1)
\]

\[
8.0 \pm 2 \times S\hat{E}(\bar{x}_2 - \bar{x}_1)
\]

\[
S\hat{E}(\bar{x}_2 - \bar{x}_1) = \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}
\]

\[
= \sqrt{\frac{(28.1)^2}{146} + \frac{(34.7)^2}{142}} \approx 3.7
\]

- Business as usual!!
95% CI for $\mu_2 - \mu_1$:
- $8 \pm 2 \times (3.7)$
- $8 \pm 7.4$
- $(0.6\text{ gm}, 15.4 \text{ gm})$
- Notice that 0 is not included in the 95% CI