ANALYSIS OF DATA SET 1

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The time period splits into a preliminary period (1 to 4) and a treatment period (4 to 7). The preliminary period provides information about the pre-treatment consistency and sensible statistics are the mean weight and the weekly gain [(wk 4 – wk 1)/3)]. The rate of weight increase after treatment can be estimated by the linear regression (weeks 4 to 7) or, if the autocorrelation is suspected to be substantial, by the extremes rate [(wk 7 – wk 4)/3]. The calculated statistics are shown over. The first guinea pig in group 1 is an outlier candidate but not wholly convincing. It is always the bottom of the pile, but at the end of the preliminary period is not a clear outlier and not surprisingly does not really recover. I would need confirmation from the experimenter that the animal was genuinely sick before I would be happy about omitting the animal, which is clearly the extreme one, from the analysis.

If the doubtful animal is included the means for group 1, group 2, group 3, and groups 2 + 3 are

$$-1 \qquad +25 \qquad +15 \qquad +20$$

with standard errors of difference

$$\pm 7.6 \text{ (any pair of groups)} \qquad \pm 5.7 \text{ (1 vs 2, 3).}$$

If the doubtful animal is omitted the corresponding figures are

$$+4 \qquad +24 \qquad +15 \qquad +20$$

$$\pm 5.4 \text{ to } \pm 5.7 \qquad \pm 5.1.$$

The conclusion is clear, in both cases. Vitamin E increases the growth rate. The results are almost identical if only the results for weeks 4 and 7 are used in the weight gain calculations.

In the context of the model-based approaches to this and other data sets, random effect slopes are fitted expressing variation between animals, slope estimates are mainly dependent on extreme times, thereby being robust to positive autocorrelations, and the pre-treatment results