$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\left(\frac{(N_1-1)s_1^2 + (N_2-1)s_2^2}{N_1+N_2-2}\right)\left(\frac{1}{N_1}+\frac{1}{N_2}\right)}}$$

Social Science Statistics

T-Test Calculator for 2 Independent Means

Success!

Explanation of results

The output of this calculator is pretty straightforward. The values of *t* and *p* appear at the bottom of the page. If the text is blue, your result is significant; if it's red, it's not. The only thing that might catch you out is the way that we've rounded the data. The data you see in front of you, apart from the *t* and *p* values at the page bottom, has been rounded to 2 significant figures. However, we did not round when actually calculating the values of *t* and *p*. This means if you try to calculate these values on the basis of the summary data provided here, you're likely going to end up with a different, less accurate, result. This is especially the case if you're dealing with numbers that are fractions of 1.

Treatment 1 (*X*)	*Diff* (*X* - *M*)	*Sq. Diff* (*X* - *M*)^2
52	3.60	12.96
45	-3.40	11.56
50	1.60	2.56
49	0.60	0.36
52	3.60	12.96
47	-1.40	1.96
49	0.60	0.36
45	-3.40	11.56
51	2.60	6.76
44	-4.40	19.36
	M: 48.40	SS: 80.40

Treatment 2 (*X*)	*Diff* (*X* - *M*)	*Sq. Diff* (*X* - *M*)^2
51	-2.40	5.76
53	-0.40	0.16
54	0.60	0.36
52	-1.40	1.96
59	5.60	31.36
42	-11.40	129.96
57	3.60	12.96
59	5.60	31.36
49	-4.40	19.36
58	4.60	21.16
	M: 53.40	SS: 254.40

Significance Level:

Difference Scores Calculations

N_2: 10
$df_2 = N - 1 = 10 - 1 = 9$
M_2: 53.4
SS_2: 254.4
$s^2_2 = SS_2/(N - 1) = 254.4/(10-1) = 28.27$

T-value Calculation

$s^2_p = ((df_1/(df_1 + df_2)) * s^2_1) + ((df_2/(df_2 + df_2)) * s^2_2) = ((9/18) * 8.93) + ((9/18) * 28.27) = 18.6$

$s^2_{M_1} = s^2_p/N_1 = 18.6/10 = 1.86$
$s^2_{M_2} = s^2_p/N_2 = 18.6/10 = 1.86$

$t = (M_1 - M_2)/\sqrt{(s^2_{M_1} + s^2_{M_2})} = -5/\sqrt{3.72} = -2.59$

The *t*-value is -2.59238. The *p*-value is .009196. The result is significant at $p < .05$.

Note: If you wish to calculate the effect size, this calculator will do the job.

Want to know how to report this *t*-test result in your work? (Opens in a new tab so you don't lose your calculation.)

How to report a *t*-test result (APA)

Calculate T and P Values Reset