

More than two groups: summary

If we have more than two populations, with a sample from each, the analysis of variance allows us:

1. To estimate the percentage of the total variation that can be attributed to difference between populations (over and above differences between individuals).
2. To assess the statistical significance of the apparent differences between populations.

If the significance test is positive (F_s larger than tabulated F), then we can conclude that there are probably real differences between the populations. If it is not, then we can conclude that any differences between populations are too small to be demonstrable with reasonable sureness from the available data.

Prospect

The analysis of variance is an elegant and powerful statistical tool. It can be used for more complex analyses than I have shown here. For example, suppose we had samples from several locations, each divided into males and females. Differences in wing-length might arise from four basic sources:

1. Differences between individuals
2. Differences between sexes
3. Differences between locations
4. Differences between locations in the size of sex differences (or, to put it another way, differences between sexes in the size of locality differences)

All these could be estimated, and their significance tested, by the appropriate analysis of variance.

Even more complex analyses are possible. Their case depends very much on how the data are collected. It is always valuable, therefore, to consult a statistician before gathering the data. That way, one is less likely to amass a set of data that it is quite impossible to analyse - as happens all too often.

This series of articles has dealt with some basic statistical ideas and techniques. I have not dealt with the statistics of counts or with the examination of correlations. I hope, nonetheless, that the basic ideas presented have made it easier for readers to approach such matters. I hope also that they have shown that statistics is basically a matter of ornithological common sense and that the arithmetic involved is fairly trivial. What I intend to do in the next (and last) of the series is to discuss some of the traps into which the unwary often fall, so that the common sense and ability to use the formulae will be backed up with a sufficient degree of caution.

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Table 6

Partial table of F values for 5% significance level

<u>Second Degrees of Freedom ($\sum n - k$)</u>	<u>First Degrees of Freedom (k - 1)</u>			
	1	2	3	4
1	161	299	216	225
2	18.5	19.0	19.2	19.3
3	10.1	9.55	9.28	9.12
4	7.71	6.94	6.59	6.39
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13	4.67	3.81	3.41	3.18

IT'S THE THOUGHT THAT COUNTS?

Extract from a notice to wildfowl counters fastened to the wall of a hide at a coastal nature reserve:-

"Accurate estimates of wildfowl in flight are very difficult and should be avoided where possible."