SPECIAL TESTS FOR THREE (AND HIGHERWAY) DESIGNS

I. All two-way tests and one-way tests discussed previously can be applied to collapsed (pooled) data from higher way designs.

* Can run single df contrasts on marginal means
* Can run single df contrasts on individual cell means
* Can run two-way single df contrasts on pooled two-way matrices (i.e., CB, CP, BP)
* Can run simple main effects on pooled two-way matrices
* Can run partial interactions on pooled two-way matrices

II. Can extend notions of two-way and partial interaction contrasts to 3 (and higher) way designs if it makes sense.

III. New test: simple interaction effect

Asks whether there is an interaction between two factors, say CP, at a particular level of a third factor, say B.

Let's compute $SS_{CP@RIR}$ =

$$[C]@RIR = \frac{2200^2 + 4100^2}{40} = \frac{21{,}650{,}000}{40} = 541250$$

$$[P]@RIR = \frac{500^2 + 2300^2 + 2000^2 + 1500^2}{20} = \frac{11{,}790{,}000}{20} = 589500$$

$$[CP]@RIR = \frac{100^2 + 900^2 .... + 1300^2 + 1000^2}{10} = \frac{6{,}370{,}000}{10} = 637{,}000$$

$$[T]@RIR = \frac{6300^2}{80} = 496{,}125$$

$SS_{CP@RIR}$ = [CP] – [C] – [P] + [T] = 2375

$MS_{CP@RIR}$ = 2375/3 = 791.67

$$F = \frac{791.67}{520.83} = 1.52$$ ns. Conclude: For RIR's, there is no interaction between period and cue. A-V is better than A at all levels by about the same amounts.

Now do the same for $SS_{CP@PR}$

$$[C]@PR = \frac{1900^2 + 3900^2}{40} = 470{,}500$$

$$[P]@PR = \frac{300^2 + 1200^2 + 2400^2 + 1900^2}{20} = 545{,}000$$

$$[CP]@PR = \frac{100^2 + 500^2 .... + 1700^2 + 1300^2}{10} = 622{,}000$$

$$[T]@PR = \frac{5800^2}{80} = 420{,}500$$

$SS_{CP@PR} = [CP] - [C] - [P] + [T] = 27{,}000$

$MS_{CP@PR} = 27{,}000/3 = 9{,}000$ $\quad F = 9{,}000/520.83 = 17.28$ $\quad p < .05$

Conclusion: The difference between A and AV cues is not the same at all periods for PR's. (We see visually, it begins small, increases to max at time period = 24, then drops off.)

---

Note: $SS_{CP@RIR} + SS_{CP@PR} = 2375 + 27{,}000 = 29{,}375$

$SS_{CP} + SS_{CPB} = 21187{,}5 + 8187.5 = 29{,}375$