Primary Research Question

What percentage of the time are college students happy? How does our estimate of the true mean change as sample size increases?

Analysis

Let's break this question down into the different descriptive statistics that you will need to construct your answer. Be sure that your R output includes all of the following components.

Determine the population parameters:
1. Visualize the shape of the population data by making a histogram.
2. Calculate the "true" mean and standard deviation of the population.

Compare the sample statistics:
3. Draw 1,000 samples of size n=5 from the population data. Calculate the mean of each sample.
4. Graph these 1,000 sample means in a histogram and examine the shape.
5. Calculate the mean and standard deviation of the sampling distribution.
6. Repeat this process for samples of size n=15 and n=25.
7. Compare the results you get to the predictions of the Central Limit Theorem.

(4/4 points)

Population Parameters

1a) What is the **shape** of the population happiness scores?

- approximately Normal
- positively skewed
- negatively skewed ✔

1b) What percentage of the time are college students happy, on **average**? (report with no decimals and no %)

78 ✔ **Answer:** 78

78

1c) What is the **standard deviation** of the happiness percent scores? (round to 1 decimal place)

16.3 ✔ **Answer:** 16.3

16.3

1d) Is it more **common** for students to have high or low happiness percent scores relative to the range of percent scores in the population?

- high ✔
- low

You have used 1 of 1 submissions

(3/3 points)

Simulation

For the sampling distributions:

2a) The mean was _____ for all three sampling distributions.

approximately the same ▾ ✔ **Answer:** approximately the same

2b) The sample error (SE) _____ as sample size increased.

decreased ✔ **Answer:** decreased

2c) The distributions became _____ as sample size increased.

more Normal ✔ **Answer:** more Normal

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(4/4 points)

Central Limit Theorem

For the following questions, please use the rounded standard deviation value you provided above where necessary.

3a) According to the Central Limit Theorem, what do we expect the **mean** to be for each sampling distribution (n=5, n=15 and n=25)? (round to 2 decimal places)

78.03 ✔ **Answer:** 78.03

78.03

3b) According to the Central Limit Theorem, what should be the **standard error** for the sampling distribution of n=5? (round to 2 decimal places).

7.29 ✔ **Answer:** 7.29

7.29

3c) According to the Central Limit Theorem, what should be the **standard error** for the sampling distribution of n=15? (round to 2 decimal places).

4.21 ✔ **Answer:** 4.21

4.21

3d) According to the Central Limit Theorem, what should be the **standard error** for the sampling distribution of n=25? (round to 2 decimal places).

3.26 ✔ **Answer:** 3.26

3.26

You have used 1 of 1 submissions

(1/1 point)

4) Based on these simulations, what can you say about the relationship between the shape of the **population** and the shape of the **sampling distribution** of means?

- The sampling distribution will be Normal only if the original population was also Normal.
- If the population is skewed, the sampling distribution will be skewed as well, no matter how large the sample size.
- If the sample size is large enough, the sampling distribution will be Normal no matter what the shape of the population. ✔

You have used 1 of 1 submissions