**Module III: Single-Sample Tests**

**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

**•Determine the critical value(s)**

Area of the normal distribution where we reject the null hypothesis

Also called alpha (*α*), or *p*-level

• Probability of incorrectly rejecting the null

•Type I and type II errors

**Errors are the result of chance, convenience samples, or poor methodology**

•Type I error (false positive)

•We reject the null when the null was true

•Say there is a difference in between training programs when there is not

•Diagnosed with cancer when no cancer

•Typically results in unnecessary action

**•Type II error (false negative)**

•We fail to reject the null when the null was false

•Say there is no difference in training programs when there is actually a difference

•Told no cancer when you have cancer

•Typically results in no action

**Researcher decides *α***

Convention is *α* = .05

Directionality

**• Three types of *α***

Extreme *α* above the mean

Extreme *α* below the mean

Extreme *α* above or below the mean (*α*/2)

**Scenario Slide**

Applebee’s has implemented a validated and new training program that has been shown to

increase performance. They would like to measure the program’s success by comparing the

performance appraisals of 30 randomly selected 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).

**Scenario Slide**

Applebee’s has implemented a new training program that research has shown to decrease

performance but is more cost effective. They would like to measure the program’s impact on

performance by comparing the performance appraisals of 30 randomly selected 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).

**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).

**Relates to hypotheses…**

Null hypothesis

• Performance of Applebee employees is lower or equal with the new training program

than with the old training program

Research hypothesis

• Performance of Applebee employees is higher with the new training program than

with the old training program

**Null hypothesis**

• Performance of Applebee employees is higher or equal with the new training

program than with the old training program

Research hypothesis

• Performance of Applebee employees is lower with the new training program than

with the old training program

**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**

5. Calculate test statistics

The performance appraisals for all employees who received the old training had a mean of

72 with a standard deviation of 12.

The performance appraisals for employees who received the new training had a mean of 76

with a standard deviation of 10.

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

•Population *σ*

•Sample size (*N*)

**•*Z*-statistic**

•Population mean (*μM*)

•Population standard error (*σM*)

•Sample mean (*M*)

**•Steps of hypothesis testing**

6. Make a statistical decision

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

*α* = .05; *z*-crit. = +/- 1.96; *z*-statistic = 1.83

**•What is our practical decision?**

What are reliability/validity of variables?

Did we meet assumptions?

Are the savings greater than the costs?

How technical is the training?

How does the training match with organization mission and vision?