One Sample t Test

(Note that some aspects of this output have been rearranged for the sake of presentation!)

These values of the one-sample statistics are identical to the values that would be provided by the "Descriptives" commands. See the earlier annotated output for details of how these are computed from frequency distributions.

Descriptives

	N	Mean	SD	SE
Outcome	8.000	4.000	3.117	1.102

The "Standard Error of the Mean" provides an estimate of how spread out the distribution of all possible random sample means would be. Here it's calculated as:

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

One Sample T-Test

	t	df	p	Mean Difference	Cohen's d	95% Confidence Interval	
						Lower	Upper
Outcome	-2.722	7	0.030	-3.000	-0.963	-5.606	-0.394

Note. All tests, hypothesis is population mean is different from 6

"Cohen's d" provides a standardized effect size for the difference between the two means.

$$d = \frac{M - \mu}{SD} = \frac{-3.000}{3.117} = 0.963$$

Given Cohen's heuristics for interpreting effect sizes, this would be considered a large effect.

The "statistic", "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.

The "Mean Difference" 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.

This section provides a confidence interval around (centered on) the "Mean." 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).