**ESCP 7170 Analysis Project 4**

**3. Create a new R script file, save it as AP 4, and use the “t.test” command (or in SPSS use the**

**“Analyze" pull down and select the “Compare Means” interface) to investigate the following**

**(Assess assumptions for each analysis and note any possible concerns):**

Step 1\_Question 3a

**Were there significant differences between the starting readings scores and end reading**

**scores?**

**Answer:**

**Step 1**

* **Null Hypothesis:** There are no mean differences between the starting readings scores and end reading scores. Statistical formula, ***H0 : µD = 0***
* **Alternative Hypothesis:** There are mean differences between the starting reading scores and end reading scores. Statistical formula, ***H1 : µD ≠ 0***

**Step 2**

* **Alpha Level:** ***α*** = .05
* **Degree of freedom: *df*** *= 200-1 = 199*

**Step 3**

* **Test:** Dependent samples t-test, two-tailed.
* **Normality:** There are no departures from normality.
* **Calculated Test Statistics: *tcalc =*** 33.02

**Step 4**

* ***P*- Value:** *p<.001*
* **Decision:** **REJECT** the null hypothesis, ***H0 : µD = 0***
* **Statement:** Students’ end reading scores were significantly higher (*M* = 553.91, *SD* = 11.46) than students’ starting reading scores (*M* = 501.16, *SD* = 18.98).

**Compilation of the 4 steps of hypothesis testing:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Step 1** | ***H0 : µD = 0*** | ***H1 : µD ≠ 0*** | |
| **Step 2** | **α = .05** | ***df* = 199** | |
| **Step 3** | Dependent samples t-test, two-tailed. | ***tcalc =* 33.02** | |
| **Step 4** | *p<.001* | **REJECT** | ***H0 : µD = 0*** |

Students’ end reading scores were significantly higher (*M* = 553.91, *SD* = 11.46) than students’ starting reading scores (*M* = 501.16, *SD* = 18.98).

Step 1\_Question 3b

**Were there significant differences between the intervention groups on end reading scores?**

**Answer:**

**Step 1**

* **Null Hypothesis:** There are no significant differences between the means of the intervention groups in terms of end reading scores. Statistical formula, ***H0 : µ1 - µ2 = 0***
* **Alternative Hypothesis:** There are significant differences between the means of the intervention groups in terms of end reading scores. Statistical formula, ***H1 : µ1 - µ2 ≠ 0***

**Step 2**

* **Alpha Level:** ***α*** = .05
* **Degree of Freedom: *df*** *= n- 2 = 200- 2= 198*

**Step 3**

* **Test:** Independent samples t-test, two- tailed.
* **Normality:** There are departures from normality.
* **Equal Variances:** There are no departures from Homogeneity of Variance.
* **Calculated Test Statistics: *tcalc =*** 27.08

**Step 4**

* ***P-* Value:** *p<.001*
* **Decision:** **REJECT** the null hypothesis, ***H0 : µ1 - µ2 = 0***
* **Statement:** Students in the new intervention group (*M* = 564.05, *SD* = 5.30) had significantly higher end reading scores than the students in the traditional intervention group (*M* = 543.76, *SD* = 5.30).

**Compilation of the 4 steps of hypothesis testing:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Step 1** | ***H0 : µ1 - µ2 = 0*** | | ***H1 : µ1 - µ2 ≠ 0*** | |
| **Step 2** | **α = .05** | | ***df = 198*** | |
| **Step 3** | Independent samples t-test, two tailed. | Normality Departure | ***tcalc =*** 27.08 | |
| **Step 4** | *p<.001* | | **REJECT** | ***H0 : µ1 - µ2 = 0*** |

Students in the new intervention group (*M* = 564.05, *SD* = 5.30) had significantly higher end reading scores than the students in the traditional intervention group (*M* = 543.76, *SD* = 5.30).

Step 2\_APA write up for Question 3a

We assessed differences between start and end reading scores with a dependent samples t-test. Prior to conducting the test, assumptions for normality were assessed and no departures were noted (*p* > .05). All other assumptions were supported. The result of our t-test, *t*(199) = 33.02, *p* < .001, *d* = 3.37, suggests that end reading scores were significantly higher (*M* = 553.91, *SD* = 11.46) than starting reading scores (*M* = 501.16, *SD* = 18.98) with a large effect for reading.

Step 2\_APA write up for Question 3b

We then assessed differences in reading scores at end between the two intervention groups with an independent sample t-test. Prior to conducting the test, assumptions for normality and homogeneity of variance were assessed. The Shapiro Wilks test found that reading scores did not follow a normal curve (*p* < .05), but t-test are generally robust to such departures. All other assumptions were supported. The result of our t-test, *t*(198) = 27.08, *p* < .001, *d* = 3.83, suggests that the new intervention group (*M* = 564.05, *SD* = 5.30) had significantly higher end reading scores than the traditional intervention group (*M* = 543.76, *SD* = 5.30) with a large overall effect for intervention.