8.3.1: Table of Critical t-scores

Student's t Distribution

Table 8.3.1.1, which follows Figure 8.3.1.1, shows the critical t-score. If the absolute value of your calculated t-score is bigger (more extreme) than the critical t-score, then you reject the null hypothesis. In Figure 8.3.1.1, the critical t-score is represented by the line; if the absolute value of the calculated t-score is to the left (where the alpha sign is, α), then the null hypothesis should be rejected.

Standard normal curve with line representing the critical t-score on the extreme right side showing the Alpha.

Figure 8.3.1.1 - Upper critical values of Student's t Distribution (CC-BY by Barbara Illowsky & Susan Dean (De Anza College) from OpenStax)

Note

Remember

Critical < |Calculated| = Reject null = means are different = p<.05

Critical > |Calculated| = Retain null = means are similar = p>.05

Table of Critical Values for **Student's t**

Table 8.3.1.1 shows the critical t-scores for different probabilities (p-values) that represent how likely it would be to get a calculated t-scores this big if the sample was really from the population, by the Degrees of Freedom (df, to represent the size of the sample). More information Degrees of Freedom is below the table. If we think that the sample is not from the population, we would expect a larger t-score and want a small p-value.

Table 8.3.1.1 - Table of Critical t-values

Degrees of Freedom (df)	p = 0.10	p = 0.05	p = 0.025	p = 0.01
1	3.078	*6.314*	12.706	31.821
2	1.886	*2.920*	4.303	6.965
3	1.638	*2.353*	3.182	4.541
4	1.533	*2.132*	2.776	3.747
5	1.476	*2.015*	2.571	3.365
6	1.440	*1.943*	2.447	3.143
7	1.415	*1.895*	2.365	2.998
8	1.397	*1.860*	2.306	2.896
9	1.383	*1.833*	2.262	2.821
10	1.372	*1.812*	2.228	2.764
11	1.363	*1.796*	2.201	2.718
12	1.356	*1.782*	2.179	2.681
13	1.350	*1.771*	2.160	2.650
14	1.345	*1.761*	2.145	2.624
15	1.341	*1.753*	2.131	2.602
16	1.337	*1.746*	2.120	2.583
17	1.333	*1.740*	2.110	2.567
18	1.330	*1.734*	2.101	2.552

Degrees of Freedom (df)	p = 0.10	p = 0.05	p = 0.025	p = 0.01
19	1.328	*1.729*	2.093	2.539
20	1.325	*1.725*	2.086	2.528
21	1.323	*1.721*	2.080	2.518
22	1.321	*1.717*	2.074	2.508
23	1.319	*1.714*	2.069	2.500
24	1.318	*1.711*	2.064	2.492
25	1.316	*1.708*	2.060	2.485
26	1.315	*1.706**	2.056	2.479
27	1.314	*1.703*	2.052	2.473
28	1.313	*1.701*	2.048	2.467
29	1.311	*1.699*	2.045	2.462
30	1.310	*1.697*	2.042	2.457
40	1.303	*1.684*	2.021	2.423
60	1.296	*1.671*	2.000	2.390
100	1.290	*1.660*	1.984	2.364
∞	1.282	*1.645*	1.960	2.326

Degrees of Freedom

- One-Sample t-test: N-1
- Independent Sample t-test: $N_1 + N_2 - 2$
- Dependent Sample t-test: N-1 (in which N is the *number of pairs*)

Because tables are limited by size, not all critical t-scores are listed. There are a couple of options when your Degrees of Freedom is not listed on the table.

- One option is to use the Degrees of Freedom that is *closest* to your sample's Degrees of Freedom. For example, if your df = 49. you would use the df row for 40, (so a p=0.05 would have a critical value of 1.684). If your df=55, you would use the df row for 60. It's sorta silly, but, mathematically, any score is closer to df=100 than infinity (∞), so if your sample is more than 100 scores, use df=100.
- Another option is to always we round down. For our example of df=49, we would still use the df row for 40. If your df=55, you would still use the df row for 40. And if your sample is more than 100 scores, use df=100. This option avoids inflating Type I Error (false positives).

Ask your professor which option you should use!

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