EPS 351

Lab 4: Independent Samples t tests and repeated samples t tests in SPSS

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1. **What are the assumptions that must be met in order to conduct an independent samples t test?**

1 There is equal variances between groups

2 The variables are normally distributed

3 The observations are independent of each other

4 The data is numeric

1. **Levene’s Test – What assumption does Levene’s test confirm? What conditions indicate that the assumption has been met?**

Assumption 1 of equal variances between groups is confirmed by the Levene’s test. When we fail to reject the null hypothesis after carrying out the Levene’s test then the condition has been met.

Dataset: pisa\_us

1. Open/Import/Read Dataset: File -> Open -> Data. Select **All Files** from Files of type to show the file you’re looking for. Select the correct file and click **Open**.

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1. Independent samples t-test. Test whether reading score (wleread2) differs by gender (ST03Q01; 1=Female, 2=Male).

**What is the independent variable?**

**Gender**

**What is the dependent variable?**

**Reading Scores**

**State the null and alternative hypotheses**

**H­­0: The reading score does not differ by gender**

**H1: The reading score differs by gender**

Analyze -> Compare Means -> Independent Samples T Test -> Find and move **wleread2** into Test Variable(s) -> Move **ST03Q01** into Grouping Variable -> Define Groups -> Enter 1 into Group 1 and 2 into Group 2 -> Continue -> Paste.

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1. Interpreting your results.

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**To Calculate effect Size:**

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**To formally write up your results, use the following format:**

Results from an independent samples t-test indicate that females (M= 516.68, SD = 104.52, n = 865) score higher than males (M = 488.75 SD= 118.94, n = 836) on reading level, t(1655.43) = 5.14, p < .001.

Levene’s test found the assumption of homogeneity of variances was violated (p < .05) [plausible (p > .05)] , therefore degrees of freedom were adjusted [the test was carried out based on equal variances]. The mean difference of 27.93 points (95% CI [17,29, 38.57]) is a small effect size, d = 0.25.

1. Repeat the process – do an Independent Samples T-Test using the variable wlemath and sex as your grouping variable. State your null and alternative hypotheses and then provide a formal write up for your results.

**H0: The mathematics score does not differ by gender**

**H1: The mathematics score differs by gender.**

**Results:** Results from an independent samples t-test indicate that females (M= 491.07, SD = 91.22, n = 860) score similar to males (M = 497.70 SD = 101.66, n = 832) on mathematics level, t(1657.52) = -1.409, p > .05.

Levene’s test found the assumption of homogeneity of variances was violated (p < .05) [plausible (p > .05)] , therefore degrees of freedom were adjusted [the test was carried out based on equal variances]. The mean difference of -6.62 points (95% CI [-15.84, 2.6]) is a small effect size, d = -0.07.

**Repeated Samples t tests in SPSS**

1. **What are the assumptions that must be met in order to conduct a repeated samples t test?**

1 Existence of two dependent samples

2 The differences of the paired values are normally distributed

3 The dependent variable is continuous

4 Observations are independent from one another

Dataset: Addhealth.sav

1. Open/Import/Read Dataset: File -> Open -> Data. Select **All Files** from Files of type to show the file you’re looking for. Select the correct file and click **Open**.

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1. Independent samples t-test. Test the means of the standardized Peabody test scores for wave1 (PVTSTD1) and wave3 (PVTSTD3C) are equal.

**State the null and alternative hypotheses**

**H­­0: The average Peabody test scores for wave1 and wave3 are equal.**

**H1: The average Peabody test scores for wave1 and wave3 are not equal.**

Analyze -> Compare Means -> Paired Sample T Test -> Find and move both **“PVTSTD1” and “PVTSTD3C”** into Test Variable(s) -> -> Paste.

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**Take a screenshot of your syntax and paste it here:**

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**Run the test (highlight the syntax and click the green triangle button). Take a screenshot of the output and paste it below:**

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1. Interpreting your results.

**Table

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**To formally write up your results, use the following format:**

**Results from the paired t-test indicate that Peabody math scores statistically differ between wave1 and wave 3 *(M = 100.76, SD = 14.68, n = 4476 for Wave1; M = 100.06, SD = 15.19, n = 4476 for Wave3)*, *t(4475) = 3.67, p < .001, Mdiff = .70, SD = 12.76, 95% CI: [.33, 1.07].***

Additional Practice

1. Repeat the process – Using a paired t-test to test whether the means of the standardized Peabody test scores for wave 1 (PVTSTD1) and wave 2 (PVTSTD2) are equal. (Data is in Addhealth.sav). Provide a write-up of your interpretation of the SPSS results.

**H0: The average Peabody test scores for wave 1 and wave 2 are equal.**

**H1: The average Peabody test scores for wave 1 and wave 2 are not equal.**

**Results: Results from the paired t-test indicate that Peabody math scores statistically differ between wave 1 and wave 2 *(M = 100.81, SD = 14.57, n = 4274 for Wave1; M = 97.23, SD = 12.61, n = 4274 for Wave2)*, *t(4273) = 17.75, p < .001, Mdiff = 3.59, SD = 13.21, 95% CI: [3.19, 3.98].***

Bonus Practice (EXTRA CREDIT – 2 points). Use the dataset Honeymoon Period for this activity.

B1. Use the skills you’ve learned to determine whether there is a difference in life satisfaction between any of the measurement periods (baseline and 6 months, 6 months and 12 months, and 12 months and 18 months). Write up your results using APA format.

HINT – if you find that there is a significant difference at the smallest possible intervals (6 months apart for each test), then increasing the length of that interval will also be significant. You don’t need to test the larger intervals unless you get null results.

B2. Determine whether or not there is a difference in any of the life satisfaction measurements based on gender. Write up your results using APA format.