Post-hoc procedures

Pairwise comparisons

In the case you have no specific a priori predictions about the data you have collected

Post-hoc consists of pairwise comparison (compare all different combinations of the treatment groups)

Perform a t-test on each pair of groups??
No!!!
Pairwise comparisons control the family wise error by correcting the level of significance for each test such that the overall Type I error rate (a) across all comparisons remains at .05

Control the overall Type I error Bonferroni correction

- Divide by the number of comparisons, thus ensuring that the total Type I error is below .05.

- If we conduct 10 tests, .05/10 = .005 our criterion for significance

- But there is a chance – a loss of statistical power – This means that the probability of rejecting an effect that does not actually exist (Type II error)

- By being more conservative in the Type I error, we increase the chance that we will miss a genuine difference in the data

Which post-hoc test to perform

- It is important that multiple comparisons procedures control the Type I error rate but without a substantial loss in power
- When you have equal sample sizes and group variances are similar use REGWQ or Tukey
- If you want guaranteed control over the Type I error rate use Bonferroni
- If sample sizes are slightly different then use Gabriel
- If sample sizes are very different use Hochberg's GT2
- If there is any doubt that group variances are equal then use the Games-Howell procedure