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FLEXIBLE WORK SCHEDULES AND FAMILY TIME ALLOCATION: ASSESSMENT OF A SYSTEM CHANGE ON INDIVIDUAL BEHAVIOR USING SELF-REPORT LOGS

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This study assessed the effects of a flexible work schedule ("flextime") on time allocated to children and spouse by federal workers. Direct behavioral observations of family, home, and work functions were precluded because of the cost involved in observing many people for long periods of time. In order to obtain detailed individual data, participants completed hour-by-hour activity logs a mean of twice per week for 35 weeks. Participants received prior training on log completion, initial feedback on the detail of their log entries, and were prompted to complete the forms. Four different procedures assessing reliability indicated a corroboration rate of 80% with other sources. Log data were reliably reduced to nine categories such as "PM time with children" and 37 subcategories such as "time at dinner." The log data were presented in time-series form and the use of a quasi-experimental design showed that participants who altered their work schedule were able to spend more PM time with their families. The log data demonstrated that the capacity exists to assess closely the effects of large-scale changes at a micro-behavioral level, but other methods are needed to make complex self-reporting systems less expensive and more capable of immediate monitoring of the intervention's effects.

DESCRIPTORS: evaluation research, behavioral community psychology, self-report logs

One important trend in the evolution of behavior analysis involves efforts at large-scale system modifications (Glenwick & Jason, 1980). The principles and methodologies of behavior analysis have recently been extended, for example, to such areas as organizational behavior management (Prue, Frederiksen, & Bacon, 1978), community health education (Meyer, Nash, McAlister, Maccoby, & Farquhar, 1980), and transportation management (Everett, Hayward, & Meyers, 1974). Often the dependent measures in such investigations are system or setting focused, or aggregate counts of individual behavior, rather than analyses of the same individual's behavior under varying conditions. For example, in community litter programs, the primary dependent measure has generally been litter counts made in designated areas (Geller, Brasted, & Mann, 1980). Transportation interventions have used bus ridership counts to assess effectiveness (Everett et al., 1974), and health-care programs have focused on aggregate appointment data (Reiss, Piotrowski, & Bailey, 1976). Obviously, in many instances, having the level of the independent and dependent variables closely match is an appropriate strategy, e.g., system-level intervention with system or aggregate individual data.

However, there are also some situations in which detailed analyses of the interactions of system-level change with individual behavior change may also be highly appropriate (Meyer et al., 1980; Willems, 1974). For example, Bronfenbrenner (1979) has recently proposed

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a framework for developing and evaluating what he described as "macro-level" changes (system, organization) on "micro-level" events (individual behavior). Bronfenbrenner's formulations are specifically directed to family policy. In particular, he has proposed that ("macro") changes in work patterns, including instituting flexible work schedules and career-oriented part-time work, should be developed and longitudinally analyzed for their ("micro-level") benefits to families with young children.

Such investigations will require methods to assess in detail various aspects of family life, for many families, studied over relatively long periods of time. However, observational procedures typically used for most behavioral research would appear to be too expensive (and possibly obtrusive) for the proposed family life and work-patterns studies, or for other large-scale studies of the effects of system-level change on individual behavior. Other, less expensive methods that still yield reliable, fine-grain individual data seem needed.

This paper will report on one type of benefit that may accrue to young families when a worker from the family is allowed to temporally alter his or her work schedule—increased time for family-related activities. However, the major purpose of the paper is to describe the methodology involved in collecting detailed time-allocation data for such activities as commuting, work, spouse, child, and family interactions, and a range of highly specific events such as time spent in dinner, exercise, or TV watching. These data were collected from hour-by-hour *time-activity logs* kept by participants in two studies on flexible work hours. The methodology for collecting these data, examples of outcomes, and costs and benefits of such fine-grained data for analyzing system changes will be discussed.

METHOD

Background

Two studies were conducted with employees of two large federal agencies (see Winett & Neale, 1980*a* and Winett, Neale, & Williams, Note 1, for a complete summary of this work). All participants (N = 97) were volunteers, and in both agencies, workers could adopt a minimal flexitime system that allowed them to alter their work schedule by about one hour. Political and logistical considerations did not allow random or staggered (e.g., multiple baseline) assignment of workers to flexitime and regular hour conditions, necessitating that a quasi-experimental (nonequivalent control group) design be used for evaluation (Campbell, 1969).

The studies involved a baseline period when all workers were on regular work hours and a flexitime period when some workers then chose to change their work schedule. For study two, which will be the focus of this report, the baseline (regular hours) lasted for seven weeks and data were collected for 28 weeks during the flexitime period. The limited flexitime system allowed workers to arrive or depart 45 min earlier or later than the original 8:15 AM to 4:45 PM schedule, with an eight-hour work day (plus ½ hour for lunch) still required. Employees (N = 24) were considered to have changed their schedules if they always came to work at least 30 minutes earlier (e.g., all opted for an earlier schedule) than regular hours during the flexitime system. *No change* employees (N = 26) retained their original schedule, and 15 employees varied their schedule. Results for this latter group will not be presented here.

A major objective of the studies was to ascertain how even minimal alteration of the work schedule affected time allocated to family activities. For example, there may be some benefits in arriving home somewhat earlier, e.g., more time with children, less traffic. Such changes in schedule could also have qualitative benefits as certain difficult situations (e.g., having time to prepare dinner) now could become easier. However, given the number of participants in the study (N = 65 for study two) who lived in diverse locations, the length of the data collection period (35 weeks), and the fact that the

activities to be investigated primarily took place in the home, ethical, fiscal, and logistical constraints precluded direct observation of participants in their homes.

Instead of direct observations, time allocation data were obtained through the use of standardized and detailed logs recorded by participants two to three times per week. Reviews (Ciminero, Nelson, & Lipinski, 1977; Kazdin, 1974; Nelson, 1977) of self-reporting/self-monitoring of overt and covert events through the use of different written instruments have cautioned about the accuracy of such data and the persistence of data recording. Despite these possible limitations, our studies used the log instrument for a number of reasons: (a) as noted above, direct observation was precluded; (b) cross-sectional time-allocation research investigating similar issues had reported acceptable reliability with a log instrument (Robinson, 1977); (c) it was possible to train participants in log recording, and (d) to prompt log completion; and (e) reliability of the logs could be assessed through multiple methods.

Participants

Participants were 65 federal employees performing administrative work at the agency's headquarters who volunteered (see Winett, Neale, & Williams, 1979, for recruitment procedures) for the project. Participants spanned a complete range of federal job levels and had a mean 1978 gross income of approximately $20,000. As noted above, data will be presented only on workers who either changed (N = 24) or did not change (N = 26) their work schedule. The change group consisted of four males from dual-earner families; two males from families where the wife worked part-time; seven males from single-earner (male) families; five females from dual-earner families, and six females from single-parent families. The *no-change* group included two males from dual-earner families; two males from families where the wife worked part-time; 10 males from single-earner (male) families; five females from dual-earner families, and seven females from single-parent families.

The mean age of *change* participants was 33.4 years and spouse mean age was 31.1 years. Change families had a mean of 1.8 children with a mean age of 5.7 years. The means for the *no change* group were age, 34.4 years; spouse age, 32.6 years; number of children, 1.8; child age, 5.9.

Mean job level (specific to the setting) was about the same, but the no-change group had been on the job for more years ($\bar{x} = 7.4$) than the change group ($\bar{x} = 5.3$ years). Thus, on most age, familial, and employment variables, the two groups were quite comparable.

Instrument and Completion Schedule

The time-activity log was an 8½″ × 14″ form that required participants to record the main activity engaged in; the time each activity began and ended; the setting for the activity; person interacted with for each activity; other secondary activities occurring while engaged in the primary activity noted (e.g., eating dinner is the main activity but also watching TV), and a rating of "enjoyment" of each main activity on a 5-point scale. Thus, the log potentially could yield a wealth of self-reported data on activities, interactions, time-allocations, and perceptions.

For the first 16 weeks (starting in April) of the project, seven of which were for the baseline period, logs were completed for Tuesday, Wednesday, and Thursday. For the next 10 weeks, logs were completed for Tuesday and Wednesday, and for the final 9 weeks (ending in December), logs were completed for only Wednesday. Logs were not completed on weekday holidays and there was a total of 75 possible log days. The rationale for the log schedule was to focus on typical weekdays, across a spring baseline period and across flexitime periods in the late spring, summer, and fall, while gradually decreasing the number of logs completed each week. The data to be presented below, do not indicate differential outcomes by day or schedule, suggesting the feasibility of the recording schedule. In addition, participants were

allowed by agreement with management to complete logs during work hours.

Training

Training for log completion consisted of providing each participant with a model sample form and giving written feedback for the first six weeks of the project on the quality of detail provided on his or her log. Feedback was given using one of three 8½″ × 11″ forms placed in each participant's weekly folder (see below). A gold form with a large smile on it was given if a project staff person judged the detail of a participant's logs for the week to be of a quality equal to or greater than the sample. A yellow form with a small smile, which listed all possible recording deficiencies, was given when it was judged that the participant's logs displayed less than four problems, with the problems specified by a check on the form. For more than four problems, a green form identical to the yellow form, but with a lesser smile, was given with the appropriate deficiencies checked.

Delivery and Retrieval of Log Forms

Log forms and other data instruments were placed in a folder and hand-delivered to each participant's desk, and hand-retrieved at the desk following a schedule of delivery on Tuesday morning and retrieval on Friday morning throughout the entire study. During the 35 weeks of the study, about 90% of distributed forms were completed and returned by the participants.

Reliability

The reliability of the logs was assessed using four different procedures as shown in Table 1 and as discussed in more detail in Winett et al. (1979). Despite the use of different modalities of information (e.g., telephone and time records versus logs); time between a spouse's log completion and the corresponding day for the participant's log (see Table 1); no training of the spouse in log completion, and a conservative estimate of spouse and participant agreement on the logs (see Table 1), the correspondence of log data with the four different corroborating sources at an 80% agreement level appears to meet acceptable standards (Kazdin, 1975).

Reliability and the Process of Reduction of Log Data

The log data were reduced to nine standard categories (work time, and AM or PM time with spouse, children, spouse and children, or alone) and 37 subcategories (such as time in exercise, commuting, dinner, or TV) by six trained coders following reliability procedures involving independent matching of activity category and time entries to a "master" coder (author two), and independent agreement between individual coders. Reliability checks were done in such a way that coders were unaware they were being checked, and were done throughout a 3-mo data reduction period. Agreement with the master coder and between coders was approximately 90%. The exact criteria and procedures are specified in detail in Winett et al., 1979.

Thus, the log data as recorded by participants appear to be of acceptable reliability and log data were reliably reduced to standard categories.

RESULTS

Overall Outcomes

For each participant, a maximum of 75 logs were available. However, this total was reduced in several ways. Logs were not completed during sick days or vacation days, and across participants, 10% of the logs were simply not completed. Logs were not included in analyses when less than 23 hours of time were found during data reduction procedures to be accounted for on a log; when a participant worked more than 570 min or less than 450 min (e.g., 510 min was the regular day); or when children were not at home (e.g., summer vacations) for three or more consecutive days, retroactively effective to the first day of the series.

Overall analyses of the log data based on

Table 1

Methods, Criteria, and Correspondence Rate for Assessing Log Reliability

Method	*Criteria*	*Correspondence*
Telephone calls to participants by "blind" assistant. Participants called a mean of 2.2 times during the middle of the project. Participant recounts activities during last 30 min, notes settings, and people involved.	Checked by other staff person. Activity, settings, persons noted the same, and time within 15 min, between telephone report and log.	155 calls made; 222 reports of activities, 204 reports corresponded (92%).
The *recording of a known event* checked by staff. Home interviews were conducted as part of the study on certain weeknights that logs were to be (independently) completed. Participants were not told of checks. Interviews conducted during first third of the study.	Checked later by staff person. The interview had to be indicated on the log at the same time it was scheduled.	30 of 34 (88%) interviews correctly listed.
Informant reports were obtained during the baseline, and middle of the study, by having the spouse complete a time-activity log during a home interview for a day corresponding to the last recording day for the participant. A mean of 2.7 days existed between the spouse and participant recording days, and no training was given to the spouse.	Checked later by staff person. Activity, settings, persons noted the same and time within 30 min.	296 of 325 (91%) of activities reported by both spouse and participant agree. However, 106 activities were not noted by each other. When these were included as "disagreements," the correspondence rate was 296 of 431 (69%).
Archival records were kept at the work site by a designated department timekeeper on arrival, departure, and lunch time. Records were obtained at the 7-mo point in the study for 10 specified days that had occurred at the 6-mo point.	Timekeeper records and participant reports on logs within 15 min of each other.	432 of 664 lunch time agreed (65%); 779 of 842 (93%) of arrival and departure times agreed; overall, 1,211 of 1,506 (80%) times agreed.
TOTAL		Including 106 activities not reported by spouse and participant (see above), 1,741 agreements were scored on 2,193 checks (80%).

mean participant scores for the baseline, spring, summer, and fall periods and reported elsewhere (Winett & Neale, 1980*a*; Winett et al., Note 1) indicated that the group of workers changing to an earlier schedule significantly increased their PM time with their children, and decreased their commute time. The no change group showed stability across these measures. However, rather than simply shifting time-allocation patterns, change group participants reported on other data instruments that the increase in PM time alleviated some of the difficulties involved in coordinating a number of work and home life situations (see Winett & Neale, 1980*a*; Winett et al., Note 1). The time and qualitative data outcomes of the second study were congruent with the results of a prior small-scale study (reported in Winett and Neale, 1980*b*), suggesting the generality of the time effects of the alteration in work schedule and family life. And, in both studies, the flexitime program was rated highly by management and employees (see Winett & Neale, 1980*a* and Winett et al., Note 1).

Fine-Grained Data

Figure 1 shows the "composite PM time spent with the family" for the change and no change

group for 75 log reporting days. Composite family PM time is comprised of data from PM "time with spouse," "time with children," and "time with spouse and children." Each reporting day's data represent a mean for those participants in each group completing a log for that day and within the criteria for work-time and children at home noted above.

The data show considerable day-to-day variability that did not, however, appear to be a function of the inclusion of individuals in a reporting day's mean, or as a function of day of the week. Particularly for the no change group, a pattern existed for days of high time with the family to be followed by low time days during all the phases of the study. The pattern was less apparent during the fall when recording was reduced to one day per week. We have no explanation for this pattern. Despite the variability, consistent group trends for change of level are apparent. During the baseline period, the group spent a mean of 237 min per recording day in composite family time compared to a mean of 226 min by the no change group. Mean time was increased by 36 min ($x = 273$) for the change group during the spring, but only by 6 min by the no change group ($x = 232$). During the summer, however, the change group again showed an increase of 36 min from baseline ($x = 273$), but the no change group showed an increase of 22 min ($x = 248$). During the fall, the change group showed an increase from baseline of 31 min ($x = 268$), while the no change group only increased 4 min ($x = 230$).

The daily patterns of the two groups shows considerable overlap in data points during the baseline period, some overlap during the summer, and virtually no overlap during the spring and fall. Both groups, however, show a trend for decreased family time as the fall phase progressed. These results suggest some seasonal interactions with family time and the effects of an alteration in work schedule.

Data similar to those shown in Figure 1 were available for each participant and for all main category time-allocation data, plus all subcategory data (e.g., "time in dinner"). Thus, it was possible to analyze outcomes for any participant

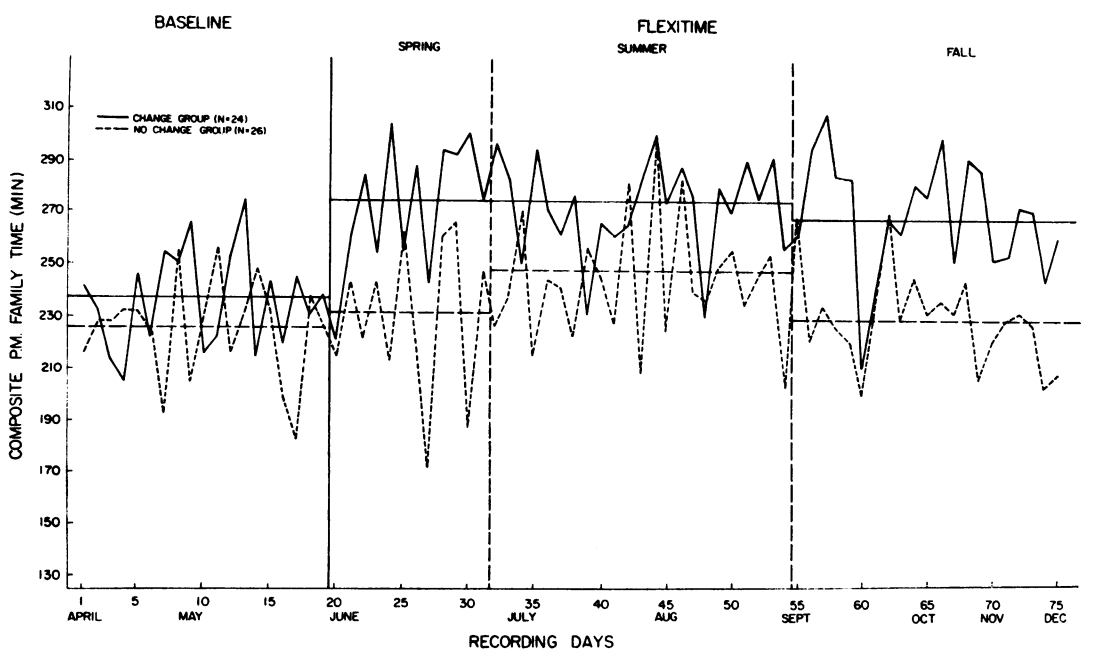

Fig. 1. Mean composite PM family time in minutes for the change and no change groups for each recording day across the baseline and flexitime phases of the study. Mean group times for the baseline period, and the spring, summer, and fall flexitime periods are indicated by horizontal lines.

and for any activity category included in the standard data-reduction procedures.

DISCUSSION

The time-activity log data that were presented demonstrated that relatively complex, written reports of events can be reliably recorded for long periods of time when people are provided with appropriate forms, training, feedback, and minimal prompting (e.g., form delivery and retrieval). This method may be particularly valuable when detailed behavioral observations of individuals are precluded for a variety of poential reasons.

In the present example, individually based, but group-presented, time-allocation data indicated that the introduction of a flexitime system that allowed employees to come to work earlier resulted in these workers being able to spend more time with their families during PM hours. A comparison group who retained their original schedule showed only minimal changes. A seasonal interaction effect was also identified.

Besides focusing on major categories of behavior (e.g., time with children), the time-activity log procedure also allowed assessments of more micro-level events (e.g., time for dinner, exercise, TV) that were also reliably recorded and reduced (Winett et al., 1979). For example, it was ascertained that the mean time in exercise on recording days for all study participants was 10.5 min. Time in exercise was not influenced by the flexitime system, but, not surprisingly, showed a seasonal effect with more exercise related activity reported in the summer. Similar data were analyzed for time in dinner, watching TV, and commuting, with commuting time showing significant reductions for the "change" group (see Winett & Neale, Note 2). Thus, the potential seems to exist to perform rather fine-grained, micro-analyses of diverse behaviors that may be affected by interventions at macro-levels. Such analyses may be helpful in planning public policies by pinpointing the costs and benefits to different types of individuals as a result of existing or proposed policies (Bronfenbrenner, 1979).

We are, however, by no means offering the time-activity log as the best means of securing such data. When used in its present form with many people, the time-activity log, though much less expensive than on-site observations (see Winett et al., Note 1), is still very expensive in terms of data reduction. For example, after training, the persons reducing the log data at a rate of $4.25 per hour, could only complete about six logs per hour, or about $.71 per log.

Further, the cost and subsequent time involved in data-reduction eliminated the possibility of continuous monitoring of the effects of the flexitime system. Without a continuous monitoring system, the potential to perform true behavioral analyses of a variety of flexitime/alternative work pattern programs, or other large-scale changes, is sharply reduced. Therefore, we are turning our attention to the development of methods using forms allowing direct computer entry. For the research on alternative work patterns, direct computer entry may allow continual assessment of how changes at work are affecting reported family behaviors for employees from different kinds of families, and help to develop more optimal *matches* between work arrangement and family life. Our goal is to use such instruments to evaluate, and "fine-tune" diverse alternative work pattern systems that are much more innovative than the flexitime system evaluated in the present study.

Thus, as behavior analysis evolves to frequent investigation of system-level change, we may still be able to ascertain reliably how such changes affect complex human behaviors even in circumstances where direct behavioral observations are not possible.

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