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Title: Planning of experiments and the use of Hasse diagrams

Abstract:

Experiments, as opposed to surveys, involve researchers manipulating situations by applying treatments, in an effort to draw conclusions about what their manipulations have caused. Surveys merely observe some aspect of the world as it is. Experiments represent a very important technique in the acquisition of scientific knowledge. In this talk we outline the experimental process, discuss the necessity of using replication and randomization in an experiment, and the desirability of using blocking. We describe the three most basic experimental designs: completely randomized design, randomized complete block design, and latin square and outline considerations in selecting the set of treatments to be included, which depends on whether the goal of the experiment is selection, comparison or optimization. We also discuss the importance of internal and external validity for an experiment. Finally, we illustrate the construction of Hasse diagrams and their usefulness in forming an ANOVA table, calculating degrees of freedom, sums of squares expressions, and expected mean squares.