Results

Two-Tailed Wilcoxon Signed Rank Test

Introduction

A two-tailed Wilcoxon signed rank test was conducted to examine whether there was a significant difference between Reading1 and Reading2. The two-tailed Wilcoxon signed rank test is a non-parametric alternative to the paired samples *t*-test and does not share its distributional assumptions (Conover & Iman, 1981).

Results

The results of the two-tailed Wilcoxon signed rank test were significant based on an alpha value of .05, $V = 738.00$, $z = -9.19$, $p < .001$. This indicates that the differences between Reading1 and Reading2 are not likely due to random variation. The median of Reading1 (*Mdn =* 84.30) was significantly lower than the median of Reading2 (*Mdn =* 85.19). Figure 1 presents a boxplot of the ranked values of Reading1 and Reading2.

Figure 1

Ranked values of Reading1 and Reading2
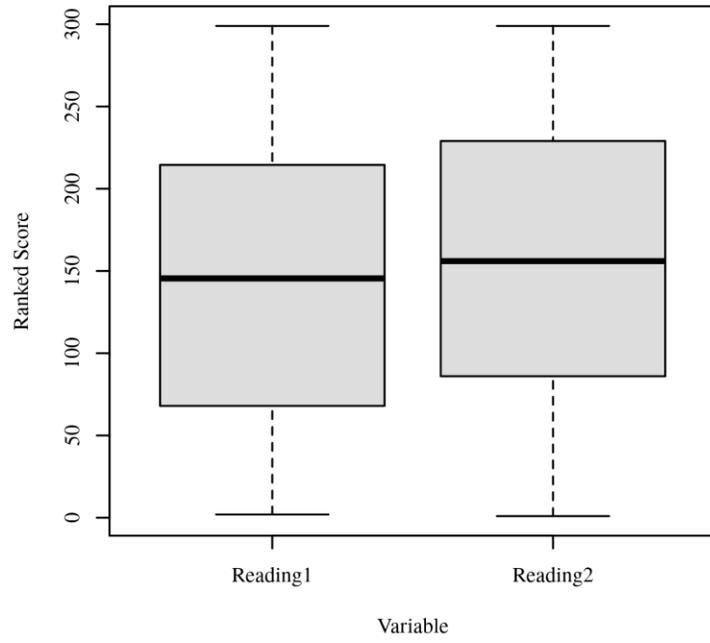
References

Conover, W. J., & Iman, R. L. (1981). Rank transformations as a bridge between parametric and

nonparametric statistics. *The American Statistician, 35*(3), 124-129.

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https://statistics.intellectus360.com

Glossaries

Wilcoxon Signed Rank

The Wilcoxon Signed Rank test is a non-parametric test used to assess for significant differences between two scale or ordinal variables that can be matched. Typically, the variables are matched by time (such as pretest vs. posttest), but the data can also be matched by other characteristics (such as husband vs. wife). This test ranks the pairs of scores by the magnitude of the differences between each matched pair, then sums the signed ranks to compute the V statistic. The V statistic is then used to compute z, which in turn is used to compute the p-value (i.e., significance level). A significant result for this test suggests that the two matched variables are reliably different from each other (e.g., pretest scores are significantly different from posttest scores). The Wilcoxon Signed Rank test assumes that the variables under investigation are scale or ordinal level.

Fun Fact! *The Wilcoxon Signed Rank test is named after Frank Wilcoxon, a chemist who published more than 70 papers over the course of his career.*

Non-Parametric Test: A type of statistical test that does not require the data to follow a particular distribution; typically used when assumptions of a parametric test are violated or when the data do not fit the level of measurement required by a parametric test.

***p*-value:** The probability of obtaining the observed results if the null hypothesis (no relationship between the independent variable(s) and dependent variable) is true; in most social science research, a result is considered statistically significant if this value is $\leq .05$.

***V*-Test Statistic (*V*):** Represents the sum of the signed ranks; used to compute the z.

***z*-Test Statistic (*z*):** Used to compute the p value.

Raw Output

Two-Tailed Wilcoxon Signed Rank Test for Reading1 and Reading2

Included Variables:
Reading1 and Reading2

Sample Size (Complete Cases):
N = 150

Results:
$V = 738.000$, $z = -9.190$, $p = 3.916 \times 10^{-20}$

Medians:
Reading1 = 84.300 and Reading2 = 85.195