One Sample t Test

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

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Outcome	8	4.0000	3.11677	1.10195

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 Test

	Test Value = 7					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Outcome	-2.722	7	.030	-3.00000	-5.6057	-.3943

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 both the significance test and the confidence interval.

The “t”, “df”, and “Sig.” 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.

This section provides a confidence interval around (centered on) the “Mean Difference.” 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).