

EPRS855
ANCOVA

Data in SPSS

pre	post	x1	x2	prex1	prex2
4.0	2.0	1.0	.0	4.0	.0
5.0	3.0	1.0	.0	5.0	.0
6.0	1.0	1.0	.0	6.0	.0
7.0	4.0	1.0	.0	7.0	.0
7.0	3.0	1.0	.0	7.0	.0
8.0	5.0	1.0	.0	8.0	.0
9.0	3.0	1.0	.0	9.0	.0
9.0	5.0	1.0	.0	9.0	.0
10.0	6.0	1.0	.0	10.0	.0
11.0	5.0	1.0	.0	11.0	.0
4.0	3.0	.0	1.0	.0	4.0
5.0	5.0	.0	1.0	.0	5.0
5.0	3.0	.0	1.0	.0	5.0
6.0	6.0	.0	1.0	.0	6.0
7.0	6.0	.0	1.0	.0	7.0
8.0	7.0	.0	1.0	.0	8.0
8.0	6.0	.0	1.0	.0	8.0
9.0	8.0	.0	1.0	.0	9.0
10.0	6.0	.0	1.0	.0	10.0
11.0	4.0	.0	1.0	.0	11.0
5.0	5.0	.0	.0	.0	.0
5.0	4.0	.0	.0	.0	.0
5.0	4.0	.0	.0	.0	.0
6.0	8.0	.0	.0	.0	.0
8.0	8.0	.0	.0	.0	.0
8.0	9.0	.0	.0	.0	.0
9.0	7.0	.0	.0	.0	.0
10.0	10.0	.0	.0	.0	.0
10.0	8.0	.0	.0	.0	.0
7.0	10.0	.0	.0	.0	.0

1. Testing the assumption of equal slopes

5 predictor model

Model post = pre, x1, x2, prex1, prex2 OR

$$Y' = b_0 + b_1(\text{pre}) + b_2(X1) + b_3(X2) + b_4(\text{pre} \cdot x1) + b_5(\text{pre} \cdot x2)$$

↘

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.822 ^a	.675	.607	1.46052

a. Predictors: (Constant), prex2, pre, x1, x2, prex1

3 predictor model

Model post = pre, x1, x2

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.803 ^a	.645	.604	1.46628

a. Predictors: (Constant), pre, x2, x1

$$F = \frac{(R^2_{\text{pre, x1, x2, prex1, prex2}} - R^2_{\text{pre, x1, x2}}) / (k_1 - k_2)}{(1 - R^2_{\text{pre, x1, x2, prex1, prex2}}) / k_1} = \frac{(.67488 - .64501) / (5-3)}{(1 - .67488) / 24}$$

= 1.10 (Test for Equal Slopes)

2. Testing for pretest

2 predictor model
Model post = x1, x2

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.642 ^a	.412	.368	1.85193

a. Predictors: (Constant), x2, x1

$$F = \frac{(R^2_{\text{pre, x1, x2}} - R^2_{\text{x1, x2}}) / (k_1 - k_2)}{(1 - R^2_{\text{pre, x1, x2}}) / k_1} = \frac{(.64501 - .41194) / (3-2)}{(1 - .64501) / 26}$$

= 17.07 (Test for Pretest)

2. Testing for group difference

1 predictor model
Model post = pre

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.444 ^a	.198	.169	2.12431

a. Predictors: (Constant), pre

$$F = \frac{(R^2_{\text{pre, x1, x2}} - R^2_{\text{pre}}) / (k_1 - k_2)}{(1 - R^2_{\text{pre, x1, x2}}) / k_1} = \frac{(.64501 - .19757) / (3-1)}{(1 - .64501) / 26}$$

= 16.38 (Test for Group Difference)