Hypothesis Testing:Motivation through an example

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We have already seen the familiar example where we had six different plots that were as identical as possible,and we sow 3 different varieties randomly in equal proportion on these plots.We measure the yield for these different varieties. We get the equations as:

$$y_{ij} = \mu + \alpha_i + \epsilon_{ij} \quad i = 1, 2, 3 \quad j = 1, 2$$

where

$$\epsilon_{ij} \sim (0, \sigma^2)$$

We ask the following question:Do the 3 varieties differ in terms of their yield? If not then our model is:

$$y_{ij} = \mu + \epsilon_{ij} \quad i = 1, 2, 3 \quad j = 1, 2$$

The above is a restricted version of our original model,where we are setting the α_i's equal to 0 or some other constant.Note that the two μ's in the two models may be different.So our second model represents a set of distributions which is a subset of the first set of distributions.Such a model is called a restricted model, or a nested model and that's what we are going to specialize on.