Post Hoc Comparisons

Descriptives CI % : 95

Group	N	M	SD	SE	Lower	Upper
1	4	2.000	2.449	1.225	-1.898	5.898
2	4	6.000	2.449	1.225	2.102	9.898
3	4	7.000	2.449	1.225	3.102	10.898
Total	12	5.000	3.162	0.913	2.991	7.009

These values of the group statistics are calculated separately for each group. They are not identical to the values obtained from analyzing the variable as a whole.

A grand mean can be determined by taking the weighted average of all of the group means:

$$M_{TOTAL} = \frac{\sum n(M_{GROUP})}{N} = \frac{4(2) + 4(6) + 4(7)}{4 + 4 + 4} = 5.000$$

Tests of Between Subjects Effects

Source	SS	df	MS	F	p	Eta-Sq
Between	56.000	2	28.000	4.667	0.041	0.509
Within	54.000	9	6.000			
Total	110.000	11				

Multiple Comparisons (HSD)

(I) IV	(J) IV	Diff.	SE	p	Lower	Upper
1	2	-4.000	1.732	0.106	-8.836	0.836
	3	-5.000	1.732	0.044	-9.836	-0.164
2	1	4.000	1.732	0.106	-0.836	8.836
	3	-1.000	1.732	0.836	-5.836	3.836
3	1	5.000	1.732	0.044	0.164	9.836
	2	1.000	1.732	0.836	-3.836	5.836

Mean Difference ("Diff") is the difference between the means for the two listed groups.

These "Standard Errors" are for the difference between the two group means. The values are a function of the MS_{WITHIN} (from the ANOVA) and the sample sizes:

$$SE_{DIFF} = \sqrt{\left(\frac{MS_{WITHIN}}{n_{GROUP}}\right) + \left(\frac{MS_{WITHIN}}{n_{GROUP}}\right)}$$

$$SE_{DIFF} = \sqrt{\left(\frac{6}{4}\right) + \left(\frac{6}{4}\right)} = 1.732$$

In this case, because all groups are of the same size, the standard error for each comparison is the same.

This section provides confidence intervals around (centered on) the Mean Differences. Calculation requires the appropriate critical value. Specifically, the HSD statistic (with 2 $df_{BETWEEN}$ and 9 df_{WITHIN}) that has a probability of .05 equals 3.068. For the first comparison in the example:

$$CI_{DIFF} = M_{DIFF} \pm (HSD_{CRITICAL})(SE_{DIFF})$$
$$CI_{DIFF} = 4.000 \pm (2.792)(1.732)$$

Thus, the estimates that the true population mean difference is somewhere between -8.836 and 0.836 (knowing that the estimate could be incorrect).

The "t" column provides an HSD value that is conceptually similar to a *t* statistic in that it is a function of the "Diff" and the "SE". For the first comparison in the example:

$$HSD = \frac{M_2 - M_1}{SE_{DIFF}} = \frac{-4.000}{1.732} = -2.309$$

The "p" column provides the probability of the HSD statistic. An HSD of -2.309 (with 2 $df_{BETWEEN}$ and 9 df_{WITHIN} like in the ANOVA source table) has a two-tailed probability (*p*) of .106, a finding that is not statistically significant.