**Two-Way MANOVA Done with SPSS Syntax: Partial Output**

 The data are at [PLASTER](https://core.ecu.edu/wuenschk/SPSS/PLASTER.sav).

 Here is the SPSS Code

Get

 File='D:\\_Stats\SPSS\Plaster.sav' .

EXECUTE .

Manova

 serious years BY pa(1 3) crime(1,2)

 /discrim raw stan corr alpha(1)

 /print signif(mult univ eigen dimenr stepdown)

 homogeneity(boxm) error(corr)

 /noprint param(estim)

 /method=unique

 /error within+residual

 /design .

 If you wanted to include a covariate or covariates in the model, for example age, you would add it like this:

 serious years BY pa(1 3) crime(1,2) with age

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 114 cases accepted.

 0 cases rejected because of out-of-range factor values.

 0 cases rejected because of missing data.

 6 non-empty cells.

 1 design will be processed.

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 Multivariate test for Homogeneity of Dispersion matrices

 Boxs M = 16.47303

 F WITH (15,59705) DF = 1.04619, P = .403 (Approx.)

 Chi-Square with 15 DF = 15.69697, P = .402 (Approx.)

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 EFFECT .. **pa BY crime**

 Multivariate Tests of Significance (S = 2, M = -1/2, N = 52 1/2)

 Test Name Value Approx. F Hypoth. DF Error DF Sig. of F

 Pillais .04795 1.32648 4.00 216.00 **.261**

 Hotellings .05034 1.33406 4.00 212.00 .258

 Wilks .95206 1.33042 4.00 214.00 .260

 Roys .04771

 Note.. F statistic for WILKS' Lambda is exact.

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 Eigenvalues and Canonical Correlations

 Root No. Eigenvalue Pct. Cum. Pct. Canon Cor.

 1 .05010 99.52818 99.52818 .21843

 2 .00024 .47182 100.00000 .01541

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EFFECT .. pa BY crime (Cont.)

 Univariate F-tests with (2,108) D. F.

 Variable Hypoth. SS Error SS Hypoth. MS Error MS F Sig. of F

 serious .20842 541.54673 .10421 5.01432 .02078 .979

 years 52.76379 1366.43810 26.38190 12.65220 2.08516 .129

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 Standardized discriminant function coefficients

 Function No.

 Variable 1 2

 serious -.56481 1.03223

 years 1.17491 -.06396

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 Correlations between DEPENDENT and canonical variables

 Canonical Variable

 Variable 1 2

 serious .05436 .99852

 years .87726 .48002

 These coefficients could be used to compute, for each subject, the two canonical variate scores for the interaction.

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 **EFFECT .. crime**

 Multivariate Tests of Significance (S = 1, M = 0, N = 52 1/2)

 Test Name Value Exact F Hypoth. DF Error DF Sig. of F

 Pillais .00519 .27902 2.00 107.00 **.757**

 Hotellings .00522 .27902 2.00 107.00 .757

 Wilks .99481 .27902 2.00 107.00 .757

 Roys .00519

 Note.. F statistics are exact.

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 Eigenvalues and Canonical Correlations

 Root No. Eigenvalue Pct. Cum. Pct. Canon Cor.

 1 .00522 100.00000 100.00000 .07203

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 EFFECT .. crime (Cont.)

 Univariate F-tests with (1,108) D. F.

 Variable Hypoth. SS Error SS Hypoth. MS Error MS F Sig. of F

 serious .39300 541.54673 .39300 5.01432 .07838 .780

 years 2.49705 1366.43810 2.49705 12.65220 .19736 .658

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 Standardized discriminant function coefficients

 Function No.

 Variable 1

 serious -.94836

 years 1.09172

These coefficients could be used to compute the canonical variate scores for the effect of crime. There were only two levels of crime, so only one canonical variate. For each subject one would compute 1.09172\*years - .94836\*serious. If one wanted to use Cohen’s d to estimate the magnitude of effect of the difference between the two crime groups, the within-group canonical variate scores could be used to calculate that d.

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 Correlations between DEPENDENT and canonical variables

 Canonical Variable

 Variable 1

 serious -.37303

 years .59194

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 **EFFECT .. pa**

 Multivariate Tests of Significance (S = 2, M = -1/2, N = 52 1/2)

 Test Name Value Approx. F Hypoth. DF Error DF Sig. of F

 Pillais .08560 2.41444 4.00 216.00 .050

 Hotellings .09191 2.43567 4.00 212.00 .048

 Wilks .91515 2.42536 4.00 214.00 .049

 Roys .07581

 Note.. F statistic for WILKS' Lambda is exact.

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 Eigenvalues and Canonical Correlations

 Root No. Eigenvalue Pct. Cum. Pct. Canon Cor.

 1 .08203 89.24783 89.24783 .27534

 2 .00988 10.75217 100.00000 .09892

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 Dimension Reduction Analysis

 Roots Wilks L. F Hypoth. DF Error DF Sig. of F

 1 TO 2 .91515 2.42536 4.00 214.00 .049

 2 TO 2 .99021 1.06731 1.00 108.00 .304

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 EFFECT .. pa (Cont.)

 Univariate F-tests with (2,108) D. F.

 Variable Hypoth. SS Error SS Hypoth. MS Error MS F Sig. of F

 serious 5.62951 541.54673 2.81476 5.01432 .56134 .572

 years 76.98002 1366.43810 38.49001 12.65220 3.04216 .052

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 **Standardized discriminant function coefficients – SAS gives slightly different values**

 Function No.

 The standardized DFCs from SAS, same data

 Variable 1 2 Variable 1 2

 serious -.70218 .94417 serious -.691 .928

 years 1.17246 .09919 years 1.198 .101

 To compute canonical variate scores for each subject one would first standardize the variables (serious and years) and then for each subject compute, for the first canonical variate, 1.17246\*years - .70218\*serious, and, for the second canonical variate, .09919\*years + .94417\*serious.

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 Correlations between DEPENDENT and canonical variables

 Canonical Variable

 Variable 1 2

 serious -.08430 .99644

 years .80242 .59676

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 [One-Way Multiple Analysis of Variance](http://core.ecu.edu/psyc/wuenschk/MV/MANOVA/MANOVA1.docx).

 [Factorial MANOVA](http://core.ecu.edu/psyc/wuenschk/MV/MANOVA/MANOVA2.pdf).