

Specific Comparisons

$$F = \frac{n_{\bar{Y}} (\sum w_j \bar{Y}_j)^2 / \sum w_j^2}{MS_{S/AB\dots}} = \frac{SS_{(reg.X_j)}}{MS_{(resid)}}$$

- This is the same basic formula
- The only difference is that you are now performing comps on different IVs so it is important to keep track of the number of subjects in each group of the comp

Specific Comparisons



- If a main effect is significant than you need to do marginal comparisons
 - If you performed ANOVA through regression than just use the codes for each sub test of each IV

Specific Comparisons



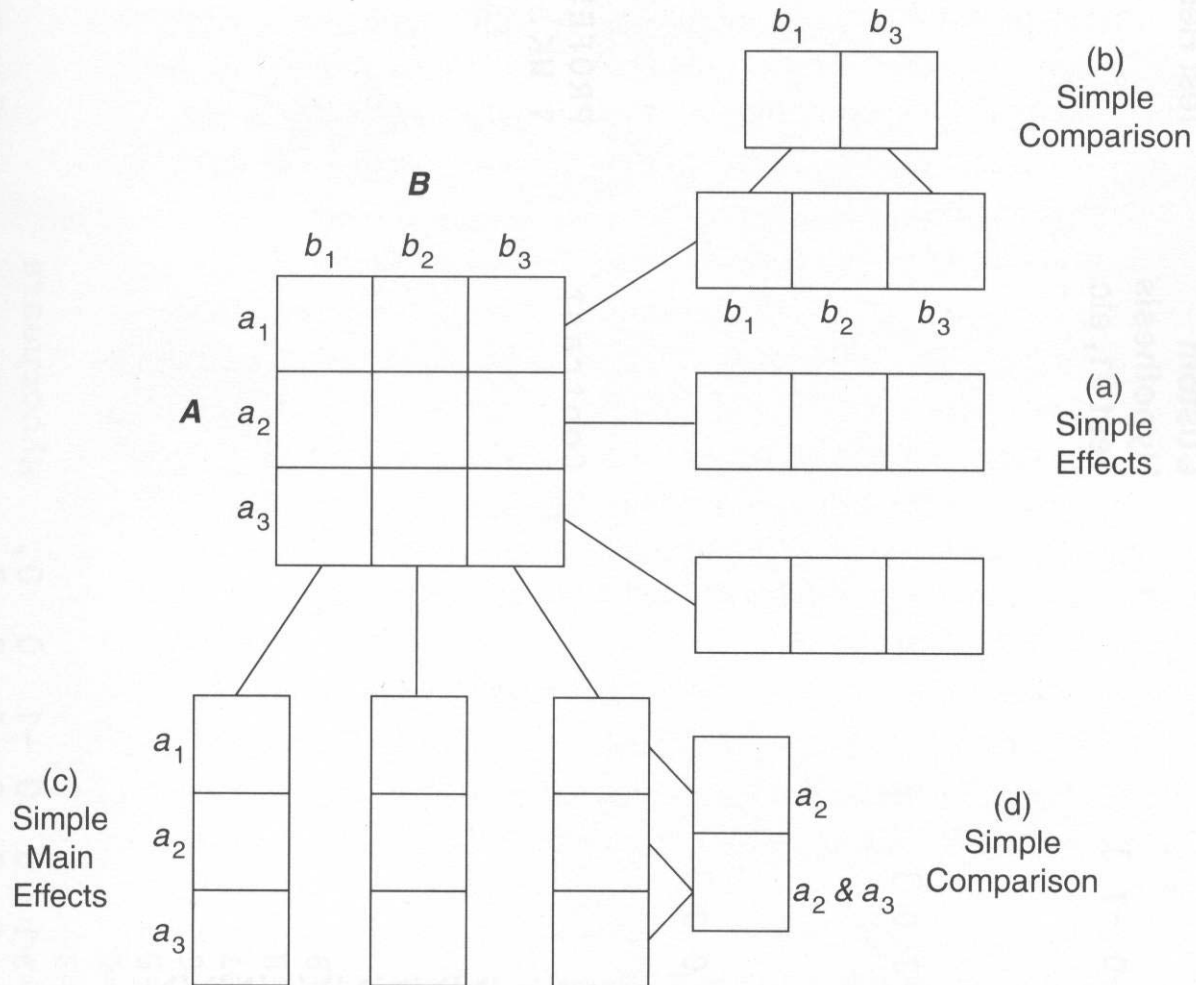
- If one IV is significant (A), the others are not (B), but the interaction is significant
 - You should break the interaction down by performing a simple effect analysis of A at each level of B (The effect of A at B1, A at B2, A at B3, etc.)
 - If any of them are significant and if A has more than 2 levels, follow up with simple contrasts

Specific Comparisons



- If everything is significant:
 - If the interaction is significant than you need to perform interaction contrasts
 - If you performed ANOVA through regression than just use the codes for each sub test for the interactions

Specific Comparisons



Specific Comparisons



- If the comparisons were planned than analyze them without any adjustment to the critical value
- If they were post-hoc than the F-critical value needs to be adjusted (e.g. Scheffe, Tukey, etc.)
 - This is the same as previously covered

Higher-Order Designs

- Higher-order – meaning more than 2 IVs
 - With 3 IVs; each with 2 levels you have a 2 x 2 x 2 design
 - If we have even 5 subjects per cell we are talking about a minimum of 40 subjects
 - We are also talking about:
 - $SS_T = SS_A + SS_B + SS_C + SS_{AB} + SS_{AC} + SS_{BC} + SS_{ABC} + SS_{S/ABC}$

Higher-Order Designs

- Higher-order – meaning more than 2 IVs
 - With 4 IVs; each with 2 levels you have a 2 x 2 x 2 x 2 design
 - If we have even 5 subjects per cell we are talking about a minimum of 80 subjects
 - We are also talking about:
 - $SS_T = SS_A + SS_B + SS_C + SS_D + SS_{ABC} + SS_{ABD} + SS_{ACD} + SS_{BCD} + SS_{AB} + SS_{AC} + SS_{AD} + SS_{BC} + SS_{BD} + SS_{CD} + SS_{ABCD} + SS_{S/ABCD}$

Higher-Order Designs

- Rules for creating the equations
 1. List all IVs. There is a main effect for each IV, with degrees of freedom equal to the number of levels of that IV minus 1.
 2. Form all combinations of two-way interactions among IVs. Degrees of freedom for each interaction are the products of the degrees of freedom for each of the IVs forming the interaction.

Higher-Order Designs



- Rules for creating the equations
 3. Form all combinations of three-way interactions among IVs...
 4. Continue forming interactions until you reach the highest level of interaction.
 5. The error term: S before the slash, the highest level interaction after the slash

Higher-Order Designs

- Rules for creating the equations
 6. Expand the degrees of freedom equations to develop the pieces of the equations.
 7. Each piece gets placed in the numerator with everything else in the denominator (e.g. in an A x B x C design; if A is on top, bcn is on the bottom)
 8. Replace every 1 with $(\Sigma Y)^2/abcn$
 9. Replace every N (or abcn at the beginning of equation) with ΣY^2

Dangling Group Design

- Often a research design will have two or more factorial IVs but only a single control.

		B: Dosage	
		b1: 5 mg	b2: 10 mg
A: Type of Drug	a1: Xanax	a1b1: Group 1	a1b2: Group 2
	a2: Scruital	a2b1: Group 3	a2b2: Group 4
			Control: 0 mg Group 5

Dangling Group Design

- In this particular design the first step would be to treat it as a 1-way design with 5 levels in order to calculate the error term
 - You calculate the SS the same but the DF are $\#groups(n - 1)$
 - Use this DF to calculate the $MS_{S/AB}$
 - Then test comparisons (e.g. control vs. the other four averaged $\{1, 1, 1, 1, -4\}$)

Power and Sample Size

$$n = \frac{2\sigma^2}{\delta^2} (z_{1-\alpha} + z_{1-\beta})^2$$

- The best advice is to calculate the number of subjects based on the each main effect and the interaction and use the largest estimate.

Power and Sample Size



- When calculating based on main effects divide the estimate by the number of levels of the other IV
- When calculating based on the interaction you may need to multiply by the number of cells that were averaged together to create the interaction difference.
- Recommend using PC-Size or other program