

PLANT-GROWTH EXPERIMENT

16. Alternative Models

The two-predictor variables in this study, seed and water, are categorical, and they were entered as fixed factors in the GLM General Factorial procedure. *Water* factor occurs at four levels. In the model described in Section 8, the *seed* factor and *water* factor are the main effects of interest, and their interaction is in the model. In this section

Now we will consider two alternative models that can be used to study the effects of seed variety and water on the plant height.

1. Model 1: Water is now measured on a continuous scale.

The experiment is redesigned in this way that seeds are randomly assigned to the pots, but water is no longer a categorical variable. Instead, we measure the total amount of water used for each plant, where the amount of water used each time is a continuous random variable.

In this case a simple linear regression model can be used for each seed with water as the predictor variable and height as the response variable. If the effects of seed type seem to be additive, a regression model with seed as a indicator variable and water as quantitative variable can be applied.

2. Model 2: Plant height is measured twice: at two weeks and ten weeks.

In this case the response variable is the height of the plants at 10 weeks. The factor of interest is the type of seed. If there is no variation in the heights of plants at 2 weeks, the model used in Section 8 can be applied. However, if there is variation in the heights of the plants at 2 weeks, the height at 2 weeks can be entered as a covariate in order to determine whether the type of seed makes a difference in the final height for plants of equal height at 2 weeks.

To produce the analysis of covariance results, recall the GLM General Factorial dialog box, or from the menus choose:

Statistics

General Linear Model

GLM-General Factorial...

Dependent Variable(s): final height (at 10 weeks)

Fixed Factor(s): seed, water

Covariate(s): initial height (at 2 weeks)

Model...

Full Factorial

Carry out the analysis with SPSS and formulate your conclusions.