Multiple Regression using Effect Size

Numeric Results

Model: Unconditional (Random X's)

Power	N	Independent Variables Controlled kc	Independent Variables Tested kT	Effect Size f²	Alpha	Beta
0.8002	762	0	8	0.020	0.050	0.1998
0.8010	111	0	8	0.150	0.050	0.1990
0.8045	54	0	8	0.350	0.050	0.1955
0.9001	966	0	8	0.020	0.050	0.0999
0.9004	139	0	8	0.150	0.050	0.0996
0.9051	67	0	8	0.350	0.050	0.0949

References

Gatsonis, C. and Sampson, A.R. 1989. 'Multiple Correlation: Exact Power and Sample Size Calculations.' Psychological Bulletin, Vol. 106, No. 3, Pages 516-524.

Benton, D. and Krishnamoorthy, K. 2003. 'Computing discrete mistures of continuous distributions: noncentral chisquare, noncentral t and the distribution of the square of the sample multiple correlation coefficient.' Computational Statistics & Data Analysis, Vol. 43, Pages 249-267.

Krishnamoorthy, K. and Xia, Y. 2008. 'Sample Size Calculation for Estimating or Testing a Nonzero Squared Multiple Correlation Coefficient.' Multivariate Behavioral Research, Vol. 43, Pages 382-410.

Cohen, Jacob. 1988. Statistical Power Analysis for the Behavioral Sciences, Lawrence Erlbaum Associates, Hillsdale, New Jersey.

Report Definitions

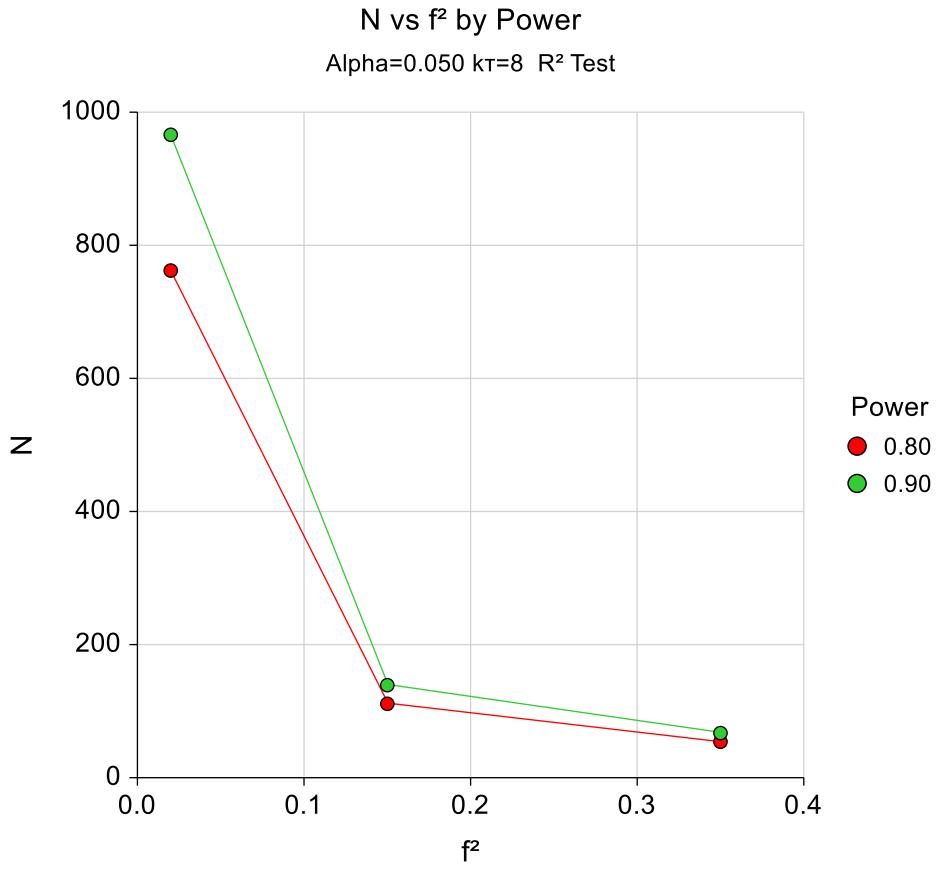
Power is the probability of rejecting a false null hypothesis.
N is the number of observations on which the multiple regression is computed.
kc is the number of independent variables controlled.
kT is the number of independent variables tested.
Ind. Variables Controlled are those variables whose influence is removed from experimental error.
Ind. Variables Tested are those variables whose regression coefficients are tested against zero.
f^2 is the effect size. It is calculated using $f^2 = \rho^2/(1 - \rho^2)$.
ρ^2 is squared multiple correlation coefficient of the variables begin tested.
Cohen's f^2 interpretation: 0.02 = small, 0.15 = medium, 0.35 = large.
Alpha is the probability of rejecting a true null hypothesis. It should be small.
Beta is the probability of accepting a false null hypothesis. It should be small.

Summary Statements

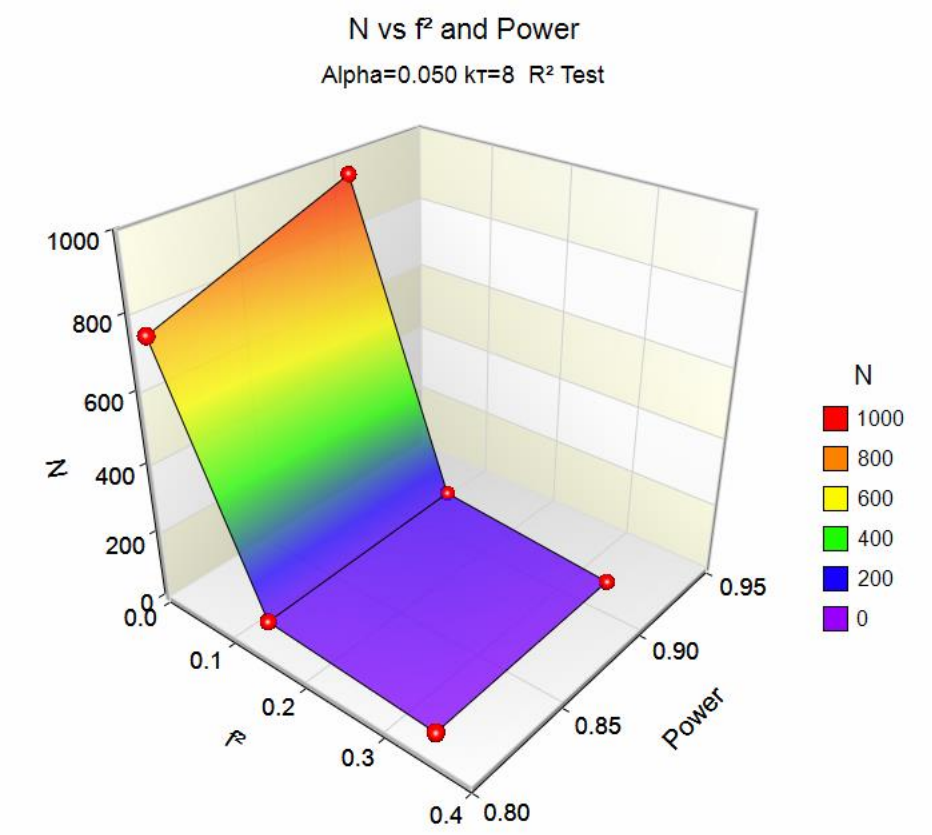
A sample size of 762 achieves 80% power to detect an effect size (f^2) of 0.020 attributable to 8 independent variable(s) using an F-Test with a significance level (alpha) of 0.050. The calculations assume an unconditional (random X's) model.

Multiple Regression using Effect Size

Chart Section



Multiple Regression using Effect Size



Procedure Input Settings

Autosave Inactive

Design Tab

Solve For:	Sample Size
Power:	0.8 0.9
Alpha:	0.05
Regression Model Type:	Unconditional (Random X's)
kc (Number of X's Controlled):	0
kT (Number of X's Tested):	8
f²:	0.02 0.15 0.35