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Data Structure for a Repeated Measures Analysis
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Repeated-measures designs are very common in many fields of study because of their logistical and statistical efficiency. This newsletter describes repeated-measures designs and the two different ways in which data from a repeated-measures design can be constructed.

A repeated-measures design measures each subject or unit two or more times. For example, one might record weights of children subjected to different diets at several different time points. Or, one might record the heights of a plants to which herbicides have been applied every week for six weeks. In both these examples, two successive measurements on the same child or plant will be expected to be more related to each other than if the measurements were taken from different children or plants. This is the basic reason why a special analysis is required to analyze these data.

Data from a repeated-measures design can be set up in two different ways. In the first way, a row in the data represents a child, referring to the first example. An identification variable is needed for child and another for diet. For each repeated measurement (i.e., weight) over time, a new variable is created. For example:

Child	Diet	Weight1	Weight2	Weight3
1	1	3.4	3.9	4.0
2	1	2.9	3.1	3.5
3	2	3.7	3.7	4.1

In the second way, a row in the data represents a child at a time. Two identification variables are needed for children and times, in addition to an identification variable for diet, but only one variable is needed for the measurements on weight. For example:

Child	Diet	Time	Weight
1	1	1	3.4
1	1	2	3.9
1	1	3	4.0
2	1	1	2.9
2	1	2	3.1
2	1	3	3.5
3	2	1	3.7
3	2	2	3.7
3	2	3	4.1

Both these methods of structuring the data preserve the connection between the information on the child level and the information on the time level. Which set-up of the data is best in a given situation will depend on a number of factors, including the assumptions to be made, presence of missing data, balance of the design, and software available for analysis.

For further information about how to proceed on constructing or analyzing the data, please contact the Office of Statistical Consulting.

Author: Francoise Vermeylen

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