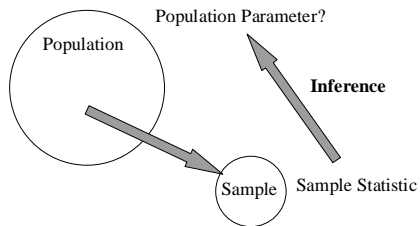


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Sampling Distribution Models



1

Proportions

- So far we have used the sample proportion, \hat{p} , to make inferences about the population proportion p .
- To do this we needed the sampling distribution of \hat{p} .

2

Sampling Distribution of \hat{p}

- Shape: Approximately Normal if conditions are met.
- Center: The mean is p .
- Spread: The standard deviation is

$$\sqrt{\frac{p(1-p)}{n}}$$

3

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Categorical Variable

- When the response variable of interest is categorical, the parameter is the proportion of the population that falls in a particular category, p .

4

Quantitative Variable

- When the response variable of interest is quantitative, the parameter is the mean of the population, μ .

5

Means

- We will use the sample, \bar{y} , to make inferences about the population mean, μ .
- To do this we needed the sampling distribution of \bar{y} .

6

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Simulation

www.ruf.rice.edu/~lane/stat_sim/sampling_dist/index.html

7

Simulation

- Simple random sample of size $n=5$.
- Repeat many times.
- Record the sample mean, \bar{y} , to simulate the sampling distribution of \bar{y} .

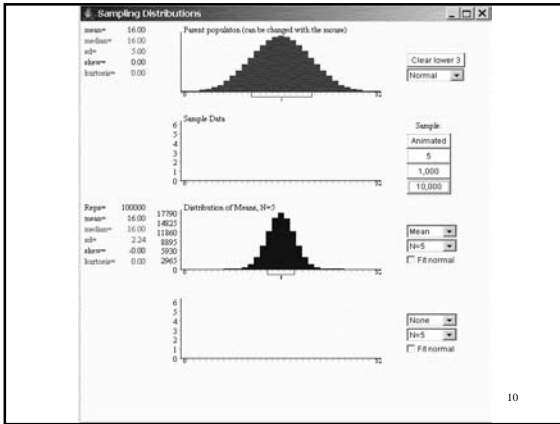
8

Simulation

- Different samples will produce different sample means.
- There is variation in the sample means.
- Can we model this variation?

9

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Population

- Shape: Basically normal
- Center: Mean, $\mu = 16$
- Spread: Standard Deviation, $\sigma = 5$

Sampling Distribution of \bar{y}

- $n = 5$
- Shape: Normal
- Center: Mean, $\mu = 16$
- Spread: Standard Deviation,

$$SD(\bar{y}) = \frac{\sigma}{\sqrt{n}} = \frac{5}{\sqrt{5}} = 2.24$$
