Table 1

Power of the One Sample t for Two-tailed Alpha Level = .05

Tabled entries are power to detect an effect size equal to the column header with a sample whose size is the row header.

Sample Size	Effect Size = .2	Effect Size = .5	Effect Size = .8
10	0.09	0.32	0.67
15	0.12	0.46	0.85
20	0.14	0.59	0.94
25	0.17	0.69	0.97
30	0.19	0.77	0.99
35	0.21	0.83	1.00
40	0.24	0.88	1.00
45	0.26	0.91	1.00
50	0.29	0.94	1.00
55	0.31	0.96	1.00
60	0.34	0.97	1.00
65	0.36	0.98	1.00
70	0.38	0.99	1.00
75	0.41	0.99	1.00
80	0.43	0.99	1.00
85	0.45	1.00	1.00
90	0.47	1.00	1.00
95	0.49	1.00	1.00
100	0.51	1.00	1.00
120	0.59	1.00	1.00
140	0.65	1.00	1.00
160	0.71	1.00	1.00
180	0.76	1.00	1.00
200	0.81	1.00	1.00
300	0.93	1.00	1.00
400	0.98	1.00	1.00
500	0.99	1.00	1.00
GPOWER ES:	0.2828	0.7071	1.1314

If you can't find the desired sample size in the leftmost column, use the next smaller tabled value.

This table was prepared using the program GPOWER (Erdfelder, Faul, & Buchner, 1996; Faul & Erdfelder, 1992.) Cohen's (1988, pp. 45-47) recommendations concerning modification of input values appropriate for the one sample t were employed: Effect sizes used as input for GPOWER were 1.414 times the values .2, .5, and .8.

References

Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Hillsdale, NJ: Erlbaum.

Faul, F. & Erdfelder, E. (1992). GPOWER: A priori-, post hoc-, and compromise power analyses for MS-DOS [Computer Program]. Bonn, Germany: Bonn University.

Erdfelder, E., Faul, F. & Buchner, A. (1996). GPOWER: A general power analysis program. Behavior Research Methods, Instruments, & Computers, 28(1), 1-11.

Table 2

Power of the Independent Groups t for Two-tailed Alpha Level = .05

Tabled entries are power to detect an effect size equal to the column header with samples whose sizes are specified in the row header.

Sample Sizes	Effect Size = .2	Effect Size = .5	Effect Size = .8
N_1=10; N_2=10	0.07	0.19	0.40
N_1=15; N_2=15	0.08	0.26	0.56
N_1=20; N_2=20	0.09	0.34	0.69
N_1=25; N_2=25	0.11	0.41	0.79
N_1=30; N_2=30	0.12	0.48	0.86
N_1=35; N_2=35	0.13	0.54	0.91
N_1=40; N_2=40	0.14	0.60	0.94
N_1=45; N_2=45	0.16	0.65	0.96
N_1=50; N_2=50	0.17	0.70	0.98
N_1=55; N_2=55	0.18	0.74	0.99
N_1=60; N_2=60	0.19	0.78	0.99
N_1=65; N_2=65	0.20	0.81	0.99
N_1=70; N_2=70	0.22	0.84	1.00
N_1=75; N_2=75	0.23	0.86	1.00
N_1=80; N_2=80	0.24	0.88	1.00
N_1=85; N_2=85	0.25	0.90	1.00
N_1=90; N_2=90	0.27	0.92	1.00
N_1=95; N_2=95	0.28	0.93	1.00
N_1=100 N_2=100	0.29	0.94	1.00
N_1=120; N_2=120	0.34	0.97	1.00
N_1=140; N_2=140	0.39	0.99	1.00
N_1=160; N_2=160	0.43	0.99	1.00
N_1=180; N_2=180	0.47	1.00	1.00
N_1=200; N_2=200	0.51	1.00	1.00
N_1=300; N_2=300	0.69	1.00	1.00
N_1=400; N_2=400	0.81	1.00	1.00
N_1=500; N_2=500	0.88	1.00	1.00

Note: This table was prepared using the program GPOWER (Erdfelder, Faul, & Buchner, 1996; Faul & Erdfelder, 1992.)

References

Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Hillsdale, NJ: Erlbaum.

Faul, F. & Erdfelder, E. (1992). GPOWER: A priori-, post hoc-, and compromise power analyses for MS-DOS [Computer Program]. Bonn, Germany: Bonn University.

Erdfelder, E., Faul, F. & Buchner, A. (1996). GPOWER: A general power analysis program. Behavior Research Methods, Instruments, & Computers, 28(1), 1-11.

Table 3

Power of the Correlated Groups t for Two-tailed Alpha Level = .05

Tabled entries are power to detect an effect size equal to the major column header with the number of pairs specified in the row header and correlation between paired values equal to the minor column header.

	Effect Size = .2				Effect Size = .5				Effect Size = .8			
	Correlation between pairs				Correlation between pairs				Correlation between pairs			
No. pairs	r=0	r=.3	r=.6	r=.9	r=0	r=.3	r=.6	r=.9	r=0	r=.3	r=.6	r=.9
10	0.07	0.08	0.10	0.27	0.19	0.24	0.39	0.92	0.40	0.53	0.76	0.99
15	0.08	0.10	0.13	0.39	0.26	0.35	0.55	0.99	0.56	0.72	0.92	1.00
20	0.09	0.11	0.16	0.50	0.34	0.45	0.68	1.00	0.69	0.84	0.97	1.00
25	0.11	0.13	0.19	0.59	0.41	0.54	0.78	1.00	0.79	0.91	0.99	1.00
30	0.12	0.15	0.23	0.67	0.48	0.62	0.85	1.00	0.86	0.95	1.00	1.00
35	0.13	0.17	0.26	0.74	0.54	0.69	0.90	1.00	0.91	0.98	1.00	1.00
40	0.14	0.18	0.29	0.80	0.60	0.75	0.94	1.00	0.94	0.99	1.00	1.00
45	0.16	0.20	0.32	0.84	0.65	0.80	0.96	1.00	0.96	0.99	1.00	1.00
50	0.17	0.22	0.35	0.88	0.70	0.84	0.97	1.00	0.98	1.00	1.00	1.00
55	0.18	0.24	0.38	0.91	0.74	0.87	0.98	1.00	0.99	1.00	1.00	1.00
60	0.19	0.25	0.40	0.93	0.78	0.90	0.99	1.00	0.99	1.00	1.00	1.00
65	0.20	0.27	0.43	0.95	0.81	0.92	0.99	1.00	0.99	1.00	1.00	1.00
70	0.22	0.29	0.46	0.96	0.84	0.94	1.00	1.00	1.00	1.00	1.00	1.00
75	0.23	0.31	0.49	0.97	0.86	0.95	1.00	1.00	1.00	1.00	1.00	1.00
80	0.24	0.32	0.51	0.98	0.88	0.96	1.00	1.00	1.00	1.00	1.00	1.00
85	0.25	0.34	0.54	0.98	0.90	0.97	1.00	1.00	1.00	1.00	1.00	1.00
90	0.2	0.36	0.56	0.99	0.92	0.98	1.00	1.00	1.00	1.00	1.00	1.00
95	0.28	0.37	0.58	0.99	0.93	0.98	1.00	1.00	1.00	1.00	1.00	1.00
100	0.29	0.39	0.60	0.99	0.94	0.99	1.00	1.00	1.00	1.00	1.00	1.00
120	0.34	0.45	0.68	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00
140	0.39	0.51	0.75	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
160	0.43	0.57	0.80	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
180	0.47	0.62	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
200	0.51	0.66	0.88	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
300	0.69	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
400	0.81	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
500	0.88	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ES:	.2000	.2390	.3162	.6325	.5000	.5976	.7906	1.581	.8000	.9562	1.265	2.540

Note that the values in the columns headed "r=0" are identical to those specified for the independent groups t.

Note: This table was prepared using the program GPOWER (Erdfelder, Faul, & Buchner, 1996; Faul & Erdfelder, 1992.) Cohen's (1988, pp. 48-50) recommendations concerning adjustments appropriate for different correlations between paired scores were followed. Specifically, effect sizes input to GPOWER were equal to nominal effect sizes divided by $\sqrt{(1-r)}$.

References

Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Hillsdale, NJ: Erlbaum.

Faul, F. & Erdfelder, E. (1992). GPOWER: A priori-, post hoc-, and compromise power analyses for MS-DOS [Computer Program]. Bonn, Germany: Bonn University.

Erdfelder, E., Faul, F. & Buchner, A. (1996). GPOWER: A general power analysis program. Behavior Research Methods, Instruments, & Computers, 28(1), 1-11.

Table 4

Sample Sizes for the One Sample t for Two-tailed Alpha Level = .05

Tabled entries are sample sizes required to detect an effect size equal to the column header with power equal to the row header.

Desired Power	Effect Size = .2	Effect Size = .5	Effect Size = .8
0.2	33	7	4
0.3	53	10	5
0.4	74	13	6
0.5	98	17	8
0.6	124	21	9
0.7	156	26	11
0.8	198	33	14
0.9	264	44	18
GPOWER ES:	0.2828	0.7071	1.131

If you can't find the desired power in the leftmost column, use the next larger tabled value.

This table was prepared using the program GPOWER (Erdfelder, Faul, & Buchner, 1996; Faul & Erdfelder, 1992.) Cohen's (1988, pp. 45-47) recommendations concerning modification of input values appropriate for the one sample t were employed: Effect sizes used as input for GPOWER were 1.414 times the values .2, .5, and .8.

References

Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Hillsdale, NJ: Erlbaum.

Faul, F. & Erdfelder, E. (1992). GPOWER: A priori-, post hoc-, and compromise power analyses for MS-DOS [Computer Program]. Bonn, Germany: Bonn University.

Erdfelder, E., Faul, F. & Buchner, A. (1996). GPOWER: A general power analysis program. Behavior Research Methods, Instruments, & Computers, 28(1), 1-11.

Table 5

Sample Sizes the Independent Groups t for Two-tailed Alpha Level = .05

Tabled entries are sample sizes required to detect an effect size equal to the column header with power equal to the row header.

Power	Effect Size = .2	Effect Size = .5	Effect Size = .8
0.2	N_1= 64; N_2= 64	N_1= 11; N_2= 11	N_1= 5; N_2= 5
0.3	N_1=104; N_2=104	N_1= 18; N_2= 18	N_1= 8; N_2= 8
0.4	N_1=147; N_2=147	N_1= 25; N_2= 25	N_1= 11; N_2= 11
0.5	N_1=194; N_2=194	N_1= 32; N_2= 32	N_1= 14; N_2= 14
0.6	N_1=246; N_2=246	N_1= 41; N_2= 41	N_1= 17; N_2= 17
0.7	N_1=310; N_2=310	N_1= 51; N_2= 51	N_1= 21; N_2= 21
0.8	N_1=394; N_2=394	N_1= 64; N_2= 64	N_1= 26; N_2= 26
0.9	N_1=527; N_2=527	N_1= 86; N_2= 86	N_1= 34; N_2= 34

If you can't find the desired power in the leftmost column, use the next larger tabled value.

Note: This table was prepared using the program GPOWER (Erdfelder, Faul, & Buchner, 1996; Faul & Erdfelder, 1992.)

References

Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Hillsdale, NJ: Erlbaum.

Faul, F. & Erdfelder, E. (1992). GPOWER: A priori-, post hoc-, and compromise power analyses for MS-DOS [Computer Program]. Bonn, Germany: Bonn University.

Erdfelder, E., Faul, F. & Buchner, A. (1996). GPOWER: A general power analysis program. Behavior Research Methods, Instruments, & Computers, 28(1), 1-11.

Table 6

Sample Sizes for the Correlated Groups t for Two-tailed Alpha Level = .05

Tabled entries are sample sizes (number of pairs) required to detect an effect size equal to the major column header with power equal to the row header and correlation between paired values equal to the minor column header.

	Effect Size = .2				Effect Size = .5				Effect Size = .8			
	Correlation between pairs				Correlation between pairs				Correlation between pairs			
Desired Power	r=0	r=.3	r=.6	r=.9	r=0	r=.3	r=.6	r=.9	r=0	r=.3	r=.6	r=.9
0.2	64	45	26	8	11	9	6	2	5	4	2	2
0.3	104	74	43	12	18	13	8	2	8	6	4	2
0.4	147	103	60	16	25	18	11	4	11	8	5	2
0.5	194	136	78	21	32	23	14	5	14	10	6	4
0.6	246	173	99	26	41	29	17	6	17	12	8	4
0.7	310	218	125	32	51	36	21	7	21	15	9	5
0.8	394	276	158	41	64	45	27	8	26	19	11	6
0.9	527	369	212	54	86	60	35	10	34	24	15	7
ES:	.2000	.2390	.3162	.6325	.5000	.5976	.7906	1.581	.8000	.9562	1.265	2.540

If you can't find the desired power in the leftmost column, use the next larger tabled value.

Note that the values in the columns headed "r=0" are identical to those specified for the independent groups t.

Note: This table was prepared using the program GPOWER (Erdfelder, Faul, & Buchner, 1996; Faul & Erdfelder, 1992.) Cohen's (1988, pp. 48-50) recommendations concerning adjustments appropriate for different correlations between paired scores were followed. Specifically, effect sizes input to GPOWER were equal to nominal effect sizes divided by $\sqrt{(1-r)}$.

References

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Faul, F. & Erdfelder, E. (1992). GPOWER: A priori-, post hoc-, and compromise power analyses for MS-DOS [Computer Program]. Bonn, Germany: Bonn University.

Erdfelder, E., Faul, F. & Buchner, A. (1996). GPOWER: A general power analysis program. Behavior Research Methods, Instruments, & Computers, 28(1), 1-11.

Table 7

Power of the Oneway Analysis of Variance for Two-tailed Alpha Level = .05

Tabled entries are power to detect an effect size equal to the column header with samples whose sizes are specified in the row header.

No. Groups	Two Groups			Three Groups			Four Groups			Five Groups			Six Groups		
Effect Size	.10	.25	.4	.10	.25	.40	.10	.25	.40	.10	.25	.40	.10	.25	.40
Group Size	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L
5	.06	.11	.2	.06	.11	.22	.06	.12	.24						
10	.07	.18	.4	.07	.20	.45	.07	.21	.50						
15	.08	.26	.57	.08	.29	.64	.08	.32	.71						
20	.09	.34	.70	.09	.38	.78	.10	.42	.84						
25	.10	.42	.80	.10	.47	.87	.11	.52	.92						
30	.11	.49	.87	.12	.55	.93	.13	.61	.96						
35	.12	.55	.92	.13	.62	.96	.14	.68	.98						
40	.14	.61	.95	.15	.68	.98	.16	.75	.99						
45	.15	.66	.96	.16	.74	.99	.17	.80	1.00						
50	.16	.71	.98	.18	.79	.99	.19	.85	1.00						
60	.19	.79	.99	.21	.86	1.00	.22	.91	1.00						
70	.21	.84	1.00	.23	.91	1.00	.26	.95	1.00						
80	.24	.89	1.00	.27	.94	1.00	.29	.97	1.00						
90	.26	.92	1.00	.29	.96	1.00	.32	.99	1.00						
100	.29	.94	1.00	.32	.98	1.00	.36	.99	1.00						
150	.41	.99	1.00	.46	1.00	1.00	.52	1.00	1.00						
200	.52	1.00	1.00	.59	1.00	1.00	.65	1.00	1.00						

Effect size is represented by $f = \sigma_M/\sigma$.

For two groups, f = d / 2, where d is the two-group effect size measure.

References

Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Hillsdale, NJ: Erlbaum.