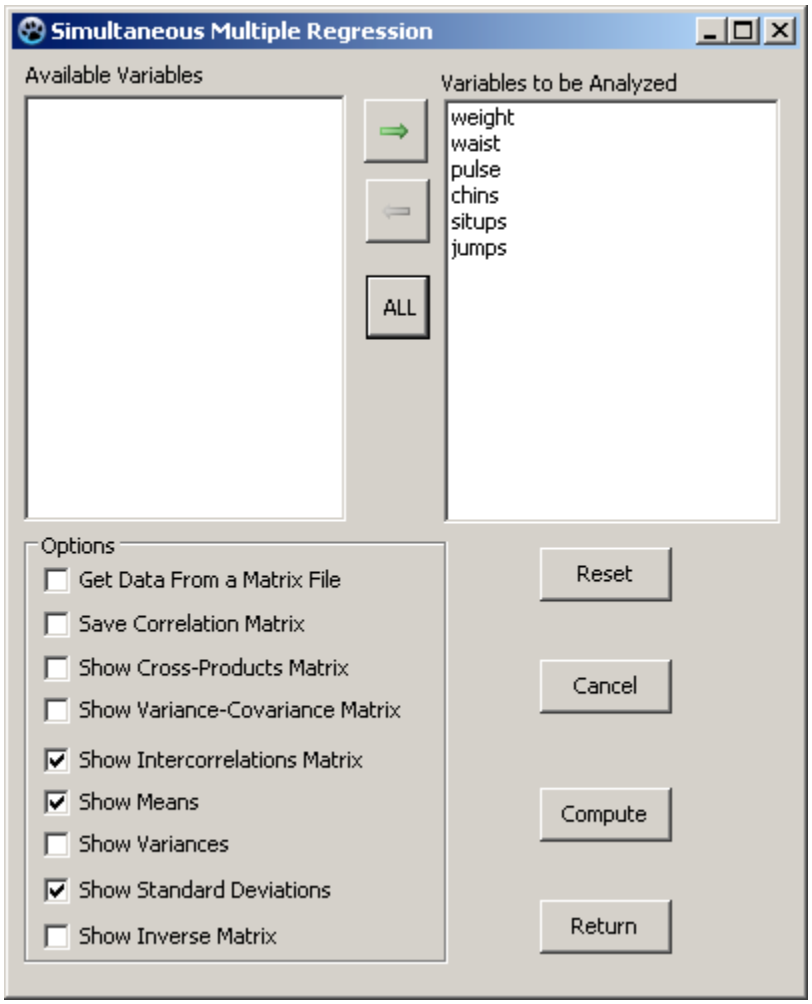
Simultaneous Multiple Regression

When one has multiple variables and wishes to know the degree of linear relationship between each of the variables and the remaining variables, one can complete a simultaneous multiple regession analysis. In the multivariate procedure known as Factor Analysis, this is routinely done to estimate the "common" variance among variables. We will use the cansas.LAZ file to demonstrate. Here is the dialog and output:

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Simultaneous Multiple Regression by Bill Miller

Product-Moment Correlations Matrix with   20 cases.

Variables
                weight        waist        pulse        chins       situps
    weight       1.000        0.870       -0.366       -0.390       -0.493
     waist       0.870        1.000       -0.353       -0.552       -0.646
     pulse      -0.366       -0.353        1.000        0.151        0.225
     chins      -0.390       -0.552        0.151        1.000        0.696
    situps      -0.493       -0.646        0.225        0.696        1.000
     jumps      -0.226       -0.191        0.035        0.496        0.669

Variables
                 jumps
    weight      -0.226
     waist      -0.191
     pulse       0.035
```

chins	0.496
situps	0.669
jumps	1.000

Means with 20 valid cases.

Variables	weight	waist	pulse	chins	situps
	178.600	35.400	56.100	9.450	145.550

Variables	jumps
	70.300

Standard Deviations with 20 valid cases.

Variables	weight	waist	pulse	chins	situps
	24.691	3.202	7.210	5.286	62.567

Variables	jumps
	51.277

Determinant of correlation matrix = 0.0208

Multiple Correlation Coefficients for Each Variable

Variable	R	R2	F	Prob.>F	DF1	DF2
weight	0.902	0.814	12.249	0.000	5	14
waist	0.939	0.882	21.017	0.000	5	14
pulse	0.386	0.149	0.490	0.778	5	14
chins	0.734	0.539	3.275	0.036	5	14
situps	0.884	0.782	10.026	0.000	5	14
jumps	0.798	0.636	4.901	0.008	5	14

Betas in Columns with 20 cases.

Variables

	weight	waist	pulse	chins	situps
weight	-1.000	0.676	-0.321	0.347	0.372
waist	1.070	-1.000	0.004	-0.616	-0.771
pulse	-0.070	0.000	-1.000	-0.017	0.049
chins	0.140	-0.157	-0.031	-1.000	0.143
situps	0.317	-0.415	0.191	0.303	-1.000
jumps	-0.301	0.317	-0.149	0.254	0.533

Variables

	jumps
weight	-0.588
waist	0.982
pulse	-0.064
chins	0.201
situps	0.888
jumps	-1.000

Standard Errors of Prediction

Variable	Std.Error
weight	12.407
waist	1.279
pulse	7.749
chins	4.181
situps	34.056
jumps	36.020

Raw Regression Coefficients with 20 cases.

Variables

	weight	waist	pulse	chins	situps
weight	-1.000	0.088	-0.094	0.074	0.944
waist	8.252	-1.000	0.008	-1.017	-15.069
pulse	-0.240	0.000	-1.000	-0.012	0.424
chins	0.655	-0.095	-0.042	-1.000	1.697

situps	0.125	-0.021	0.022	0.026	-1.000
jumps	-0.145	0.020	-0.021	0.026	0.650

Variables

	jumps
weight	-1.221
waist	15.718
pulse	-0.453
chins	1.947
situps	0.728
jumps	-1.000

Variable	Constant
weight	-114.302
waist	22.326
pulse	71.223
chins	27.313
situps	424.896
jumps	-366.967

Partial Correlations with 20 cases.

Variables

	weight	waist	pulse	chins	situps
weight	-1.000	0.851	-0.150	0.221	0.344
waist	0.851	-1.000	0.001	-0.311	-0.566
pulse	-0.150	0.001	-1.000	-0.023	0.097
chins	0.221	-0.311	-0.023	-1.000	0.208
situps	0.344	-0.566	0.097	0.208	-1.000
jumps	-0.420	0.558	-0.097	0.226	0.688

Variables

	jumps
weight	-0.420
waist	0.558
pulse	-0.097
chins	0.226
situps	0.688
jumps	-1.000