

Included Analyses

- [Two-Tailed One Sample t-Test between Reading1 and a test value of 0](#)

Results

Two-Tailed One Sample *t*-Test

Introduction

A two-tailed one sample *t*-test was conducted to examine whether Reading1 could have been produced by a probability distribution with a mean of 0.

Assumptions

Normality. A Shapiro-Wilk test was conducted to determine whether Reading1 could have been produced by a normal distribution (Razali & Wah, 2011). The results of the Shapiro-Wilk test were not significant based on an alpha value of .05, $W = 0.99$, $p = .626$. This result suggests the possibility that Reading1 was produced by a normal distribution cannot be ruled out, indicating the normality assumption is met.

Results

The result of the two-tailed one sample *t*-test was significant based on an alpha value of .05, $t(149) = 140.54$, $p < .001$, indicating the null hypothesis can be rejected. This finding suggests Reading1 was produced by a distribution with a mean not equal to 0. The results are presented in Table 1.

Table 1

Two-Tailed One Sample t-Test for the Difference between Reading1 and 0

Variable	<i>M</i>	<i>SD</i>	μ	<i>t</i>	<i>p</i>	<i>d</i>
Reading1	84.10	7.33	0	140.54	< .001	11.47

Note. Degrees of Freedom for the *t*-statistic = 149. *d* represents Cohen's *d*.

References

Intellectus Statistics [Online computer software]. (2023). Intellectus Statistics.

<https://statistics.intellectus360.com>

Razali, N. M., & Wah, Y. B. (2011). Power comparisons of Shapiro-Wilk, Kolmogorov-Smirnov, Lilliefors and Anderson-Darling tests. *Journal of Statistical Modeling and Analytics*, 2(1), 21-33.

Glossaries

One Sample *t*-Test

The one sample *t*-test is used to assess if the values of a single variable are significantly different from a test value. The test value is typically a population average or a baseline value that the researcher wishes to compare against (e.g., the average height of adults in the United States). This test uses the average deviation of the variable from the test value to compute the *t* statistic, which is used with the *df* to compute the p-value (i.e., significance level). A significant result for this test indicates that, on average, the values on the variable of interest are significantly different from the test value. The one sample *t*-test assumes that the observations are independent of each other and that the values of the variable are normally distributed (i.e., normality).

One Sample *t*-Test Formula:

$$t = \frac{\bar{X} - \mu}{s / \sqrt{n}}$$

\bar{X} = sample mean

μ = test value

s = sample standard deviation

n = sample size

Fun Fact! A dependent samples *t*-test is mathematically the same as a one sample *t*-test that compares the differences in the pairs of scores to a test value of zero.

Cohen's *d*: Effect size for the *t*-test; determines the strength of the differences between the matched scores. The larger the effect size, the greater the differences in the matched pairs.

Degrees of Freedom (*df*): Determined by multiplying the (number of rows - 1) × (number of columns - 1).

Mean (*M*): The average value of a scale-level variable.

Normality: Refers to the distribution of the data. The assumption is that the data follows the bell-shaped curve.

***p*-value:** The probability of obtaining the observed results if the null hypothesis is true. A result is usually considered statistically significant if the *p*-value is ≤ .05.

Shapiro-Wilk Test: A test to assess if the assumption of normality is met. If statistical significance is found in this test, the data is *not* normally distributed.

Standard Deviation (SD): The spread of the data around the mean of a scale-level variable.

Test Value: The value that the data is tested against.

t-Test Statistic (t): Used with the *df* to determine the *p* value.

Raw Output

One Sample t-Test for Reading1

Included Variables:
Reading1

Sample Size (Complete Cases):
N = 150

Shapiro-Wilk Test:
W = 0.993, p = 0.626

Results:

Variable	M	SD	μ	t	p	d
Reading1	84.099	7.329	0	140.538	2.847×10^{-160}	11.475

Note. n = 150, df = 149.

Confidence Interval Based on $\alpha = 0.0500$:
Lower Limit = 82.917, Mean = 84.099, Upper Limit = 85.282