

How to Find the P-value Using a t-Distribution Table

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The P-value from the t-distribution table is a statistical measure used to determine the probability of obtaining a test statistic as extreme as the one observed in a t-test, assuming the null hypothesis is true. It is calculated by comparing the observed t-value to the critical t-value from the t-distribution table. A lower P-value indicates stronger evidence against the null hypothesis, while a higher P-value suggests that the observed data is likely to have occurred by chance. The t-distribution table is used to find the critical t-value at a given significance level, which is compared to the calculated t-value to determine the P-value. Overall, the P-value from the t-distribution table is a crucial tool in determining the statistical significance of results in t-tests.

Here is Find the P-Value from the t-Distribution Table

The t distribution table is a table that shows the critical values of the t distribution. To use the t distribution table, you only need three values:

A significance level (common choices are 0.01, 0.05, and 0.10) The degrees of freedom The type of test (one-tailed or two-tailed)

	P						
one-tail	0.1	0.05	0.025	0.01	0.005	0.001	0.0005
two-tails	0.2	0.1	0.05	0.02	0.01	0.002	0.001
DF							
1	3.078	6.314	12.706	31.821	63.656	318.289	636.578
2	1.886	2.92	4.303	6.965	9.925	22.328	31.6
3	1.638	2.353	3.182	4.541	5.841	10.214	12.924
4	1.533	2.132	2.776	3.747	4.604	7.173	8.61
5	1.476	2.015	2.571	3.365	4.032	5.894	6.869
6	1.44	1.943	2.447	3.143	3.707	5.208	5.959
7	1.415	1.895	2.365	2.998	3.499	4.785	5.408
8	1.397	1.86	2.306	2.896	3.355	4.501	5.041
9	1.383	1.833	2.262	2.821	3.25	4.297	4.781
10	1.372	1.812	2.228	2.764	3.169	4.144	4.587
11	1.363	1.796	2.201	2.718	3.106	4.025	4.437
12	1.356	1.782	2.179	2.681	3.055	3.93	4.318
13	1.35	1.771	2.16	2.65	3.012	3.852	4.221
14	1.345	1.761	2.145	2.624	2.977	3.787	4.14
15	1.341	1.753	2.131	2.602	2.947	3.733	4.073
16	1.337	1.746	2.12	2.583	2.921	3.686	4.015
17	1.333	1.74	2.11	2.567	2.898	3.646	3.965
18	1.33	1.734	2.101	2.552	2.878	3.61	3.922
19	1.328	1.729	2.093	2.539	2.861	3.579	3.883
20	1.325	1.725	2.086	2.528	2.845	3.552	3.85
21	1.323	1.721	2.08	2.518	2.831	3.527	3.819
22	1.321	1.717	2.074	2.508	2.819	3.505	3.792
23	1.319	1.714	2.069	2.5	2.807	3.485	3.768
24	1.318	1.711	2.064	2.492	2.797	3.467	3.745
25	1.316	1.708	2.06	2.485	2.787	3.45	3.725
26	1.315	1.706	2.056	2.479	2.779	3.435	3.707
27	1.314	1.703	2.052	2.473	2.771	3.421	3.689
28	1.313	1.701	2.048	2.467	2.763	3.408	3.674
29	1.311	1.699	2.045	2.462	2.756	3.396	3.66
30	1.31	1.697	2.042	2.457	2.75	3.385	3.646
60	1.296	1.671	2	2.39	2.66	3.232	3.46
120	1.289	1.658	1.98	2.358	2.617	3.16	3.373
1000	1.282	1.646	1.962	2.33	2.581	3.098	3.3
Inf	1.282	1.645	1.96	2.326	2.576	3.091	3.291

t distribution table

The t distribution table is commonly used in the following hypothesis tests:

A hypothesis test for a mean
A hypothesis test for a difference in means
A hypothesis test for a difference in

paired means

When you conduct each of these tests, you'll end up with a test statistic t . To find out if this test statistic is statistically significant at some alpha level, you have two options:

Compare the test statistic t to a critical value from the t distribution table. Compare the p-value of the test statistic t to a chosen alpha level.

Let's walk through an example of how to use each of these approaches.

Examples

Suppose we conduct a two-sided hypothesis test at alpha level 0.05 to find out if mean weight loss differs between two diets. Suppose our test statistic t is 1.34 and our degrees of freedom is 22. We would like to know if these results are statistically significant.

Compare the test statistic t to a critical value

The first approach we can use to determine if our results are statistically significant is to compare the test statistic t of 1.34 to the critical value in the t distribution

table. The critical value is the value in the table that aligns with a two-tailed value of 0.05 and a degrees of freedom of 22. This number turns out to be 2.074:

	P						
one-tail	0.1	0.05	0.025	0.01	0.005	0.001	0.0005
two-tails	0.2	0.1	0.05	0.02	0.01	0.002	0.001
DF							
1	3.078	6.314	12.706	31.821	63.656	318.289	636.578
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20	1.325	1.725	2.086	2.528	2.845	3.552	3.85
21	1.323	1.721	2.08	2.518	2.831	3.527	3.819
22	1.321	1.717	2.074	2.508	2.819	3.505	3.792

Since our test statistic t (1.34) is smaller than the critical value (2.074), we fail to reject the null hypothesis of our test. We do not have sufficient evidence to say that the mean weight loss between the two diets is statistically significant at alpha level 0.05.

Compare the p-value to a chosen alpha level

The second approach we can use to determine if our results are statistically significant is to find the p-value for the test statistic t of 1.34. In order to find this p-value, we can't use the t distribution table because it only provides us with critical values, not p-values.

So, in order to find this p-value we need to use a with the following inputs:

T Score to P Value Calculator

t score

Degrees of freedom

One-tailed or two-tailed hypothesis?

One-tailed



Two-tailed



Significance level

0.01



0.05



0.10



CALCULATE

P-value: 0.19392

The result is NOT SIGNIFICANT at $p < 0.05$

The p-value for a test statistic t of 1.34 for a two-tailed test with 22 degrees of freedom is 0.19392. Since this number is greater than our alpha level of 0.05, we fail to reject the null hypothesis of our test. We do not have sufficient evidence to say that the mean weight loss between the two diets is statistically significant at alpha level 0.05.

When to Use the t Distribution Table

If you are interested in finding the t critical value for a given significance level, degrees of freedom, and type of test (one-tailed or two-tailed), then you should use

the .

Instead, if you have a given test statistic t and you simply want to know the p-value of that test statistic, then you would need to use a to do so.

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