Chapter 5 – Analysis of Differences

**Exercise 1**

1. A medical intervention in a school classroom features an imaginary family, covering the existence of depression and ways of managing the condition. Students’ scores before and after the intervention – shown below – indicate their level of engagement with mental health issues. Explain what type of analysis is appropriate for this data set to determine whether or not there is a significant difference between the students’ scores before and after the intervention class.
2. State the null and alternative hypotheses.
3. Enter the data in Jamovi (Student Grades.csv file), editing the variable name, description, and data type properly.

|  |  |  |
| --- | --- | --- |
| Student | Before Intervention | After Intervention |
| 1 | 18 | 22 |
| 2 | 21 | 25 |
| 3 | 16 | 17 |
| 4 | 22 | 24 |
| 5 | 19 | 16 |
| 6 | 24 | 29 |
| 7 | 17 | 20 |
| 8 | 21 | 23 |
| 9 | 23 | 19 |
| 10 | 18 | 20 |
| 11 | 14 | 15 |
| 12 | 16 | 15 |
| 13 | 16 | 18 |
| 14 | 19 | 26 |
| 15 | 18 | 18 |
| 16 | 20 | 24 |
| 17 | 12 | 18 |
| 18 | 22 | 25 |
| 19 | 15 | 19 |
| 20 | 17 | 16 |







1. Perform the appropriate analysis and interpret the results according to the formed hypothesis. Assume uncertainty about the direction of outcome (two-tailed test).

**Exercise 2**

 A study assessed the effectiveness of a new drug designed to reduce repetitive behaviors in children affected with autism. A total of 8 children with autism enroll in the study and the amount of time that each child is engaged in repetitive behavior during three-hour observation periods are measured both before treatment and then again after taking the new medication for a period of 1 week. The data are shown below (you will also find this in the Drug Treatment.csv file).

|  |  |  |
| --- | --- | --- |
| **Child** | **Before Technique** | **One Week of Technique** |
| 1 | 85 | 75 |
| 2 | 70 | 50 |
| 3 | 40 | 50 |
| 4 | 65 | 40 |
| 5 | 80 | 20 |
| 6 | 75 | 65 |
| 7 | 55 | 40 |
| 8 | 20 | 25 |

1. Given this small dataset, explain what is the appropriate test to see if there is a significant difference between the median of two groups.
2. State the null and alternative hypotheses.
3. Enter the data in Jamovi. Make sure to edit the variable name, description, and data type.
4. Perform the appropriate analysis and interpret the results according to the formed hypothesis.

**Exercise 3**

In an attempt to improve alertness scores for elderly people with dementia, two sets of exercise classes were performed. The scores were recorded as below.

|  |  |  |  |
| --- | --- | --- | --- |
|  Adult | Before Intervention | After First Exercise Class | After Second Exercise Class |
| 1 | 18 | 22 | 20 |
| 2 | 21 | 25 | 22 |
| 3 | 16 | 17 | 20 |
| 4 | 22 | 24 | 26 |
| 5 | 19 | 16 | 15 |
| 6 | 24 | 29 | 30 |
| 7 | 17 | 20 | 25 |
| 8 | 21 | 23 | 26 |
| 9 | 23 | 19 | 25 |
| 10 | 18 | 20 | 23 |
| 11 | 14 | 15 | 20 |
| 12 | 16 | 15 | 14 |
| 13 | 16 | 18 | 22 |
| 14 | 19 | 26 | 24 |
| 15 | 18 | 18 | 19 |
| 16 | 20 | 24 | 23 |
| 17 | 12 | 18 | 25 |
| 18 | 22 | 25 | 27 |
| 19 | 15 | 19 | 22 |
| 20 | 17 | 16 | 20 |

1. Explain why administering multiple t-tests would not be beneficial for this scenario. Which test is appropriate?
2. State the null and alternative hypotheses.
3. Load Adult Fitness.csv into JASP (unlike Jamovi, JASP has no data editing tool).
4. Perform the appropriate analysis and interpret the results related to the hypothesis.

**Exercise 4**

Suppose that you want to compare the scores of participants from two *different* exercise classes for elderly adults, where the first class followed a traditional training method, whereas the second was an experimental class, applying a different teaching style. Do note that each separate group needs to be represented by a number (here, within the 'Class' variable); this would be the same with an ANOVA (independent samples / unrelated), only with more than 2 such numbers.

This data set is available in Teaching Methods.csv

|  |  |  |
| --- | --- | --- |
| Participant | Score | Class |
| 1 | 18 | 1 |
| 2 | 21 | 1 |
| 3 | 16 | 1 |
| 4 | 22 | 1 |
| 5 | 19 | 1 |
| 6 | 24 | 1 |
| 7 | 17 | 1 |
| 8 | 21 | 1 |
| 9 | 23 | 1 |
| 10 | 18 | 1 |
| 11 | 14 | 1 |
| 12 | 16 | 1 |
| 13 | 16 | 1 |
| 14 | 19 | 1 |
| 15 | 18 | 1 |
| 16 | 20 | 1 |
| 17 | 12 | 1 |
| 18 | 22 | 1 |
| 19 | 15 | 1 |
| 20 | 17 | 1 |
| 21 | 22 | 2 |
| 22 | 25 | 2 |
| 23 | 17 | 2 |
| 24 | 24 | 2 |
| 25 | 16 | 2 |
| 26 | 29 | 2 |
| 27 | 20 | 2 |
| 28 | 23 | 2 |
| 29 | 19 | 2 |
| 30 | 20 | 2 |
| 31 | 15 | 2 |
| 32 | 15 | 2 |
| 33 | 18 | 2 |
| 34 | 26 | 2 |
| 35 | 18 | 2 |
| 36 | 24 | 2 |
| 37 | 18 | 2 |
| 38 | 25 | 2 |
| 39 | 19 | 2 |
| 40 | 16 | 2 |

1. State the null and alternative hypotheses.
2. Which test is appropriate here?
3. Input the data in Jamovi. Make sure to edit the variables data type accordingly to be able to perform the test.
4. Perform the analysis and interpret the results.