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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: State of New jersey _____
2. Name the sample: n=16 Participants from the state of new jersey aged 19-35 _____
3. What is the independent variable? _____zylex_____
4. What is the dependent variable? _____concentration___
5. What is the appropriate hypothesis test? _____Non-directional (Two tail) Z Test__
6. What two means are you comparing in this test? _____population mean μ and the sample mean M_____
7. Please calculate the appropriate hypothesis test using all four steps:

Step 1: Name the Hypothesis

H,0: zylex, a new antidepressant, will NOT affect concentration

H1: zylex, a new antidepressant, will affect concentration

Step 2: set a critical region , ...

-1.96(p<.05) — p>.05—-+1.96(p<.05

Step 3:Math σm= σ/n (square root)

Z= M - μ/σm ....56-50/3=6/3=2 so z=2.

-1.96(p<.05) — p>.05—-+1.96(p<.05) (2 falls in the positive side of the critical region

Step 4: Reject Null Hypothesis _____

Write the statistical statement for your results: Z=2, P <.05

Interpret your results (relating back to the hypothesis): _____Our Study supports zylex, a new antidepressant, DID affect concentration, the data we're significant._____
_____
_____

Is there a probability of Type I error? Yes

If yes, what is the probability of a Type I error? _____2__

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

Is there a probability of Type II error? _ No_

If it is appropriate, please calculate effect size: Answer:__(Medium Size effect) size effect .05

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: _____Rutgers University _____
2. Name the sample: n=36 participants from Rutgers University
   _____
3. What is the independent variable? _____alcohol
4. What is the dependent variable? _____reaction time
5. What is the appropriate hypothesis test? _____
   Z test (one tail directional test)
6. What two means are you comparing in this test?
   _____population μ and sample mean M
7. Please calculate the appropriate hypothesis test using all four steps:

Step 1: name the Hypothesis

H0: Alcohol will NOT increase reaction time

H1: Alcohol WILL increase reaction time

Step 2: set critical region One directional. ——-+1.65

Step 3: Math. M - μ/σm. σ/n square root = 48/6 ....412-400/8 = 12/8=1.5. Z=1.5

Step 4: ____Fail to Reject Null Hypothesis_____

Write the statistical statement for the results: _____Z=1.5, P>.05

Interpret your results (relating back to the hypothesis): ___Study shows that Alcohol does NOT increase reaction time.

_____
_____
_____

Is there a probability of Type I error? No

Is there a probability of Type II error? Yes

If appropriate, please compute effect size: Answer: _____Small Effect Size (size effect 0.25)