Data Analysis and Statistical Inference
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In-Video Quiz Questions for Unit 3: Part 2 – (4) CI (for the mean) examples

(02:24)

1. The General Social Survey asks: "For how many days during the past 30 days was your mental health, which includes stress, depression, and problems with emotions, not good?" Based on responses from 1,151 US residents, the survey reported a 95% confidence interval of 3.40 to 4.24 days in 2010.

   If a new survey asking the same questions was to be done with 500 Americans, would the standard error of the estimate be larger, smaller, or about the same. Assume the standard deviation has remained constant since 2010.

   (a) smaller
   (b) larger
   (c) about the same

(03:29)

2. Which of the following is a condition that needs to be met to calculate a confidence interval for a population mean using methods that rely on the Central Limit Theorem?
   (a) The population distribution must be nearly normal.
   (b) At least 10% of the population must be sampled.
   (c) The sampled observations must be independent with respect to the variable in question.
   (d) There should be at least 10 successes and 10 failures.

(05:29)

3. Which of the following is the correct calculation of the 98% confidence interval for the average number of exclusive relationships college students on average have been in?

   Remember, we had a random sample of 50 college students, who had been in 3.2 exclusive relationships on average, with a standard deviation of 1.74.

   (a) $3.2 \pm 2.33 \times {}^{1.74}/_{\sqrt{50}}$
   (b) $3.2 \pm 1.96 \times {}^{1.74}/_{\sqrt{50}}$
   (c) $3.2 \pm 1.96 \times 1.74$
   (d) $3.2 \pm (-2.33) \times {}^{1.74}/_{\sqrt{50}}$
   (e) $3.2 \pm 2.33 \times \sqrt{{}^{1.74}/_{50}}$

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Answers:

1. b

Explanation: If sample size decreases, all else held constant, the standard error will increase: $SE = \frac{s}{\sqrt{n}}$.

2. c

Explanation: The population distribution does not necessarily need to be nearly normal, as the CLT will hold if the sample size is large even if the population distribution is skewed. At most, not at least, 10% of the population must be sampled. The success-failure condition is useful for categorical variables, not numerical. So the only choice that is correct is “The sampled observations must be independent with respect to the variable in question.”

3. a

Explanation: Sample mean = 3.2, sample SD = 1.74, SE = $1.74/\sqrt{50}$, and Z* for a 98% confidence interval is 2.33.