

## 9.1 Sampling Distributions

Slides 1-5

	mean	proportion
Population $\Rightarrow$ parameter	$\mu$	$p$
Sample $\Rightarrow$ Statistic	$\bar{x}$	$\hat{p}$

Sampling variability - value of a statistic varies in repeated random sampling

Language: Example 9.2 A sample of 515 US adults were asked whether they believe in ghosts. Of those, 160 said yes. Therefore  $\hat{p} = \frac{160}{515} = .31$

The value .31 is a statistic we can use to estimate parameter  $p$ .

Would a second sample of 515 produce the same result? No, due to sampling variability

Slide 6-7

Sampling distribution - distribution of values taken by the statistic in all possible samples of the same size from the same population

Slide 8

### Exercise 9.5a,b

Each student choose a different line from Table B

Complete 10 simulations

Construct a class histogram

CUSS - Center (mean, median), unusual features, shape, spread (std. dev)

Language  
Fig 9.5, 9.6

unbiased statistic - if the mean of the sampling distribution is equal to the true value of the parameter, the statistic is an unbiased estimator.

Discuss standard deviation and sample sizes

Example 9.6



95%  $\pm 2\sigma$

Sample size 100:  $\mu = .37$   $\sigma = .05$

95%  $\Rightarrow$  27% - 47%

Sample size 1000:  $\mu = .37$   $\sigma = .01$

95%  $\Rightarrow$  35% - 39%

Variability of a statistic - spread of its sampling distribution. Larger samples will have a smaller spread.

Size of population has little influence on the behavior of statistics from SRS.