

Null Hypothesis Significant Testing:

	None	Tape	Pamphlet	
Individual	28	37	31	32
Group	26	29	29	28
	27	33	30	30

$$SS(A) = 12 \times 3 \times [(32-30)^2 + (28-30)^2] = 288$$

$$nK \sum (\bar{Y}_{j.} - \bar{Y})^2$$

$$SS(B) = 12 \times 2 \times [(27-30)^2 + (33-30)^2 + (30-30)^2] = 432$$

$$SS(A \times B) = 12 \times$$

$$nJ \sum (\bar{Y}_{.k} - \bar{Y})^2$$

There separate F tests – thus three separate (and potentially different) critical values.

Conclusion:

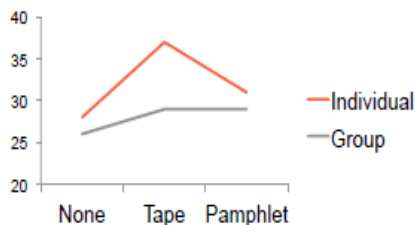
There is evidence to suggest that individual therapy (mean = 32) results in significantly better well-being than group therapy (mean = 28), $F(1, 66) = 20.0$, $p < .05$, averaged over type of back up. There are significant differences in well-being according to the type of back up, $F(2, 66) = 15.0$, $p < .05$, averaged over type of therapy. Also, the effects of therapy significantly differ according to the type of back-up used, $F(2, 66) = 5.0$, $p < .05$.

The effect of therapy does differ depending on the type of treatment received.

The Symmetry of Interaction:

The one chosen is based on theory.

Does the effect of IVA on DV depend on the level of IVB? = Does the effect of IVB on DV depend on the level of IVA?



Therapy vs Back-Up Media Example:

IVA; is already a contrast.

IVB; we choose to compare.

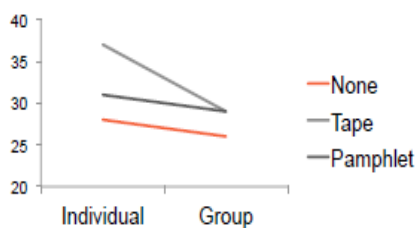
None vs Tape/Pamphlet

Tape vs Pamphlet

IVAB;

Is difference between none and tape/pamphlet different for individual vs group?

Is the difference between tape and pamphlet different for individual vs group?



Main Effect Contrast Coefficients:

Individual vs Group – 1 -1

None vs Tape/Pamphlet – 2 -1 -1

Tape vs Pamphlet – 0 1 -1.

Main Effect Contrasts:

The SS for a Main Effect IV involves multiplication by the number of groups (J or K) on the other IV.

MSE = 14.39 so we can calculate each main effect F as the MS for each contrast divided by the MSE.

IVA Main Effect Contrasts:

The SS is the same as the SSA from the omnibus test.

IVB Main Effect Contrasts:

$SS_{\psi B1} + SS_{\psi B2} = SSB$ from the omnibus test (they're mutually orthogonal contrasts).

Because the coefficients are in integer form they don't represent the actual mean differences.

For IVA $SS_{\hat{\Psi}_A} = \frac{Kn(\hat{\Psi}_A)^2}{\sum c^2}$

For IVB $SS_{\hat{\Psi}_B} = \frac{Jn(\hat{\Psi}_B)^2}{\sum c^2}$

Interaction Contrasts:

Like the main effects, the SS for interaction contrasts add up and are independent.

$$\hat{\Psi}_{AB1} = (2 \times 28) + (-37) - 31 - (2 \times 26) + 29 + 29 = -6$$

$$SS_{\hat{\Psi}_{AB1}} = \frac{12 \times (-6)^2}{12} = 36$$

	Individual			Group		
	None	Tape	Pamphlet	None	Tape	Pamphlet
A	1	1	1	-1	-1	-1
B1	2	-1	-1	2	-1	-1
B2	0	1	-1	0	1	-1
AB1	2	-1	-1	-2	1	1
AB2	0	1	-1	0	-1	1

Controlling for Type 1 Error Rate – Families of Comparisons:

In Two-Way ANOVA there are three families;

Two main effects (A and B), & one interaction effect (AxB).

It is acceptable to use DER for the omnibus tests but control the EER for the contrasts.

Controlling Type 1 Error Rate for Multiple Contrasts:

DER – too liberal (contrasts may not be independent or orthogonal).

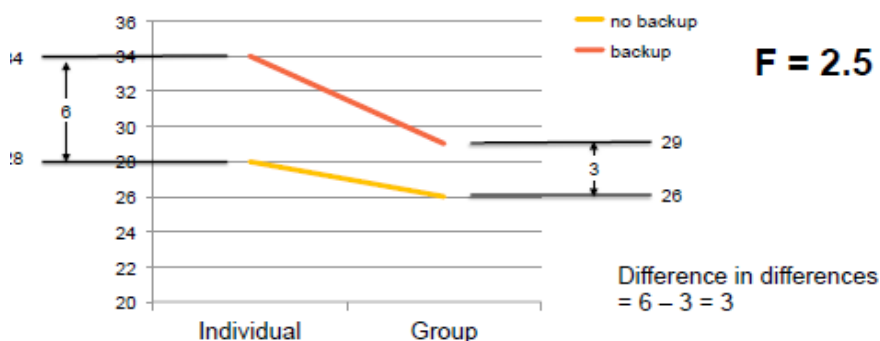
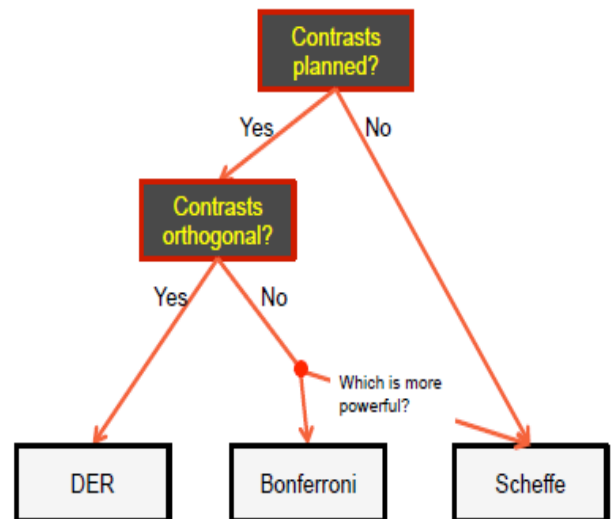
FER – acceptable (each family of F tests share .05).

EER – too restrictive

We control α because we're very likely to make a type 1 error because there're so many potential comparisons.

Controlling FER:

If $k \leq dfB$, Bonferroni is more powerful than Scheffe.



Interpreting Interaction Contrasts:

AB1 – A = Individual vs Group, **B1** = None vs Tape/Pamphlet.

Is the difference between no back-up to back-up between individual or group sig. different to zero?

You obtain the same F value whether the difference is across rows or across columns.