

Please join the Biometric Colloquium

LUDWIG A. HOTHORN

Retired from Leibniz Universität Hannover, Germany

THE DUNNETT PROCEDURE IN TWO-WAY FACTORIAL LAYOUTS WHEN INTERACTION IS POSSIBLE

April 24th, 2025 at 9:30-11:00 am

Seminarraum Center for Medical Data Science (previously CeMSIIS),

Spitalgasse 23, Room 88.03.513

Medical University of Vienna, 1090 Wien

Host: Martin Posch

Abstract:

The appropriate use of multiple comparison procedures in factorial designs is challenging. The common conditional approach uses MCPs ‘split by secondary factor levels j ’ when the global interaction F-test is significant, and pooled across these levels when it is not. This approach has several disadvantages, such as severe loss of power when splitting, or ignoring the effects of global vs. local interactions.

As an alternative, a multiple contrast test in a pseudo-oneway cell means model based on Kronecker-type interaction contrasts is demonstrated. A possible Dunnett-type contrast matrix includes i) comparisons against the control for the pooled data, ii) j Dunnett's type comparisons split per level of the secondary factor. The advantage: interpretation of simultaneous confidence intervals in terms of main, secondary and interaction effects - jointly. The disadvantage is obvious: many comparisons, leading to conservatism. This can be reduced by i) restricting to only 2 or 3 factors with only 3, 4 or 5 levels - typically in RCT, ii) taking into account correlation, iii) comparing power with multiplicity-adjusted ANOVA.

The R code for this approach is demonstrated using a data example for a clinical dose-finding study with males and females as secondary factor levels.

Finally, a brief extension to non-Kronecker-type cell means models is shown, e.g. dose combination trials with only a single zero-dose placebo group.