

COMPUTER-ASSISTED REAL-TIME OBSERVATION: ISSUES IN DATA MANAGEMENT.

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ABSTRACT

Growing interest in real-time behavioral observation is hindered by the limited amount of information available on the topic. With this in mind, emphasis will be placed on relating the structure of real-time data, the inherent problems encountered when using such data, and the actual programming approach we utilize in our work.

INTRODUCTION

Advances in computer software technology have made it possible for researchers using microcomputers to record the precise frequency and duration of multiple behavioral and environmental events in natural settings. The result is large and highly complex data sets composed of multiple, overlapping event sequences. Unfortunately, data of this type are not amenable to statistical analysis without a considerable amount of manipulation. The purpose of this presentation is to familiarize you with a few of the unique problems associated with real-time programming, the logic behind our approach, and a demonstration of how this logic translates into SAS ® code. This discussion will focus specifically on resetting start up keys, "forcing" non-occurring codes, and calculating the total time spent for each activity.

COMPUTER-ASSISTED REAL-TIME OBSERVATION

The authors and their colleagues are currently using the Portable Computer Systems for Observational Research Software from Communitech International (DeKalb, IL). This software allows laptop computers to be

programmed to record the frequency and/or duration of up to 45 events in real-time; thus making it possible to examine the temporal relationship of behavioral and environmental events in greater depth than has been previously possible (Burgio 1996; Suen & Ary, 1989).

The primary difficulty encountered in real-time programming is being able to accurately account for 100 percent of the observation time. We use three simple procedures to guarantee that all observation time is accounted for and that unbiased descriptive and parameter estimates are obtained.

First, it is necessary to recover the three to seven seconds lost while initiating each observation session by resetting the start time of all data files to zero.

Second, all non-occurring codes must be "forced" into each data file and assigned a value of zero so that true means and standard deviations can be calculated. For example, if a patient spends 10 minutes engaged in some activity in one file and zero time engaged in that activity in a second file, SAS will ignore the second file because the activity does not occur. Without "forcing" zeroes the mean time spent in this activity would appear to be 10 minutes per file (10 minutes/1 occurrence). Instead, the true mean would be 5 minutes per file (10 minutes/ 2 occurrences).

Third, when computing the total time spent engaged in each activity, multi-second duration codes and one second frequency codes must be treated differently. In cases where a code's start time and end time are different, we simply

subtract the former from the latter and are left with the true duration of the activity. In cases where a code's begin time and end time are the same, as is always the case with frequency codes, a value of one second is assigned.

CONCLUSION

The use of microcomputers in direct behavioral observation has the advantage of greatly simplifying the recording task; thus reducing problems of information overload, maximizing the time available for observation, and increasing the number of subjects and behaviors that can be observed concurrently (Suen & Ary, 1989). Real-time observational software, however, is still relatively unrefined. Programmers doing real-time work should be aware of the advantages and limitations of the data collection system.

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