**SPSS Practical 8:**

**Part A:**

// dependent test이기 때문에 한 줄에 한 개씩 짝으로 입력

// t-test = parametric test

The following data were collected from a group of students who participates in a statistics test. Each student completes two sets of questions which are written in English and Korean. The full score for the test is 250 points. You are required to compare the means for the two scores.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| English | 180 | 190 | 170 | 220 | 170 | 190 | 200 | 195 | 205 | 190 |
| Korean | 210 | 205 | 165 | 230 | 185 | 215 | 220 | 185 | 220 | 210 |

1. Run a t-test to compare the means between the two tests. Interpret your answers based on the SPSS outputs.

Normality Test

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Tests of Normality** | | | | | | |
|  | Kolmogorov-Smirnova | | | Shapiro-Wilk | | |
| Statistic | df | Sig. | Statistic | df | Sig. |
| diff | .248 | 10 | .082 | .902 | 10 | .233 |
| a. Lilliefors Significance Correction | | | | | | |

: Normality can be assumed

: Normality can not be assumed

D(10) = 0.248, sig = 0.082(>0.05)

This is non significant

Conclusion : Normality can be assumed

Dependent T Test

// analyze -> compare mean -> Paired samples t test(쌍으로 넣어야 함)

// correlation 이 낮으면 의심해봐야함

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Paired Samples Statistics** | | | | | |
|  | | Mean | N | Std. Deviation | Std. Error Mean |
| Pair 1 | English | 191.00 | 10 | 15.420 | 4.876 |
| Korean | 204.50 | 10 | 20.062 | 6.344 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Paired Samples Correlations** | | | | |
|  | | N | Correlation | Sig. |
| Pair 1 | English & Korean | 10 | .783 | .007 |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Paired Samples Test** | | | | | | | | | |
|  | | Paired Differences | | | | | t | df | Sig. (2-tailed) |
| Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | |
| Lower | Upper |
| Pair 1 | English - Korean | -13.500 | 12.483 | 3.948 | -22.430 | -4.570 | -3.420 | 9 | .008 |

:

:

Since sig = 0.008 (<0.05)

This test is significant.

Reject

Conclusion : The different between two means is significant.

// mean two means different level 두 variable 사이에 차이가 있음

1. Students perform better in which language?

On average, students perfomed better in test written in Korean(M = 204.5, SE = 6.344) than test written in English (M=191, SE = 4.867),t(9)=-3.42,p < 0.05

**// se = std.error, t(df) = t**

**Part B:**

Another group of students participate in the same test. The following data were collected for the test written in English:

// independent 따라서 다른 열에 group(value에 두 개로 나눔), English 넣고 구분

// 그러고 group 나눌 때 data -> split file -> 3번째 라디오버튼, 그룹 넣기

// 나누기 취소할 때는 1번째 라디오 버튼

// 취소한 후 k-s할 때 factor에 group 넣어도 나눠져서 나옴

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| English | 185 | 200 | 180 | 210 | 190 | 190 | 200 | 190 | 185 | 195 |

1. Run a t-test to compare the means between the two groups (test written in English). Interpret your answers based on the SPSS outputs.

// normal 안할시 trim이나 trans 해서 만들어줌

Normality Test

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Tests of Normality** | | | | | | | |
|  | Group | Kolmogorov-Smirnova | | | Shapiro-Wilk | | |
|  | Statistic | df | Sig. | Statistic | df | Sig. |
| English | Group A | .174 | 10 | .200\* | .950 | 10 | .674 |
| Group B | .211 | 10 | .200\* | .947 | 10 | .633 |
| \*. This is a lower bound of the true significance. | | | | | | | |
| a. Lilliefors Significance Correction | | | | | | | |

Group A (K-S test)

: Normality can be assumed

: Normality can not be assumed

D(10) = 0.174, sig = 0.200(0.05)

This is non significant

Conclusion : Normality can be assumed

Group B (K-S test)

: Normality can be assumed

: Normality can not be assumed

D(10) = 0.211, sig = 0.200(>0.05)

This is non significant

Conclusion : Normality can be assumed

// analyze -> compare -> imdependent t test (grouping variable 은 무조건 norminal of ordinal) -> define group (내가 입력한 숫자 값) -> option 들어가서 ci 확인

Independent T test

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Group Statistics** | | | | | |
|  | Group | N | Mean | Std. Deviation | Std. Error Mean |
| English | Group A | 10 | 191.00 | 15.420 | 4.876 |
| Group B | 10 | 192.50 | 8.898 | 2.814 |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Independent Samples Test** | | | | | | | | | | |
|  | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
| F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference | |
| Lower | Upper |
| English | Equal variances assumed | 1.433 | .247 | -.266 | 18 | .793 | -1.500 | 5.630 | -13.328 | 10.328 |
| Equal variances not assumed |  |  | -.266 | 14.395 | .794 | -1.500 | 5.630 | -13.544 | 10.544 |

Leven’s Test

: Homogenity variance can be assumed

: Homogenity variance can not be assumed

r(18) = 1.433 , sig = 0.247 (> 0.05)

This is non-significant

Accept

Conclusion : Homogenity variance can be assumed

Independent T-test

:

:

Since Sig = 0.793 (> 0.05)

This test is non-significant

Accept

Conclusion : The different between two means is non-significant

1. Which group of students performs better in the test written in English?

// non sig 하기 때문에

On average, students in Group A (M = 191.00, SE = 4.876) and Group B (M = 192.50, SE = 2.814) performed about the same, t(18) = -0.266, p >0.05

1. Find a linear regression between the group and the test result.

**//** 보통 둘 다 scale 이여야 하지만, 여기서는 group으로 나눴기 때문에 괜찮음(special case)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Coefficientsa** | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| B | Std. Error | Beta |
| 1 | (Constant) | 191.000 | 3.981 |  | 47.980 | .000 |
| Group | 1.500 | 5.630 | .063 | .266 | .793 |
| a. Dependent Variable: English | | | | | | |

English = 191 + 1.5(Group)

// sig = 0.793 이기 때문에 group이 중요하지는 않음