Review of Brien et al. 2011

The example is testing the effect of training condition on heart rate in endurance athletes.

Twelve athletes are to be recruited and each will undergo three tests, separated by seven days, under 3 training conditions.

The author give describe the factor-allocation diagram which is an extension from the randomisation diagram.

The first principle is to formulate the skeleton ANOVA table using this factor-allocation diagram.

However, I can already produce the skeleton of ANOVA table directly from the design using my package.

The second principle stated a good experimental design employs, replication, randomisation and blocking.

The third principle says assign treatments to the least variable entity-type so that the contribution of other entity types to the variance of the estimates of treatments effects is reduced as far as possible. That is, the general aim should be to have treatment sources estimated solely from or confounded with the source associated with the smallest entity-type, unit, as these entities are anticipated to have smallest variation.

Take a rectangular grid of plots, which indexed by Rows and Columns, they should only be designated as crossed if substantial Rows and Columns differences are envisaged, if the differences in just the rows direction would result in Columns nest within Rows.

Nesting – hierarchical unit factors

Crossing – non-hierarchical unit factors.

In the Athlete training experiment, the Tests is nested within Athlete by assuming no order effect in testing an athlete which is sensible because there are seven days gap between tests. However, consider the Test is crossed with the Athlete, the degrees of freedom will reduced from 22 to 14, due to the 8 degrees of freedom associated with the between Tests within Month stratum.

Principle 4, if confounding some treatment sources with unit sources for which greater variation is expected, that is when the treatment factors: i) require larger united than others, e.g. cages.

ii) expected to have larger effect.

iii) less of interest than others.

Principle 5. Whenever possible,