Assignment 6

1. One method for assessing the bioavailability of a drug is to note its concentration in blood and/or urine samples at certain periods of time after the drug is given. Suppose we want to compare the concentrations of two types of aspirin (types A and B) in urine specimens taken from the same person 1 hour after he or she has taken the drug. Hence, a specific dosage of either type A or type B aspirin is given at one time and the 1-hour urine concentration is measured.

One week later, after the first aspirin has presumably been cleared from the system, the same dosage of the other aspirin is given to the same person and the 1-hour urine concentration is noted. Because the order of giving the drugs may affect the results, a table of random numbers is used to decide which of the two types of aspirin to give first. This experiment is performed on 10 people; the results are given in the following table.

Concentration of aspirin in urine samples

|  |  |  |
| --- | --- | --- |
| Person | Aspirin A  1-hour concentration (mg%) | Aspirin B 1-hour concentration (mg%) |
| 1 | 15 | 13 |
| 2 | 26 | 20 |
| 3 | 13 | 10 |
| 4 | 28 | 21 |
| 5 | 17 | 17 |
| 6 | 20 | 22 |
| 7 | 7 | 5 |
| 8 | 36 | 30 |
| 9 | 12 | 7 |
| 10 | 18 | 11 |

1. Suppose we want to test the hypothesis that the mean concentrations of the two drugs are the same in urine specimens. State the appropriate hypothesis.
2. Test the hypothesis using a paired t-test, report the p-value and state your conclusion (alpha = 0.05)
3. Suppose that you tested this hypothesis using a two-sample t-test (instead of a paired t-test). What would the p-value of your test have been?
4. Can active exercise shorten the time that it takes an infant to learn how to walk alone? Researchers randomly allocated 12 one-week old male infants from white, middle class families to one of two treatment groups. The is the active exercise group received stimulation of the walking reflexes for four 3-minute sessions each day from the beginning of the second week through the end of the eighth week. Those in the other group received no such stimulation.

Is there sufficient evidence to conclude that the groups differ in the typical time required to first walking?

1. State the null and alternative hypothesis
2. Why might you want to use a non-parametric method for analyzing this data?
3. Analyze using the Mann-Whitney-U test using R with alpha=0.05

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| --- | --- |
| Collected Data  (time in months) | |
| Active Exercise | No Exercise |
| 9.50 | 11.50 |
| 10.00 | 12.00 |
| 9.75 | 13.25 |
| 9.75 | 11.50 |
| 9.00 | 13.00 |
| 13.0 | 9.00 |