Example of Canonical Correlation

The purpose of the research was to examine the relationships between measures of mental health (depression, stress & loneliness) and social support (total, significant other, family & friend).

SPSS Code:

```
variable labels dep 'depression'
   ruls 'loneliness'/
   tss 'total social support'/
   soss 'significant other social support'/
   fass 'family social support'/
   frss 'friend social support'.

corr  tss fass frss soss dep ruls stress .
```

SPSS Output: Here is the correlation matrix, partitioned into the two sets of variables.

```
Correlations:  TSS        FASS       FRSS       SOSS     |  DEP        RULS       STRESS

  TSS         1.0000      .8280**    .8136**    .8569**  |  -.3691**   -.6282**   -.1849**
  FASS         .8280**   1.0000      .5192**    .5972**  |  -.3218**   -.4945**   -.2049**
  FRSS         .8136**    .5192**   1.0000      .6109**  |  -.3150**   -.5774**   -.1132
  SOSS         .8569**    .5972**    .6109**   1.0000    |  -.3044**   -.5266**   -.1291*
  ------------------------------------------------------+-------------------------------
  DEP         -.3691**   -.3218**   -.3150**   -.3044**  |  1.0000      .5368**    .4872**
  RULS        -.6282**   -.4945**   -.5774**   -.5266**  |   .5368**   1.0000     .2846**
  STRESS      -.1849**   -.2049**   -.1132     -.1291*   |   .4872**    .2846**   1.0000

N of cases:   405         2-tailed Signif:  * - .01  ** - .001
```

SPSS Code:
canonical correlation is available using syntax code for MANOVA, setting one set of variables as the "dependent" and the other set as the "covariates" with no "IVs"

```
manova tss fass frss soss with dep ruls stress      ← identifies the sets of variables
            /print signif(multiv dimenr eigen)      ← asks for canonical analysis
            /discrim raw stan cor.                  ← requests info to interpret the canonicals
```

SPSS Output:

```
 EFFECT .. WITHIN CELLS Regression
 Multivariate Tests of Significance (S = 3, M = 0, N = 198 )

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

 Pillais          .42888   16.68088      12.00    1200.00       .000   ← omnibus tests
 Hotellings       .71377   23.59403      12.00    1190.00       .000
 Wilks            .57895   20.14088      12.00    1053.30       .000
 Roys             .40981
```

```
Dimension Reduction Analysis
 Roots    Wilks L.          F Hypoth. DF   Error DF  Sig. of F      Tests of each canonical
 1 TO 3    .57895   20.14088      12.00    1053.30       .000      ← only 1st is statistically
 2 TO 3    .98095    1.28534       6.00     798.00       .261        significant
 3 TO 3    .99873     .25506       2.00     400.00       .775
```

Eigenvalues and Canonical Correlations

Root No.	Eigenvalue	Pct.	Cum. Pct.	Canon Cor.	Sq. Cor
1	.694	97.282	97.282	.640	.410
2	.018	2.539	99.821	.133	.018
3	.001	.179	100.000	.036	.001

	Raw canonical coefficients for DEPENDENT variables	Standardized canonical coeffs for DEPENDENT variables	Correlations between DEPENDENT and canonical
TSS	-.440	-.520	-.983
FASS	-.062	-.089	-.773
FRSS	-.288	-.376	-.905
SOSS	-.065	-.096	-.825

	Raw canonical coefficients for COVARIATEScoeffs	Standardized canonical for COVARIATESand	Corrs between COVARIATES canonical variables
DEP	.012	.080	.576
RULS	.085	.969	.998
STRESS	-.007	-.050	.265

Interpretation is usually based on the combination of the standardized weights and the structure (as in ldf).

Variance explained by canonical variables of DEPENDENT variables (social support)

Tells us -- % of variance among the dependent variables accounted for by the dep and cov canonical variates, respectively

CAN. VAR.	Pct Var DE	Cum Pct DE	Pct Var CO	Cum Pct CO
1	76.555	76.555	31.373	31.373

a "PC" -- how much variance among the dependent variables is accounted for by the dependent canonical variate

a "rd" -- how much variance among the dependent variables is accounted for by the covariate canonical variate

Variance explained by canonical variables of the COVARIATES (mental health)

Tells us -- % of variance among the covariates accounted for dep and cov canonical variates, respectively

CAN. VAR.	Pct Var DE	Cum Pct DE	Pct Var CO	Cum Pct CO
1	19.089	19.089	46.580	46.580

a "rd" -- how much variance among the covariates is accounted for by the dependent canonical variate

a "PC"-- how much variance among the covariates is accounted for by the covariate canonical variate

Depiction of the "Variances Accounted For" in this Analysis