"Kinds" By-the-Numbers

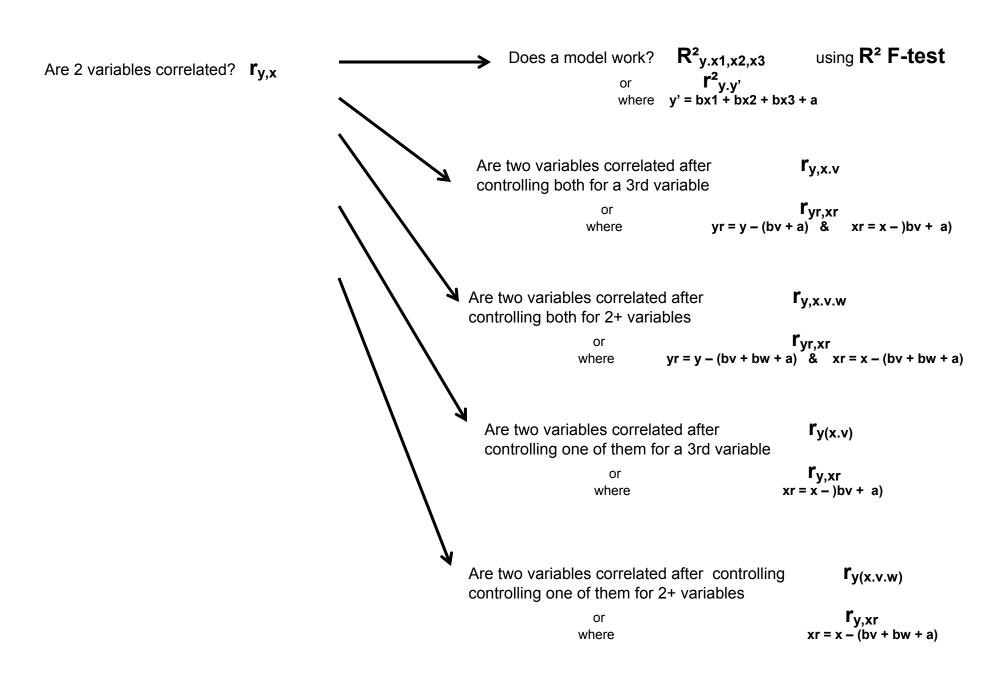| # pops	# crits	# preds	# controls	# controlled	Which is better?	Model or Model Comparison to Use	
1	1	1	0	0	no	Simple correlation (direct p-value)	
2	1	1	0	0	yes	Comparing a correlation across populations (Z_F)	
1	1	2	0	0	yes	Comparing correlated correlations (Z_S)	
1	2	1	0	0	yes	Comparing correlated correlations (Z_S)	
1	1	1	1	2	no	Partial correlation(direct p-value)	
1	1	1	2+	2	no	Multiple partial correlation (direct p-value)	
1	1	1	1	1	no	Semi-partial correlation (direct p-value)	
1	1	1	2+	1	no	Multiple semi-partial correlation (direct p-value)	
1	1	2+	0	0	no	Multiple regression model (R^2 F-test and/or t-test of b/Beta)	
1	1	3+	0	0	yes	**Are the preds in one model a subset of the preds in the other model?**	Comparing nested multiple regression model ($R^2\Delta$ F-test)
1	1	2+	0	0	yes		Comparing non-nested multiple regression model (Z_S)
2	1	2+	0	0	yes	Comparing a multiple regression model across populations (Z_F & Z_S)	
1	2	2+	0	0	yes	Comparing a multiple regression model across criteria (Z_S)	

Different Questions & Details
(Some of the models have multiple characterizations)

The Major Question or Hypothesis	The details	Model or Model Comparison to Use
Are two variables correlated?		Simple correlation (direct p-value)
Are two variables correlated?	Is the correlation difference for 2 populations?	Comparing a correlation across populations (Z_F)
Are two variables correlated?	Are the correlations different if we change predictors?	Comparing correlated correlations (Z_S)
Are two variables correlated?	Are the correlations different if we change criterion?	Comparing correlated correlations (Z_S)
Is a criterion better correlated with one predictor than with another predictor?		Comparing correlated correlations (Z_S)
Is a predictor better correlated with one criterion than with another criterion?		Comparing correlated correlations (Z_S)
Are two variables correlated?	Control both variables for 1 control variable.	Partial correlation (direct p-value)
Are two variables correlated?	Control both variables for 2+ control variables	Multiple partial correlation (direct p-value)
Are two variables correlated?	Control one of the variables for 1 control variable	Semi-partial correlation (direct p-value)
Are two variables correlated?	Control one of the variables for 2+ control variable	Multiple semi-partial correlation(direct p-value)
Does a regression model work?		Multiple regression model (R^2 F-test &/or t-test of b/Beta)
Does a particular predictor contribute to the model?		b t-test & Comparing nested multiple regression models ($R^2\Delta$ F-test)
Does a subset of predictors work as well as "all" the predictors?		Comparing nested multiple regression models ($R^2\Delta$ F-test)
Does one subset of predictors work as well as another subset of predictors?		Comparing non-nested multiple regression models (Z_S)
Does a regression model work?	Is the model different for 2 populations?	Comparing a multiple regression model across populations (Z_F & Z_S)
Does a regression model work?	Is the model different for 2 criteria?	Comparing a multiple regression model across criteria (Z_S)

Relationships between Bivariate & Control, Multivariate Models & Comparisons
Based on the idea that a multivariate model is represented by its predictions (y')

Are 2 variables correlated? $r_{y,x}$

Does a model work? $R^2_{y.x1,x2,x3}$ using R^2 **F-test**

or $r^2_{y.y'}$

where $y' = bx1 + bx2 + bx3 + a$

Are two variables correlated after controlling both for a 3rd variable $r_{y,x.v}$

or $r_{yr,xr}$

where $yr = y - (bv + a)$ & $xr = x -)bv + a)$

Are two variables correlated after controlling both for 2+ variables $r_{y,x.v.w}$

or $r_{yr,xr}$

where $yr = y - (bv + bw + a)$ & $xr = x - (bv + bw + a)$

Are two variables correlated after controlling one of them for a 3rd variable $r_{y(x.v)}$

or $r_{y,xr}$

where $xr = x -)bv + a)$

Are two variables correlated after controlling controlling one of them for 2+ variables $r_{y(x.v.w)}$

or $r_{y,xr}$

where $xr = x - (bv + bw + a)$

Do two nested models work differently well?

$$R^2_{y.x1,x2,x3,x4} \text{ vs. } R^2_{z.x1,x2} \quad \text{using } R^2\Delta \text{ F-test}$$

Are 2 predictors correlate differently with a criterion?
(correlated correlations)

$$r_{y,x1} \text{ vs. } r_{y,x2} \quad \text{using } Z_S$$

→

Do two non-nested models work differently well?

$$R^2_{y.x1,x2,x3} \text{ vs. } R^2_{y.x1,x4,x5} \quad \text{using } Z_S$$

or

$$r^2_{y.y'1} \text{ vs. } r^2_{y.y'2}$$

where $y1' = bx1 + bx2 + bx3 + a$ & $y2' = bx1 + bx4 + bx5 + a$

Is a predictor correlated differently with 2 criteria?
(correlated correlations)

$$r_{y,x1} \text{ vs. } r_{z,x1} \quad \text{using } Z_S$$

→

Does a model work differently well for 2 criteria?

$$R^2_{y.x1,x2,x3} \text{ vs. } R^2_{z.x1,x2,x3} \quad \text{using } Z_S$$

or

$$r^2_{y.y'} \text{ vs. } r^2_{z.z'}$$

where $y' = bx1 + bx2 + bx3 + a$ & $z' = bx1 + bx2 + bx3 + a$

Are 2 variables correlated differently in two populations?

$$r_{y,x} \text{ in Pop}_1 \text{ vs. } r_{y,x} \text{ in Pop}_2 \quad \text{using } Z_F$$

→

Does a model work differently in two populations? using Z_F Z_S

$$R^2_{y.x1,x2,x3} \text{ in Pop1 vs. } R^2_{y.x1,x2,x3} \text{ in Pop2}$$

or

$$r^2_{y.y'} \text{ in Pop1 vs. } r^2_{y.y'} \text{ in Pop2}$$

where $y' = bx1 + bx2 + bx3 + a$ & $y' = bx1 + bx2 + bx3 + a$