

Stat 402: More uses of contrasts in a 2 way factorial design

- Why I don't use any multiple comparison adjustment for orthogonal (or nearly orthogonal) set of contrasts

Usual tests in 2 way factorial have no multiple comparison adjustment. Even when there are lots of tests (e.g. in a 4 way factorial), I've never seen any multiple testing adjustment! When equal n 's, those tests are a set of orthogonal contrasts. So, be consistent. Don't adjust other sets.

- usual structure; unusual questions

Treatments have a 2 way structure, but the questions are not the usual questions.

One example :

crop genotype, 3 levels: GMO type A, GMO type B, isoline control
insecticide, 2 levels: none, standard practice

- Q: 1) Compare the GMO type A without insecticide to control with standard practice
2) Compare the GMO type B without insecticide to control with standard practice

		μ_{AN}	μ_{BN}	μ_{CN}	μ_{AI}	μ_{BI}	μ_{CI}
Q 1	1	0	0	0	0	0	-1
Q 2	0	1	0	0	0	0	-1

Could also ask other questions, but these two are the most important.
Use contrasts above to answer.

- Augmented factorials (not the only name used for this sort of design)

Common in crop fertility studies, could easily happen elsewhere

Type of N fertilizer, 2 levels: organic or Ammonium Nitrate

Rate of application, 4 levels: 0, 50, 75 or 100.

Typical sort of cell means:	Type:	0	50	75	100
	organic	70	120	130	140
	Am.Nitr	70	140	150	160

Usual 2 way ANOVA: strong evidence of an interaction.

But, expect that if type of fertilize has any effect when applied.

The two 0 rate cells are the same treatment!

Using contrasts among 7 unique treatments:

Contrast	μ_0	$\mu_{0rg,50}$	$\mu_{0rg,75}$	$\mu_{0rg,100}$	$\mu_{AN,50}$	$\mu_{AN,75}$	$\mu_{AN,100}$
Ave. Fertilizer	1	-1/6	-1/6	-1/6	-1/6	-1/6	-1/6
Type, when present	0	1/3	1/3	1/3	-1/3	-1/3	-1/3
Rate, when present	0	-1/2	0	1/2	-1/2	0	1/2
	0	-1/4	1/2	-1/4	-1/4	1/2	-1/4
T*R, when present	0	-1	0	1	1	0	-1
	0	-1	2	-1	1	-2	1