Moore
Psych 610

Handout #__29______

Example mixed design

Data table

			Weight 1			Weight 2		
			D_1	D_2	D_3	D_1	D_2	D_3
Grade 1	F	S_1	1	1	2	2	3	5
		S_2	1	2	2	3	4	6
		S_3	3	4	4	2	5	5
	M	S_4	2	2	2	4	6	7
		S_5	1	3	3	4	5	4
		S_6	2	2	3	5	6	7
Grade 2	F	S_7	3	3	5	4	7	8
		S_8	1	1	3	3	8	7
		S_9	2	2	4	3	5	7
	M	S_{10}	3	4	5	3	5	7
		S_{11}	1	2	4	2	5	6
		S_{12}	1	3	5	2	6	8

A. Weight x $\text{Distance}_{\text{LINEAR}}$ interaction contrast - both factors within

1. Generate contrast coefficients

		D_1	D_2	D_3
		-1	0	1
W_1	1	-1	0	1
W_2	-1	1	0	-1

2. Apply coefficients to individual data; make table of $\hat{\psi}$s

-- First rewrite coefficient in form corresponding to data

Coefficients

-1	0	1	1	0	-1

		$\hat{\psi}$
Gr 1 F	S_1	-3
	S_2	-2
	S_3	-2
Gr 1 M	S_4	-3
	S_5	2
	S_6	-1
Gr 2 F	S_7	-2
	S_8	-2
	S_9	-2
Gr 2 M	S_{10}	-2
	S_{11}	-1
	S_{12}	-2

Total = - 20

[Y] = 52 [T] = $33.3\overline{3}$ [GG] = 43

[Gender] = $36.3\overline{3}$ [Grade] = $33.6\overline{6}$

3. Do a Grade x Gender anova on the table of $\hat{\psi}$ s. The test of <u>Mean</u> tests the interaction contrast.

Source	df	SS	MS	F
Mean	1	$33.3\overline{3}$	$33.3\overline{3}$	26.67
Grade	1	$.3\overline{3}$	$.3\overline{3}$	< 1
Gender	1	3.00	3.00	
G x G	1	$6.3\overline{3}$	$6.3\overline{3}$	
S/GG	8	9.00	1.125	
Total				

<u>Note also</u>:

-- The Grade effect in the contrast anova is really the Grade x Weight x $\text{Distance}_{\text{LINEAR}}$ interaction contrast.

-- The Gender effect is the Gender x Weight x $\text{Distance}_{\text{LINEAR}}$ interaction contrast.

-- The Grade x Gender effect is the Grade x Gender x Weight x $\text{Distance}_{\text{LINEAR}}$ interaction contrast.

- If there are more than 2 levels of the Between factors, then these effects are partial interactions rather than interaction contrasts.

B. Test Grade 1 F vs. Grade 2 F x $\text{Distance}_{\text{LINEAR}}$

1. Generate contrast coefficients for $\text{Distance}_{\text{LINEAR}}$. There are two ways to do this.

   a. Use -1, 0, 1 and apply these to each subject's means averaged over weight. For S_1, the means would be 1.5, 2.0, 3.5.

   b. Use -1, 0, 1, -1, 0, 1 for each subject's six scores across the two levels of weight. (I did it this way.)

2. Apply coefficients and make table of $\hat{\psi}$ s. Omit males because they aren't part of the contrast we are testing.

		$\hat{\psi}$
G1	S_1	4
	S_2	4
	S_3	4
G2	S_7	6
	S_8	6
	S_9	6

Total = 30

[T] = 150
[Y] = 156
[G] = 156

3. Do a one-way Grade anova on the $\hat{\psi}$ s.

Source	df	SS	MS	F
Mean	1	150	150	undef.
Grade @ Female	1	6.0	6.0	undef.
S/G@F	4	0		
Total	6	[Y]		

(Note: The error term is zero because by a quirk of fate; my madeup data have no within-cell variance for females for the D_{LINEAR} trend. Ooops!)

-- The test of the Mean is a test of the D_{LINEAR} @ Female.
-- The test of Grade @ Female is the test of the interaction contrast: (Grade 1F vs. Grade 2F) x $\text{Distance}_{\text{LINEAR}}$

C. Test Grade 1M vs. Grade 2M x $\text{Distance}_{\text{LINEAR}}$

1. Generate contrast coefficients.

2. Apply coefficients to individual data and make a table of $\hat{\psi}$, Omit the females.

3. Do a one-way Grade anova on the $\hat{\psi}$ s.

		$\hat{\psi}$
G1M	S_4	3
	S_5	2
	S_6	3
G2M	S_{10}	6
	S_{11}	7
	S_{12}	8
	Total = 30	

$[T] = 140.1\overline{6}$

$[G] = 168.3\overline{3}$

$[Y] = 171$

Source	df	SS	MS	F
Mean	1	$140.1\overline{6}$	$140.1\overline{6}$	210.25
Grade @ Male	1	$28.1\overline{6}$	$28.1\overline{6}$	42.25
S/G@Male	4	$2.6\overline{6}$	$.6\overline{6}$	
Total				

Note:

a. The test of Mean of $\hat{\psi}$ s tests D_{LINEAR} @ Male.

b. The test of Grade @ Male is the test of interaction contrast: Grade 1M vs. Grade 2M x D_{LINEAR}