Sampling Distributions

Definitions, terminology, notation

Parameter	Number that describes a characteristic of a population
Statistic	Number that describes a characteristic of a sample
μ	Mean of a population
$\bar{x}$	Mean of a sample
σ	Standard deviation of a population
s	Standard deviation of a sample
p	Proportion of occurrence of a parameter within a population
$\hat{p}$	Proportion of occurrence of a statistic within a sample

Sampling Distributions

A *sampling distribution* is the distribution of a statistic ($\bar{x}$, for example) in many samples of a population.

Sample Proportions

$$\hat{p} = p \qquad \sigma = \sqrt{\frac{p(1-p)}{n}}$$

Comparing difference of proportions in two populations

$$\mu_{\hat{p}_1 - \hat{p}_2} = p_1 - p_2 \qquad \sigma_{\hat{p}_1 - \hat{p}_2} = \sqrt{\sigma_1 + \sigma_2}$$

Sample Means

$$\bar{x} = \mu \qquad \sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Comparing difference of means in two populations

$$\mu_{\bar{x}_1 - \bar{x}_2} = \mu_1 - \mu_2 \qquad \sigma_{\bar{x}_1 - \bar{x}_2} = \sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}$$

Validity

These equations are valid if:

10% Rule

$n \le 0.1N$

Large Counts, proportions

$np \ge 10$

$n(1-p) \ge 10$

Large Counts, means

$n \ge 30$