AS2 (Assignment 2, Unit 4): Computing the Z-test Statistic

Research Scenario #1

A researcher hypothesizes that zylex, a new antidepressant, will affect concentration. It is known that scores on a standardized concentration test is normally distributed with a μ= 50 and a σ= 12. A random sample of n=16 participants, aged 19-35, are chosen from the State of New Jersey. The sample is put on a six month dosage plan of zylex. After six months, all the participants are given a standardized concentration test. The researcher records the data and calculates a sample mean of M=56. Are the data sufficient to conclude that the drug, zylex, does have an effect on concentration?

Based on the above research scenario, please answer the following questions:

1. Name the population: All Participants

2. Name the sample: n=16 participants

3. What is the independent variable? The cause: Zylex

4. What is the dependent variable? The effect: Concentration

5. What is the appropriate hypothesis test? If participants take Zylex on a 6 months plan, then Zylex will have an affect on concentration.

6. What two means are you comparing in this test? Sample mean to a population mean.

7. Please calculate the appropriate hypothesis test using all four steps:

Step 1:

Ho: Zylex will NOT have an affect on concentration

H1: Zylex WILL have an effect on concentration

Step 2: Two Tail (Non-directional) because there is an effect with no directions

Step 3: 56-50/12 square root 16 (I am struggling with inserting the square root symbol :) , 6/3,
Z= 2

Step 4: Reject Ho

Write the statistical statement for your results: According to the research Zylex will have an effect on concentration.

Interpret your results (relating back to the hypothesis):

Because the results were significant (Z=2, P< .05) z-value is bigger than Alpha

Is there a probability of Type I error? Yes _____ No _____

If yes, what is the probability of a Type I error? _____

Is yes, how could you have decreased that probability?
_____

Is there a probability of Type II error? Yes_____ No_____

If it is appropriate, please calculate effect size: Answer: 56 – 50/12, 6/12= 0.5 medium effect

Research Scenario #2:

A researcher wanted to study the effect of alcohol on reaction time. She hypothesized that alcohol will INCREASE reaction time (participants will take longer to react). She selected a sample of n= 36 participants from Rutgers University. The 36 participants each consumed a 6-ounce glass of wine. Thirty minutes later, the researcher measured each participant's reaction time, using a standardized driving simulation task for which the regular population has a $\mu = 400$ msec reaction time with a $\sigma = 48$. The reaction time mean for the sample was M= 412 msec. Are the data sufficient to conclude that the alcohol significantly increased reaction time?

Based on the above research scenario, please answer the following questions:

1. Name the population: All participants

2. Name the sample: n= 36 participants

3. What is the independent variable? The cause: alcohol

4. What is the dependent variable? The Effect: reaction time

5. What is the appropriate hypothesis test? alcohol will INCREASE reaction time (participants will take longer to react).

6. What two means are you comparing in this test? Sample mean to a population mean.

7. Please calculate the appropriate hypothesis test using all four steps:

Step 1:

Ho: Alcohol will NOT increase on reaction time

H1: Alcohol WILL increase on reaction time.

Step 2: One tail because there is direction.

Step 3: 412-400/48 square root 36, 12/6= 2, Z= 2

Step 4: Reject Ho

Write the statistical statement for the results: : According to the research Zylex will have an effect on concentration.

Interpret your results (relating back to the hypothesis): According to the research Alcohol will increase on reaction time because the data result that I collected were significant (Z= 2, P< .05)

Is there a probability of Type I error? Yes ____ No_____

Is there a probability of Type II error? Yes ____ No____

If appropriate, please compute effect size: Answer: 412 – 400/48= 12/48= 0.25 small effect