**CHAPTER 10: HYPOTHESIS TESTS INVOLVING TWO POPULATION MEANS**

**OR PROPORTIONS**

**PRACTICE PROBLEMS**

1.  Some criminologists argue there is a relationship between “impulsivity” and criminal offending. The idea is that impulsive people act on immediate gratification and that since crime involves quick pleasure and only the long-term possibility of any cost (getting caught and punished), it should be highly attractive to them. To test this notion you take a random sample of 40 people who responded impulsively on a personality test that includes a measure of impulsivity and a second independent random sample of 80 who indicated by the test that they were not impulsive.  You then ask each person to report the number of criminal offenses they have committed in the last year. Finally, you calculate the mean number of self-reported offenses for each group, and here is the data you get:

**Impulsive                Non-Impulsive**

n1 = 40                      n2 = 80

X1= 13.5                      X2 = 10.3

s1 = 4.9                        s2 = 4.0

Test the null hypothesis that there is no difference between the two groups in the number of delinquent acts they committed versus the alternative hypothesis that those who are impulsive commit more criminal offenses. Use an alpha of .01 and label each step of your hypothesis test. Assume that the two population standard deviations are equal (σ1 = σ2), and make sure to state each step of the hypothesis test and properly interpret your results.

2. It is often said that the criminal sentences given to minority offenders are more severe than those given to whites. You examine how this works in a federal district court. You take a sample of 80 bank robbery cases where the convicted offender was white and a second independent sample of 80 cases where the convicted offender was either African-American or Hispanic. Here’s the data that you get:

**White                Minority**

n1 = 80                      n2 = 80

X1= 67 months            X2 = 73 months

s1 = 18                        s2 = 29

Test the null hypothesis that there is no difference between the two groups versus the alternative hypothesis that white suspects are sentenced on average to fewer months. Use an alpha of .05 and label each step of your hypothesis test. You cannot assume that the two population standard deviations are equal (σ1 ≠ σ2), make sure to state each step of the hypothesis test and properly interpret your results, and use 155 as your degrees of freedom. What conclusion would you draw from these data?

3. Researchers are very interested in predicting who will and will not become a criminal as an adult. One of the strongest predictors of adult criminality is whether the person was a juvenile delinquent. You want to determine whether juvenile delinquents are more likely to become adult criminals. In a sample of 376 juvenile delinquents, you find that 58.5% become criminals as adults. In another sample of 510 people who were not juvenile delinquents, you find that 31.4% become criminals as adults. Test the hypothesis that delinquents are more likely to become adult criminals (use α = .05).

4. The District of Columbia Police has recently tried to increase the number of arrests made by police officers. You want to know if arrests have actually increased. You look at a sample of 6 police officers, and measure the number of arrests each month for the month before and after the policy change. Test the null hypothesis that the before and after number of arrests are equal, against the alternative that the number of arrests are higher after the policy change. Use an alpha of .05. What are your conclusions?

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| --- | --- | --- | --- | --- | --- |
| Person | Before  *x*1 | After  *x*2 |  |  |  |
| A | 1 | 3 |  |  |  |
| B | 0 | 2 |  |  |  |
| C | 2 | 3 |  |  |  |
| D | 3 | 2 |  |  |  |
| E | 1 | 4 |  |  |  |
| F | 0 | 2 |  |  |  |
|  |  |  | Σ |  | Σ |