

control of the experimenter. The terms independent variable and treatment will be used interchangeably. The *dependent variable* is the amount of food consumed by the rats. The dependent variable reflects any effects associated with manipulation of the independent variable.

### SELECTION OF DEPENDENT VARIABLE

The choice of an appropriate dependent variable may be based on theoretical considerations, although in many investigations the choice is determined by practical considerations. In this example, other dependent variables that could also be measured include

1. Activity level of rat in an activity cage.
2. Body temperature of rat.
3. Emotionality of rat as evidenced by amount of defecation and urination.
4. Problem-solving ability.
5. Weight of rat in grams.
6. Speed of running in a straight-alley maze.
7. Visual discrimination capacity.
8. Frequency of mating behavior.

Several independent variables can be employed in an experiment, but the designs described in this book are limited to the assessment of one dependent variable at a time. If it is necessary to evaluate two or more dependent variables simultaneously, a multivariate analysis of variance design can be used.\* Some of these multivariate procedures are so complicated or so tedious that they cannot reasonably be carried out without a digital computer. However, the increasing availability of computer facilities makes the use of multivariate procedures more widespread. Univariate procedures can be appropriately applied to most research problems because it is generally impossible to measure more than a limited number of dependent variables, and those that can be measured are often found to be highly correlated.

The selection of the most fruitful variables to measure should be determined by a consideration of the sensitivity, reliability, distribution, and practicality of the possible dependent variables. From previous experience, an experimenter may know that one dependent variable is more sensitive than another to the effects of a treatment or that one dependent variable is more reliable, that is, gives more consistent results, than another variable. Because behavioral research generally involves a sizable investment in time and material resources, the dependent variable should be reliable and maximally sensitive to the phenomenon under investigation. Choosing a dependent variable that possesses these two characteristics

\*A discussion of these designs is beyond the scope of this book. The reader is referred to Anderson (1958), Cooley and Lohnes (1962), Fryer (1966), Morrison (1967), and Rao (1952) for a discussion of multivariate procedures.