14.7.1: Table of Critical Values of r

When using this table, we're following the general pattern of rejecting the null hypothesis when the calculated value is larger than the critical value. The only difference from what we've been doing is the null hypothesis is not about whether group means are similar or not.

Note

$$\textbf{(Critical} < \textbf{Calculated)} = \textbf{Reject null} = \textbf{There is a linear relationship.} = p < .05$$

$$\textbf{(Critical} > \textbf{Calculated)} = \textbf{Retain null} = \textbf{There is not a linear relationship.} = p > .05$$

Table of Critical Values of r

Table 14.7.1.1 is a simplified and accessible version of the table in Real Statistics Using Excel by Dr. Charles Zaiontz. Table 14.7.1.1 shows the critical scores of Pearson's r for different probabilities (p-values) that represent how likely it would be to get a calculated correlation this extreme if the two variables were unrelated in the population, by the Degrees of Freedom (df) to represent the size of the sample. For Pearson's r, the Degrees of Freedom are N-2.

Table 14.7.1.1- Critical Values for Pearson's r

Degrees of Freedom (df)	p = 0.1	p = 0.05	p = 0.01
1	0.988	0.997	1.000
2	0.900	0.950	0.990
3	0.805	0.878	0.959
4	0.729	0.811	0.917
5	0.669	0.754	0.875
6	0.621	0.707	0.834
7	0.582	0.666	0.798
8	0.549	0.632	0.765
9	0.521	0.602	0.735
10	0.497	0.576	0.708
11	0.476	0.553	0.684
12	0.458	0.532	0.661
13	0.441	0.514	0.641
14	0.426	0.497	0.623
15	0.412	0.482	0.606
16	0.400	0.468	0.590
17	0.389	0.456	0.575
18	0.378	0.444	0.561
19	0.369	0.433	0.549
20	0.360	0.423	0.537
21	0.352	0.413	0.526
22	0.344	0.404	0.515

Degrees of Freedom (df)	p = 0.1	p = 0.05	p = 0.01
23	0.337	0.396	0.505
24	0.330	0.388	0.496
25	0.323	0.381	0.487
26	0.317	0.374	0.479
27	0.311	0.367	0.471
28	0.306	0.361	0.463
29	0.301	0.355	0.456
30	0.296	0.349	0.449
35	0.275	0.325	0.418
40	0.257	0.304	0.393
45	0.243	0.288	0.372
50	0.231	0.273	0.354
60	0.211	0.250	0.325
70	0.195	0.232	0.302
80	0.183	0.217	0.283
90	0.173	0.205	0.267
100	0.164	0.195	0.254
150	0.134	0.159	0.208
200	0.116	0.138	0.181
300	0.095	0.113	0.148
400	0.082	0.098	0.128
500	0.073	0.088	0.115
700	0.062	0.074	0.097
1000	0.052	0.062	0.081
5000	0.023	0.028	0.036

Because tables are limited by size, not all critical values are listed. For example, if you had 100 participants, your Degrees of Freedom would be 98 (df=N-2=100-2=98=100). However, the table provides df=90 or df=100. 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 our example of r (98), that would mean that we would use the Degrees of Freedom of 100 because 98 is closer to 100 than to 90. That would mean that the critical r-value for r(98) would be 0.194604 for a p-value of 0.05.
- Another option is to always we round down. For our example of N=100, we use the Degrees of Freedom of 90 because it is the next lowest df listed. That would mean that the critical r-value for r(98) would be 0.204968 for a p-value of 0.05. This option avoids inflating Type I Error (false positives).

Ask your professor which option you should use!

Whichever option you choose, your statistical sentence should include the actual degrees of freedom , regardless of which number is listed in the table; the table is used to decide if the null hypothesis should be rejected or retained.

Contributors and Attributions

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& Real Statistics Using Excel by Dr. Charles Zaiontz