

Don't Let the Power go to Your Head

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Scenario 1: One-Way ANOVA

The screenshot shows the G*Power 3.1.9.7 software interface. The 'Tests' tab is selected, showing 'ANOVA: Fixed effects, omnibus, one-way'. The 'Analysis' section is set to 'A priori: Compute required sample size'. The 'Input' section shows: Effect size f = 0.25, α err prob = 0.05, Power (1- β err prob) = 0.8, and Number of groups = 3. The 'Output' section shows: Noncentrality parameter λ = 9.9375000, Critical F = 3.0540042, Numerator df = 2, Denominator df = 156, Total sample size = 159, and Actual power = 0.8048873. The 'Test family' is 'F tests' and the 'Statistical test' is 'ANOVA: Fixed effects, omnibus, one-way'. The 'Type of power analysis' is 'A priori: Compute required sample size - given α , power, and effect size'. The 'Input Parameters' section has a 'Determine =>' button and input fields for Effect size f (0.25), α err prob (0.05), Power (1- β err prob) (0.8), and Number of groups (3). The 'Output Parameters' section has input fields for Noncentrality parameter λ (9.9375000), Critical F (3.0540042), Numerator df (2), Denominator df (156), Total sample size (159), and Actual power (0.8048873). At the bottom, there are buttons for 'X-Y plot for a range of values' and 'Calculate'.

G*Power 3.1.9.7

File Edit View Tests Calculator Help

Central and noncentral distributions Protocol of power analyses

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F tests – ANOVA: Fixed effects, omnibus, one-way

Analysis: A priori: Compute required sample size

Input: Effect size f = 0.25
 α err prob = 0.05
Power (1- β err prob) = 0.8
Number of groups = 3

Output: Noncentrality parameter λ = 9.9375000
Critical F = 3.0540042
Numerator df = 2
Denominator df = 156
Total sample size = 159
Actual power = 0.8048873

Test family: F tests Statistical test: ANOVA: Fixed effects, omnibus, one-way

Type of power analysis: A priori: Compute required sample size – given α , power, and effect size

Input Parameters

Determine => Effect size f 0.25
 α err prob 0.05
Power (1- β err prob) 0.8
Number of groups 3

Output Parameters

Noncentrality parameter λ 9.9375000
Critical F 3.0540042
Numerator df 2
Denominator df 156
Total sample size 159
Actual power 0.8048873

X-Y plot for a range of values Calculate

Scenario 2: Linear Regression

G*Power 3.1.9.7

File Edit View Tests Calculator Help

Central and noncentral distributions Protocol of power analyses

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F tests – Linear multiple regression: Fixed model, R^2 deviation from zero

Analysis: A priori: Compute required sample size

Input:

Effect size f^2	=	0.15
α err prob	=	0.05
Power ($1-\beta$ err prob)	=	0.8
Number of predictors	=	3

Output:

Noncentrality parameter λ	=	11.5500000
Critical F	=	2.7300187
Numerator df	=	3
Denominator df	=	73
Total sample size	=	77
Actual power	=	0.8017655

Test family: F tests

Statistical test: Linear multiple regression: Fixed model, R^2 deviation from zero

Type of power analysis: A priori: Compute required sample size – given α , power, and effect size

Input Parameters

Determine =>

Effect size f^2	0.15
α err prob	0.05
Power ($1-\beta$ err prob)	0.8
Number of predictors	3

Output Parameters

Noncentrality parameter λ	11.5500000
Critical F	2.7300187
Numerator df	3
Denominator df	73
Total sample size	77
Actual power	0.8017655

X-Y plot for a range of values

Calculate

Scenario 3: Repeated measures, within-between MANOVA

G*Power 3.1.9.7

File Edit View Tests Calculator Help

Central and noncentral distributions Protocol of power analyses

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F tests – MANOVA: Repeated measures, within-between interaction

Options: Pillai V, O'Brien-Shieh Algorithm

Analysis: A priori: Compute required sample size

Input:

Effect size f(V)	=	0.25
α err prob	=	0.05
Power (1- β err prob)	=	0.8
Number of groups	=	2
Number of measurements	=	2

Output:

Noncentrality parameter λ	=	8.0000000
Critical F	=	3.9163246
Numerator df	=	1.0000000
Denominator df	=	126

Test family: F tests

Statistical test: MANOVA: Repeated measures, within-between interaction

Type of power analysis: A priori: Compute required sample size – given α , power, and effect size

Input Parameters

Determine =>	Effect size f(V)	0.25
	α err prob	0.05
	Power (1- β err prob)	0.8
	Number of groups	2
	Number of measurements	2

Output Parameters

Noncentrality parameter λ	8.0000000
Critical F	3.9163246
Numerator df	1.0000000
Denominator df	126
Total sample size	128
Actual power	0.8014596
Pillai V	0.0588235

Options X-Y plot for a range of values Calculate



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