Handout #22.5

Prof. Moore
Psychology 610

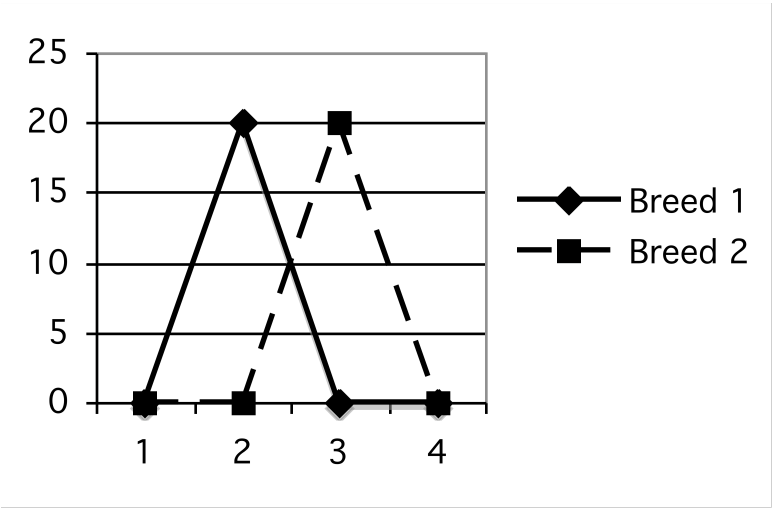
Testing Hypothesized Pattern with an Interaction Contrast

Why does the Breed x $Period_{cubic}$ interaction contrast represent a shift in the time period of peak imprinting? Or, conversely, what interaction contrast represents a shift in time period of peak imprinting? The methods below apply to any predicted pattern.

Step 1: Generate the predicted pattern of means. Use any values you like as means.

Predicted $\overline{Y}_{jk}$	Time Period			
	1	2	3	4
Breed 1	0	20	0	0
Breed 2	0	0	20	0

Also draw a graph of the predicted pattern of means for your hypothesis:

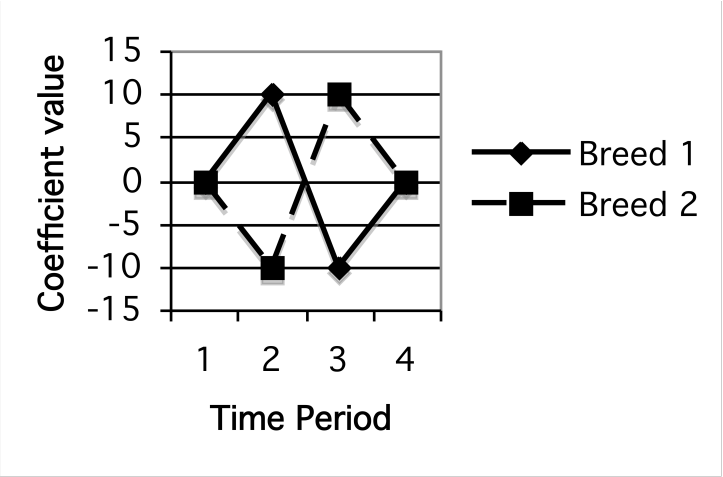


Step 2: Calculate ∝β-hats's for the predicted pattern, as if the predicted pattern were actual data:

$\propto\beta_{jk} = \overline{Y}_{jk} - \overline{Y}_{j} - \overline{Y}_{k} + \overline{Y}_{T}$

∝β-hat	Time Period			
	1	2	3	4
Breed 1	0	10	-10	0
Breed 2	0	-10	10	0

And graph the ∝β-hats:



Step 3. Can use the ∝β-hat's from step 2 as coefficients to test the hypothesized pattern. Multiply the ∝β-hats by the observed means to calculate Ψ-hat. Then proceed as usual for testing a contrast.

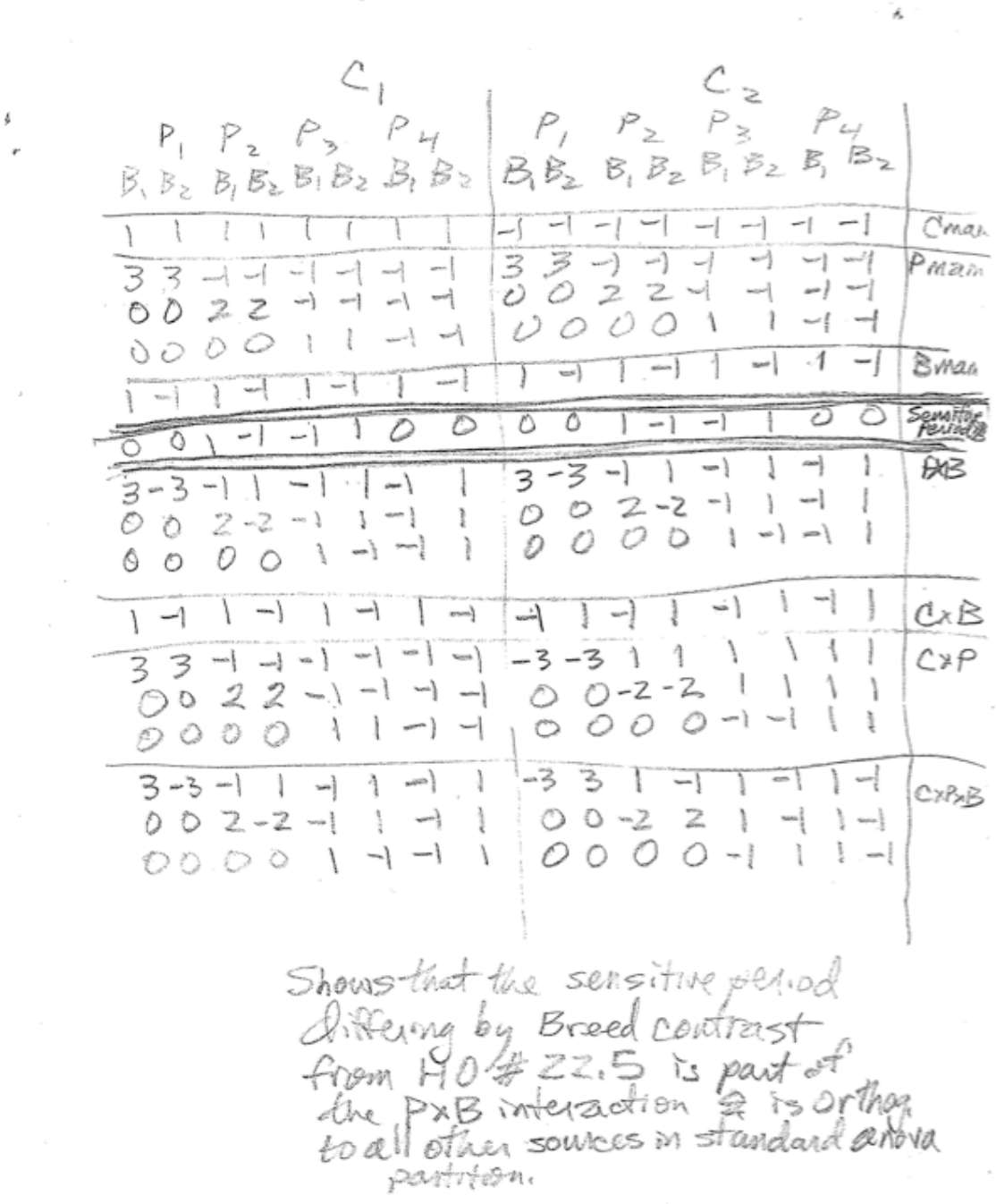
For H.O. #21 (chickens) these coefficients can be applied to the Period x Breed means.
Ψ-hat = 750. SS_{ψ} = 28125.
calc F = 28125/520.83 = 54.00
This F tests the hypothesis that the peak imprinting occurs at the second time period for the RIR's and at the third time period for the PR's. Then you can go ahead and test the residual from that contrast.

Step 4. Verify that your hypothesized pattern is a part of the targeted interaction. In this case, the targeted interaction is the P x B interaction in HO#21 (chicken imprinting).

a) Lay out the standard sources of the design in contrasts (main effect A, B, C, two way interactions, and 3 way interaction). For this example, there are 16 cells, so there are 15 contrasts to represent the standard partition.
b) Write out the contrast coefficients for your hypothesized pattern. This is the ∝β-hats in the second table above (note that you can convert the 10 and -10's to 1 and -1 without losing anything).
c) If your hypothesized pattern is part of the P x B interaction, then the contrast coeff's for testing your hypothesized pattern should NOT be orthogonal to one or more contrasts the

represent P x B. Also, the hypothesized pattern coeff's should BE orthogonal to all the other sources.

This is shown in the scribbly sheet scanned and added at the end of this handout. Notice that the hypothesized pattern (sensitive period varies by Breed) contrast is embedded in the middle of the page surrounded by double lines.



Appendix: Alternative Step 3. Compare pattern of $\propto\beta$-hats from your data to patterns of polynomial trend coefficients.

Trend Component	Period 1	Period 2	Period 3	Period 4
Linear	-3	-1	1	3
Quadratic	1	-1	-1	1
Cubic	-1	3	-3	1

Graph these, and compare to pattern of $\propto\beta$-hats in the data. Choose a pattern that corresponds to one of the lines on the $\propto\beta$-hat graph and construct coefficients for a Breed x Trend interaction contrast by multiplying your chosen trend component by a contrast representing the Breed main effect.