

The UNIVERSITY of NORTH CAROLINA
at CHAPEL HILL

STOR 155 Introductory Statistics

Lecture 20: Comparing two means
Section 7.2 (a modified case only)



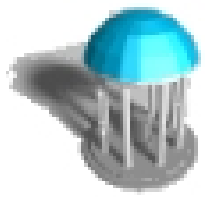
Comparing two population means

- Population 1: with mean μ_1 s.d. σ_1
- Population 2: with mean μ_2 s.d. σ_2
- Interested in the difference $\mu_1 - \mu_2$

- Sample 1: size n_1 mean \bar{X}_1 s.d. s_1
- Sample 2: size n_2 mean \bar{X}_2 s.d. s_2

- Consider the difference $D = \bar{X}_1 - \bar{X}_2$

- Assume the two samples are independent, and both n_1 and n_2 are large (e.g. at least 40).



Useful probability facts

The random variable D has approximately a normal distribution with mean $\mu_1 - \mu_2$ and standard deviation

$$SD(D) = \sqrt{\sigma_1^2/n_1 + \sigma_2^2/n_2}$$

An estimate of $SD(D)$ (Note: This is the only expression, not like in Lecture 19 with two different formulas)

$$SE_D = \sqrt{s_1^2/n_1 + s_2^2/n_2}$$