

How to Easily Report T-Test Results: A Step-by-Step Guide

Authored by
stats writer

December 5, 2025

RECOMMENDED CITATION

stats writer (2025). *How to Easily Report T-Test Results: A Step-by-Step Guide*.
PSYCHOLOGICAL SCALES. Retrieved from <https://scales.arabpsychology.com/?p=105558>

The Essentials of Reporting T-Test Results

Accurately reporting statistical findings is fundamental to reproducible research. The t-test is one of the most frequently used statistical procedures, and its results must be presented clearly, often adhering to standards like those set by the American Psychological Association (APA). A complete report includes descriptive statistics (means and standard deviations), the inferential statistics (t-statistic, degrees of freedom, and p-value), and a clear statement regarding the statistical significance of the findings.

This guide provides formalized templates and practical examples for reporting the three primary types of t-tests: the one-sample t-test, the independent samples t-test, and the paired samples t-test. When synthesizing your output, remember that all necessary statistical values must be integrated into a cohesive, narrative sentence, making the conclusion immediately accessible to the reader.

1. Reporting the One-Sample T-Test: Format and Context

The one-sample t-test is employed when researchers aim to determine if the mean of a single group differs significantly from a known constant or hypothesized value, often referred to as the population mean. This format ensures that the reader understands the comparison being made and the outcome of the hypothesis test.

Use the following standardized format to report the results of a one-sample t-test, filling in the bracketed placeholders with your specific statistical results and variable names:

A one-sample t-test was performed to compare against the hypothesized population mean of .

The observed mean value of (M = , SD =) was significantly than the population mean; $t(df) = , p = .$

When stating the conclusion, be specific: if the result is significant (typically $p < .05$), you must specify whether the sample mean was **significantly higher**, **significantly lower**, or merely **significantly different** than the population parameter, depending on the research hypothesis.

Example: Reporting Results of a One-Sample T-Test (Botanist Study)

In this example, a botanist hypothesizes that the mean height of a particular plant species is 15 inches. She collects a random sample of 12 plants and conducts a one-sample t-test to test this null hypothesis. This test helps determine if the sample mean deviates substantially enough from 15 inches to be considered a statistically meaningful difference.

The results generated by the statistical analysis package are crucial for composing the final report. The following screenshot displays the necessary descriptive and inferential statistics:

→ T-Test

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
height	12	14.3333	1.37069	.39568

One-Sample Test

Test Value = 15

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
height	-1.685	11	.120	-.66667	-1.5376	.2042

Based on the output, the sample mean height (M) is 14.33 inches, with a standard deviation (SD) of 1.37. The inferential statistics show $t(11) = -1.685$, and crucially, the p-value is .120. Since the p-value (.120) is greater than the standard alpha level of .05, we fail to reject the null hypothesis, indicating no significant difference.

A one-sample t-test was performed to compare the mean height of a certain species of plant against the hypothesized population mean of 15 inches.

The mean value of height ($M = 14.33$, $SD = 1.37$) was **not significantly different** than the population mean; $t(11) = -1.685$, $p = .120$. This indicates that the observed height of the sampled plants is statistically consistent with the expected population height of 15 inches.

2. Reporting the Independent Samples T-Test: Format and Context

The independent samples t-test is designed to compare the means of two distinct groups, such as comparing the effectiveness of two different medications or the performance between two demographic segments. Since the groups are independent (i.e., participants in one group cannot be in the other), the variability within each group contributes to the overall calculation of the t-statistic.

The reporting format must provide the descriptive statistics for **both** groups being compared, allowing readers to assess the magnitude of the difference alongside the statistical significance:

An independent samples t-test was performed to compare between and .

There a **significant difference** in between ($M = , SD =)$ and ($M = , SD =)$; $t(df) = , p = .$

It is important to clearly label the means and standard deviation for each group, ensuring that Group 1 statistics correspond correctly to Group 1, and similarly for Group 2. For the independent t-test, the degrees of freedom (df) calculation often requires attention to the assumption of equal variances, although the statistical software typically handles this complexity.

Example: Reporting Results of an Independent Samples T-Test (Fuel Treatment Study)

Researchers conducted an experiment to assess if a new fuel treatment improves the average miles per gallon (MPG) of a car. They used an independent samples design: 12 cars received the new treatment (experimental group), and 12 cars received no treatment (control group).

The following statistical output was generated from the independent samples analysis, providing the necessary statistical information for the report:

T-Test

Group Statistics					
	group	N	Mean	Std. Deviation	Std. Error Mean
mpg	.00	12	21.0000	2.73030	.78817
	1.00	12	22.7500	3.25087	.93845

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
mpg	Equal variances assumed	.034	.855	-1.428	22	.167	-1.75000	1.22552	-4.29157	.79157
	Equal variances not assumed			-1.428	21.362	.168	-1.75000	1.22552	-4.29597	.79597

The descriptive statistics show that the fuel treatment group averaged $M = 22.75$ MPG ($SD = 3.25$), compared to the no-treatment group, which averaged $M = 21$ MPG ($SD = 2.73$). The inferential test results were $t(22) = -1.428$, yielding a p-value of .167. Since .167 is greater than .05, we conclude there is no statistically significant difference in MPG between the two groups.

An independent samples t-test was performed to compare miles per gallon (MPG) between the fuel treatment group and the no-fuel treatment group.

There was **not a significant difference** in MPG between the fuel treatment group ($M = 22.75$, $SD = 3.25$) and the no fuel treatment group ($M = 21$, $SD = 2.73$); $t(22) = -1.428$, $p = .167$. The results suggest the new fuel treatment did not significantly impact mileage in this between-subjects comparison.

3. Reporting the Paired Samples T-Test: Format and Context

The paired samples t-test is used when the data points are dependent, typically resulting from measuring the same subjects under two different conditions (e.g., pre-test vs. post-test). This design controls for individual variability, often resulting in higher statistical power than the independent samples test. The test focuses on the mean difference between the pairs.

The reporting structure for the paired samples t-test must clearly identify the two measurement points or conditions:

A paired samples t-test was conducted to compare under two conditions: and .

There a **significant difference** in between ($M = , SD =$) and ($M = , SD =$); $t(df) = , p = .$

For the paired samples test, the degrees of freedom (df) is always equal to the number of pairs minus one ($N - 1$). This simplicity in calculation is a key feature of analyzing dependent samples. It is important to emphasize that while the descriptive statistics are reported for both conditions, the t-statistic itself is derived from the mean difference score.

Example: Reporting Results of a Paired Samples T-Test (Paired Design)

In this alternative experiment, the same 12 cars were measured for MPG **before** receiving the fuel treatment and again **after** receiving the fuel treatment. This dependent design aims to maximize the ability to detect change caused by the treatment within each vehicle.

The analysis output shows the following key results, focusing on the paired difference:

→ T-Test

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	mpg1	21.0000	12	2.73030	.78817
	mpg2	22.7500	12	3.25087	.93845

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	mpg1 & mpg2	12	.604	.037

Paired Samples Test

		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	mpg1 - mpg2	-1.75000	2.70101	.77971	-3.46614	-.03386	-2.244	11	.046

The descriptive statistics remain similar to the previous example: treatment ($M = 22.75$, $SD = 3.25$) and no treatment ($M = 21$, $SD = 2.73$). However, due to the elimination of between-car variability, the paired test reveals $t(11) = -2.244$, with a p-value of .046. Since .046 is less than the conventional alpha level of .05, we now find a statistically significant effect.

A paired samples t-test was performed to compare miles per gallon (MPG) for the same vehicles before and after receiving the new fuel treatment.

There was a **significant difference** in MPG between the fuel treatment condition ($M = 22.75$, $SD = 3.25$) and the no fuel treatment condition ($M = 21$, $SD = 2.73$); $t(11) = -2.244$, $p = .046$. The results confirm that the new fuel treatment led to a statistically significant improvement in the vehicles' average mileage.

Key Statistical Notation Explained and Interpreted

Understanding the standard abbreviations used in statistical reporting is crucial for interpreting the results accurately. These notations summarize the descriptive and inferential statistics of the analysis:

M (Mean): This represents the sample mean, which is the average score of the variable of interest within that specific group.

SD (Standard Deviation): This is the measure of data dispersion. It indicates the average distance between the scores and the mean. A small SD suggests scores are tightly clustered around the mean.

t (t-statistic): This value represents the calculated test statistic. It is the ratio of the difference between the sample means (or the sample mean and the population mean) to the standard error of the difference.

df (Degrees of Freedom): This value determines the specific distribution used to calculate the p-value. For instance, in a paired t-test with 12 pairs, the df is 11.

p (P-value): The probability of obtaining a test statistic at least as extreme as the one observed, assuming the null hypothesis is true. If $p < .05$, the result is considered statistically significant.

The standard reporting format for the t-test always follows the sequence: **t(df) = t-value, p = p-value**. Mastering this concise presentation is key to professional statistical communication.

Use the following calculators to automatically perform various t-tests and generate the necessary descriptive and inferential statistics: