One Sample t Test

Group Statistics CI % : 95

Variable	N	M	SD	SE	Lower	Upper
Total	8	4.000	3.117	1.102	1.394	6.606

One Sample T Test Test: 7.000

t	df	p	Diff.	SE	Lower	Upper
-2.722	7	0.030	-3.000	1.102	-5.606	-0.394

These statistics were obtained using same formulas as in the previous section on Frequencies and Descriptives.

The Standard Error of the Difference ("SE") provides an estimate of how spread out the distribution of all possible random sample mean differences would be. Here it's calculated as:

$$SE_M = \frac{SD}{\sqrt{N}} = \frac{3.117}{\sqrt{8}} = 1.102$$

This section provides a confidence interval around (centered on) the Mean Difference ("Diff"). Calculation requires the appropriate critical value. Specifically, the *t* statistic (with 7 *df*) that has a probability of .05 equals 2.365. As a result:

$$CI_{DIFF} = M_{DIFF} \pm (t_{CRITICAL})(SE_M) = -3.000 \pm (2.365)(1.102)$$

Thus, the researcher estimates that the true population mean difference is somewhere between -5.606 and -.394 (knowing that the estimate could be incorrect).

The Mean Difference ("Diff") is the difference between the sample mean (*M* = 4) and the user-specified test value (*u* = 7). For the example, the sample had a mean one point higher than the test value. This raw effect size is important for the significance test, the confidence interval, and the effect size.

The "t", "df", and "p" columns provide the results of the statistical significance test. First, *t* provides the standardized statistic for the mean difference:

$$t = \frac{M - \mu}{SE_M} = \frac{-3.000}{1.102} = -2.722$$

The *t* statistic follows a non-normal (studentized or *t*) distribution that depends on degrees of freedom. Here, *df* = *N* – 1 = 8 – 1 = 7. A *t* with 7 *df* that equals -2.722 has a two-tailed probability (*p*) of .030, a statistically significant finding.