- 1st hour: KKM Ch.9: #1, 5, 6; Ch.10: #8a
- 2nd hour: questions
- Other:

    1. Problems with printing lab overheads from web page?
    2. Format of lab session
    3. Thurs. office hour
    4. Can Ch.9 #5 be done from Ch.8 #3?

Ch. 9 #1:

Y is level of pathology

X_1 is thinking disturbance rating

X_2 is hostile suspiciousness rating

a) Variable *added-in-order* tests with X_1 added first, $\alpha = .05$

Source	df	SS	MS	F	Pr $> F$
X_1	1	1,546	1,546	6.42	(.01, .025)
$X_2 \mid X_1$	1	1,238	1,238	5.62	(.01, .025)
Residual	50	11,008	220.16		

Pr($F_{1,51} > 6.42$) is between .01 and .025.

Also,

is between .01 and .025.

What are null hypotheses for these partial F-tests?

b) Variable *added-in-order* tests with X_2 added first

Source	df	SS	MS	F	Pr $> F$
X_2	1	160	160	0.73	$> .25$
$X_1 \mid X_2$	1	2,623	2,623	11.91	$(.001, .005)$
Residual	50	11,008	220.16		

What are null hypotheses for these partial F-tests?

c) Variable *added-last* tests

Source	df	SS	MS	F	Pr $> F$
$X_1 \mid X_2$	1	2,623	2,623	11.91	$(.001, .005)$
$X_2 \mid X_1$	1	1,238	1,238	5.62	$(.01, .025)$
Residual	50	11,008	220.16		

What are null hypotheses for these partial F-tests?

d) What, if any, differences are present in the three approaches?

e) Which predictors appear to be necessary, and why?

Hint: look at part (c)

Ch.9 #6:

See Ch.8 #4

a) Provide *added-in-order* tests for the order X_2, X_1, and X_3.

Source	df	SS	MS	F	Pr $> F$
X_2	1	1,308	1,308	43.05	$< .001$
$X_1 \mid X_2$	1	9.46	9.46	0.30	$> .25$
$X_3 \mid X_1, X_2$	1	189.38	189.38	8.71	$(.005, .01)$
Residual	16	348.03	21.75		

b) Provide *added-in-order* tests for the order X_3, X_1, and X_2.

Source	df	SS	MS	F	Pr $> F$
X_3	1	1360.14	1360.14	49.45	$< .001$
$X_1 \mid X_3$	1	35.35	35.35	1.31	$> .25$
$X_2 \mid X_1, X_3$	1	111.69	111.69	5.14	$(.025, .05)$
Residual	16	348.03	21.75		

c) List all orders that can be tested and those that cannot be.

Order	Testable?
X_1, X_2, X_3	no
X_1, X_3, X_2	no
X_2, X_1, X_3	yes
X_2, X_3, X_1	yes
X_3, X_1, X_2	yes
X_3, X_2, X_1	yes

d) Provide *added-last* tests for X_1, X_2, and X_3.

Source	df	SS	MS	F	Pr $> F$
$X_1 \mid X_2, X_3$	1	29.81	29.81	1.37	$> .25$
$X_2 \mid X_1, X_3$	1	111.69	111.69	5.14	$(.025, .05)$
$X_3 \mid X_1, X_2$	1	189.38	189.38	8.71	$(.005, .01)$
Residual	16	348.03	21.75		

e) Consider $X_4 = X_2 X_3$ with the following ANOVA table:

Source	df	SS	MS	F	Pr $> F$
X_3	1	1360.14	1360.14		
$X_2 \mid X_3$	1	117.23	117.23		
$X_4 \mid X_2, X_3$	1	0.09	0.09	.0038	$> .25$
Residual	16	377.73	23.61		

Ch.9 #5:

Consider the ANOVA tables in Ch.8 #3. Use $\alpha = .05$.

a) Provide *added-in-order* tests for both variables with X_1 entered first

Source	df	SS	MS	F	Pr $> F$
X_1	1	$10,231.7$	$10,231.7$	1.74	$(.10, .25)$
$X_2 \mid X_1$	1	$92,339.1$	$92,339.1$	47.46	$< .001$
Residual	22	$42,806.2$	$1,945.74$		

b) Do (a), but with X_2 entered first

Source	df	SS	MS	F	Pr $> F$
X_2	1	$101,932.7$	$101,932.7$	53.96	$< .001$
$X_1 \mid X_2$	1	638.1	638.1	0.33	$> .25$
Residual	22	$42,806.2$	$1,945.74$		

c) Provide *added-last* tests for both variables

Source	df	SS	MS	F	Pr $> F$
$X_2 \mid X_1$	1	$92,339.1$	$92,339.1$	47.46	$< .001$
$X_1 \mid X_2$	1	638.1	638.1	0.33	$> .25$
Residual	22	$42,806.2$	$1,945.74$		

d) What if any differences are in (a)-(c)?

e) Which predictors appear to be necessary and why?

Ch.10 #8a:

$$R = \begin{array}{c} \\ Y \\ X_1 \\ X_2 \\ X_3 \end{array} \begin{array}{c} \begin{array}{cccc} Y & X_1 & X_2 & X_3 \end{array} \\ \begin{bmatrix} 1 & .959 & .979 & -.904 \\ & 1 & .951 & -.819 \\ & & 1 & -.879 \\ & & & 1 \end{bmatrix} \end{array}$$

a) Compute $r_{YX_2|X_1}$ and $r_{YX_3|X_1}$.

We have

$$\begin{aligned} r_{YX_2|X_1} &= \frac{r_{YX_2} - r_{YX_1} r_{X_2X_1}}{\sqrt{(1 - r^2_{YX_1})(1 - r^2_{X_2X_1})}} \\ &= \frac{.979 - (.959)(.951)}{\sqrt{[1 - (.959)^2][1 - (.951)^2]}} \\ &= .764 \end{aligned}$$

Similarly, $r_{YX_3|X_1} = -.727$