**Module III: Single-Sample Tests**

Statistics for the Behavioral Sciences

•What if we have group data rather than individual?

**What if our distribution of scores is skewed in the population?**

•Central Limit Theorem

•Hypothesis testing requires a normal distribution

•Confidence is increased when error is reduced

•Averaging over multiple observations does both

**•Repeated sampling of means:**

•creates a normal distribution

•reduces variability in the population

**•Introduce a new distribution**

•normal distribution of scores (old; N = 1)

•normal distribution of means (new; N > 1)

**•Distribution of means vs. scores**

•Distribution based on population of sample means

•Same mean (μM)

•Less variability (σM)

•Almost always normal when N = 30+

•Use standard error (σM) instead of standard deviation (σ)

**•To compute standard error for the population we need:**

•Population σ

•Sample size (N)

•The population mean stays the same:

**•Z-scores for individuals (N = 1)**

•Use standard deviation

•Z-statistics for groups (samples; N > 1)

•Use standard error

•Calculate a z-statistic you need:

•Population mean (μM)

•Population standard error (σM)

•Sample mean (M)

•We are now ready to analyze our first hypothesis test

**Scenario Slide**

Applebee’s has implemented a new training program. They would like to measure the

program’s success by comparing the performance appraisals of 30 randomly selected and

recently hired employees who recently finished the new training to the last performance

appraisals of all employees. Appraisals are on a scale of 0 (very poor) to 100 (excellent).

**•Steps of hypothesis testing**

1. Identify populations and assumptions

2. State null and research hypothesis

3. Identify the measures of central tendency and variability for the test

4. Determine the critical values

5. Calculate test statistics

6. Make a statistical decision

**•Identify populations, comparisons, and assumptions**

Always compare populations

What are the populations? (there are two)

**Population = Perf. on a 100 pt. scale of all employees at Applebee’s**

Population = Perf. on a 100 pt. scale of all new employees at Applebee’s with new training

• Infer from sample

**Comparison is the performance scores between the two population distributions**

**Assumptions:**

• Dependent variable is scale

• Participants are randomly selected

• Population is normally distributed

• Parameters for 1 population (z-test)

**•Steps of hypothesis testing**

2. State null and research hypothesis

Null hypothesis

• There is no difference in performance of Applebee employees between the new and

old training programs

Research hypothesis

• There is a difference in performance of Applebee employees between the new and

old training programs

**•Steps of hypothesis testing**

3. Identify the measures of central tendency and variability for the test

•Identify the characteristics of the comparison distribution (population)

The performance appraisals for all employees has a mean of 72 with a standard deviation

of 12.

Do we need to calculate standard error?

**•To compute standard error we need:**

•Population σ

•Sample size (N)

**Standard error = 2.19**

**Do we need to calculate a new mean?**

•The population mean stays the same:

•The parameters are: