ASSESSMENT OF RESIDENT AND STAFF ACTIVITY
IN A STATE RESIDENTIAL SETTING

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Previous studies have demonstrated the use of momentary time-sampling methods for the objective measurement of naturally occurring events (Zarcone, Iwata, Rodgers & Vollmer, 1993; Shore, Lerman, Smith, Iwata & DeLeon, 1995). These studies have provided information about observed levels and characteristics of direct care services, supervision, resident activity and facility conditions. The present study evaluated the utility of these assessment procedures in a residential facility for developmentally delayed adults. The procedure was further evaluated for sensitivity to changes relative to an intervention designed to increase staff and client interaction. A multiple baseline design was used to assess a data collection procedure in the context of intervention in four residences on a state facility campus. Intervention included the use of scheduling, modeling and performance feedback. Results indicate an overall increase of staff and client interaction and demonstrate the utility of the assessment procedure for the evaluation of multiple, on-going activities as well as intervention effects.
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CHAPTER I

Introduction

Several research efforts in behavior analysis have evaluated various components of residential treatment including direct care services, resident behavior change and assessment methodology (Greene, Willis, Levy & Bailey, 1978; Shore, Lerman, Smith, Iwata & DeLeon, 1995). The utility of instruments utilized to assess and affect behavior in these settings may be influenced by variables specific to the treatment population and environment (Zarcone, Iwata, Rodgers & Vollmer, 1993). For example, large-scale, naturalistic assessment conducted in residential facilities produces challenges and considerations that are not encountered in other environments. Large-scale assessment necessitates that useful information be obtained across multiple individuals, behaviors, and conditions. This presents the challenge of employing accurate and timely measurement that yields useful information.

The goals of ongoing assessment in residential service settings include, among other things, the identification of environmental variables that may influence both staff and resident behavior, monitoring of individualized behavior programming, and monitoring of staff performance.

In order to obtain data that present a clear picture of behavior and its correlates, both positive and negative behaviors of staff and residents should be recorded, in addition to other variables such as environmental conditions and events. In experimental settings, the integrity of measurement is typically not compromised because conditions are controlled and data collection focuses on specific and well-defined variables. However,
measurement of important behavioral and environmental events and conditions in large-scale residential settings may be influenced by time shortages, lack of resources, reactivity, and the inability to accurately record multiple and simultaneous occurrences of targeted behaviors and environmental events. In addition, data are often collected by caregivers whose primary functions (e.g., assisting with grooming and hygiene, food preparation and serving, conducting training and habilitative procedures, carrying out behavior management programs) may interfere with accurate and timely data collection. It is, therefore, necessary to employ assessment procedures that emphasize ease of implementation and timeliness and that enable the acquisition of valuable and accurate information. Previous efforts have evaluated several approaches to assessment, including random or scheduled continuous direct observation (Mace & Lalli, 1991), scatter plot assessment (Touchette, MacDonald, & Langer, 1985), ecological analysis (Green, Reid, Perkins & Gardner, 1991) and momentary time sampling (Shore, Lerman, Smith, Iwata, & DeLeon, 1995).

Continuous observation has been utilized as one means of obtaining data in naturalistic settings. Typically, these procedures require the investigator to record naturally occurring events continuously during pre-determined intervals of time. Investigators are able to obtain a considerable amount of information in a relatively short period of time as well as capture some events that may be differentially correlated to behavior. However, continuous observation procedures can be cumbersome to conduct, and, because of inconsistent and often chaotic conditions in many naturalistic settings, may yield data that are difficult to interpret and do not readily reveal relationships among
behavior and the environmental and social conditions that surround it (Mace & Lalli, 1991).

Mace and Lalli (1991) used a continuous observation procedure in a natural setting to investigate the conditions under which a developmentally disabled individual engaged in bizarre speech. The results of this analysis were subsequently used to develop conditions for an analog analysis conducted in an experimental context. Using this type of analysis prior to experimental assessment allowed these investigators to examine correlates of behavior and schedules of antecedents and subsequent events that occurred in the natural environment. In the descriptive assessment, observations were conducted at randomly scheduled times and lasted for durations of 30 to 60 min. Environmental and behavioral events were operationally defined and recorded according to assigned categories. The target behavior and environmental conditions were recorded using a continuous 10-s partial interval procedure. Antecedent events were recorded throughout observation and measures were obtained for subsequent events for 3 10-s intervals following each occurrence of the target. Collectively, the two assessment procedures indicated similar behavior function; however, whereas the descriptive assessment indicated multiple control of aberrant behavior, the analog analysis indicated that the behavior was maintained only by social-negative reinforcement, enabling investigators to more clearly identify and isolate behavioral function. Thus, although the descriptive assessment provided evidence that the participant’s bizarre speech was maintained by a social contingency, the analog analysis was required to identify the specific type of maintaining contingency.
In an attempt to adapt continuous observation procedures to assessment of multiple participants and responses, Repp and Barton (1980) conducted naturalistic observations in a residential setting. In this study, data were collected on staff and resident behavior for the purpose of comparing habilitative programming efforts in licensed versus unlicensed cottages. Response categories were predetermined and operationally defined for staff and resident behaviors. Observers collected data for 50 min during scheduled intervals in 5 locations daily for a total of 250 min per day. A sequential procedure was used in lieu of sampling such that all individuals present were observed. Data were recorded after 6-s intervals (signaled via earplugs) and all responses observed were marked in the appropriate response category. This procedure permitted a thorough analysis of behaviors exhibited by both staff and residents, showing that residents on both licensed and unlicensed homes engaged in maladaptive behavior for comparable amounts of time. However, this methodology was also very time consuming and required resources that may not be readily available on an ongoing basis in many facilities. The potential for reactivity was also present because all staff were informed prior to the study of the specific timing and nature of the observations that were to be conducted.

Similarly, another study employed continuous observations during 45-min time intervals to assess behavior in a residential setting (Harchik, Sherman, Sheldon & Strouse; 1992). Observers recorded data during scheduled intervals of time that varied across weeks in order to observe participants in engaging in multiple activities occurring throughout the day. However, all observations were conducted between the hours of 3:30 and 5:30, and only after staff notification had been given. Thus, the validity of
assessment may have been compromised by inadequate and scheduled sampling from among all times of day, as well as staff reactivity. Additionally, the participants’ schedule was modified to accommodate the scheduled observations, thus presenting atypically occurring events.

Touchette, MacDonald and Langer (1985) used a scatter plot assessment to identify patterns of responding and environmental correlates. The authors asserted that this methodology is useful in natural settings and can provide investigators with valuable information about behavior patterns that are differentially associated with stable environmental conditions. This study evaluated the scatter plot in three case illustrations. Maladaptive behavior occurrences were plotted within a grid in which times of the day were distributed vertically and days of the month were distributed horizontally. By scoring only those intervals in which target behaviors are observed, visual depictions of the temporal flow of behavior were produced, and correlations with regularly scheduled environmental and social events were identified. Using information generated by the scatter plots, subsequent interventions were designed to manipulate events that had been highly correlated with targeted behavior. Significant reductions in responding were obtained, suggesting that the assessment procedure produced information necessary to develop effective treatment. There are some apparent advantages to scatter plot assessment, including the ability to conduct a preliminary assessment of controlling events in the natural environment which can subsequently be confirmed in a more controlled setting.

Recently, Kahng and colleagues (1998) evaluated the extent to which scatter plots conducted in residential settings would reveal evidence of temporal patterning.
Outcomes of 20 scatter plots were evaluated using visual inspection and statistical control analysis. Results indicated that 5 plots could not be interpreted due to low interrater agreement and, although some of the data sets were determined to be out of statistical control (i.e., showed statistical evidence of nonrandom patterning), none of the remaining 15 plots showed evidence of temporal patterning via visual inspection. The authors concluded that scatter plot assessments may not routinely produce evidence of correlations between environmental and behavioral events. Furthermore, scatter plots will not identify environmental correlates of behavior in less-structured contexts, in which day-to-day activities may fluctuate. Finally, scatter plots would be difficult to adapt for large-scale assessment in which the behavior of many individuals, as well as ongoing environmental and social events, must be simultaneously monitored.

Several studies have demonstrated the use of time-sampling techniques to measure the behaviors of multiple individuals in residential settings. These studies have primarily been conducted to obtain information relative to compliance with regulated and required standards for service providers. For example, Reid, Parsons, Green, and Schepis (1991) conducted observations to provide a comparison between survey versus non-survey conditions relative to staff and resident behavior. Observers recorded staff and resident behaviors at 5-min intervals using a time sampling procedure. Behavioral definitions were developed for staff including specific types of interactive (desired) and non-work (undesired) behavior. The first behavior exhibited by each staff member was recorded, as well as the number of staff engaged in each category of behavior. These observations occurred between 4:00pm and 4:30pm daily. Further assessment included in this study utilized a brief time-sampling procedure of environmental conditions in
which observations were conducted during scheduled resident leisure time. The results yielded information about staff reactivity in the presence of a team of oversight agency (Intermediate Care Facility for People with Mental Retardation [ICF/MR]) surveyors, indicating differential responding during those times. The generality of these findings is limited due to scheduled observations, which produced no information about what occurred at other times of day and set the occasion for potential reactivity. Additionally, observations conducted during the leisure condition only required that data be recorded on whether or not materials were within reach of a resident, providing only speculative information about whether residents actually contacted or engaged with those materials.

A similar assessment strategy involves the conduct of naturalistic observation within a “structural analysis” format. Structural analysis is comparable to the scatter plot method with respect to the type of information that is recorded. Structural analysis identifies ecological structures or variables that are correlated to the presence or absence of behavior. Development of behavior change strategies is then directed toward adjustment or modification of the identified variables. Green, Reid, Perkins and Gardner (1991) used an interval-recording procedure in which observations were recorded during 15-min intervals during one of two scheduled periods of time each day. The intervals and scheduled times were distributed randomly across days to reduce predictability; however, all staff members were informed that observations would be conducted periodically for several weeks. Data for staff were summarized and reported as either direct versus non-direct basic care. Measures of basic care included general interaction and training. Indirect care was defined as engaging in work that did not directly involve interacting with the residents. Non-work was scored if the staff were engaged in activity unrelated to
work. The behavior of each staff member in a particular area was scored, and then the
total number of staff engaged in each defined category was recorded. Although this time-
sampling procedure was well suited to recording data on multiple events in a large
setting, the information provided was limited because resident data were absent from the
analysis. Thus, no information about the relationships between staff and resident
information was provided.

Zarcone et al (1993) used a time sampling procedure to assess several aspects of
service delivery at a state facility for developmentally delayed individuals. Data
collection included measures of environmental conditions, staff behavior and resident
behavior/condition. Multiple indices of resident and staff behavior were defined and
scoring rules were developed for each category of events (i.e. environment, staff activity,
etc.) Scheduled observations were conducted three times a day by two observers. Each
resident and staff member was observed in a clockwise direction and the first behavior
observed within a 30 s interval was scored. The results of this study indicated higher
percentages of appropriate resident and staff behavior and illustrate the efficiency of a
time sampling procedure with large populations where multiple behaviors and conditions
are observed.

A similar momentary time sampling procedure was used to obtain information
about environmental conditions, as well as staff and resident behaviors in a geriatric
residential facility (Shore, Lerman, Smith, Iwata & DeLeon, 1995). Investigators
targeted specific conditions and events that were specifically identified in regulatory
requirements. Observations were conducted sequentially (i.e., observation started on one
side of the room and moved across the room) and events occurring at the precise moment
of observation were recorded. The data sheet and scoring procedures were adapted from Zarcone et al. (1993). Relevant aspects of service care were measured and as well as resident and environmental conditions. Mean percentages were generated for each broad category (e.g., resident, staff activity, environmental/resident condition) and each respective subcategory (e.g., appropriate social, inappropriate, off-task etc.). Results indicated residents and staff spent most of their time engaged in “No Activity” and “Non-Resident Work” respectively and that the momentary time sampling procedure was an effective means of obtaining large amounts of useful information. The general procedures initially described by Zarcone et al. (1993) and adapted by Shore et al. (1995) appear to represent a useful method to measure multiple, naturally-occurring events in large group contexts. These time sampling procedures can produce a substantial amount of information over a brief period of time without requiring considerable personnel, thereby offering an efficient and effective tool for evaluating several components of service delivery evaluation. Although this type of assessment has proven to be useful as a general assessment tool, its ability to reveal the effects of large-scale interventions designed to affect both staff and resident behaviors in natural environments has not been evaluated.

A general approach to improving resident services and program delivery in large, residential settings is to arrange antecedents and consequences that encourage appropriate staff behaviors. The effects of strategies including training and management procedures, performance feedback, contingencies for staff behavior, and combinations of these variables have been evaluated (Quilitch, 1975).
Greene, Willis, Levy and Bailey (1978) examined the effects of both staff performance feedback and public display of resident performance on implementation of a program designed to facilitate toilet training of participants in physical therapy. During immediate feedback, minimal improvement was shown; however, substantial improvement was obtained when both variables were combined.

Harchik, Sherman, Sheldon and Strouse (1992) examined the effects of ongoing one-on-one consultation on several indices of resident and staff behavior. The participants were adults with profound mental retardation and their attending staff, and dependent variables included number of tokens distributed by staff, percentage of time samples when residents were engaged in activity, and style of interaction. The latter was defined in terms of the presence or absence of components of an appropriate teaching interaction and was recorded as the number of teaching components observed. Scheduled observations were conducted at specific times of days during 45-min intervals. Consultation consisted of feedback, role-play and workshops. The results indicated that the consultation procedure, or some component(s) thereof, was effective in changing and maintaining changes in staff behaviors.

The effects of performance feedback, both written and verbal, have been assessed with respect to staff behaviors. Based on the results of a study addressing safety measure adherence, Alavosius and Sulzer-Azaroff (1986) concluded that behavior change strategies that manipulate both consequent and antecedent events are more effective than strategies that manipulate antecedent events alone. Following the development of a task analysis, feedback was presented once a week to staff members after an average of 5 observations was conducted. This study replicated previous findings that feedback was

Shore, Iwata, Vollmer, Lerman and Zarcone (1995) developed a pyramidal training procedure for residential staff working with developmentally disabled adults whose habilitative programming included behavior reduction. In pyramidal training procedures, individuals in supervisory capacities receive initial training, and then are responsible for ongoing program evaluation and monitoring. The experimenters extended typical institutional training procedures to include a presentation of assessment and treatment procedures in addition to a visual representation of treatment protocol. Intervention consisted of implementing these training procedures with a selected supervisor. This individual was also instructed on staff training techniques including data collection and calculation, assessment of staff performance, praise and constructive feedback delivery, and treatment implementation. The experimenter provided verbal feedback as needed. Data collection resumed following supervisor training. Measures included percentage of correct staff antecedent and consequent behavior (staff adherence), percentage of resident compliance and rate of inappropriate behavior. The results of this study indicated that supplemented in-service techniques alone did not significantly affect behavior of either staff or resident. Appreciable increases in staff adherence and decreases in resident inappropriate behavior were evidenced following supervisor training. This study indicated that pyramidal training was an effective way to enhance direct care performance and address the needs of residents. However, it may be argued that this methodology requires considerable resources and may not be appropriate for large-scale treatments. This study involved eight residents, with only two of those
serving as primary participants. It is notable that behavior change on the part of attending staff did not occur after the initial supplemented training, which may indicate that changes in supervisor behavior, including ongoing monitoring and provision of feedback, more significantly impact subordinate staff performance.

Behavioral staff management procedures have been evaluated and altered in a large-scale educational service facility (Parsons, Schepis, Reid, McCarn, & Green, 1987). This study, responding to general criticisms of limited and less rigorous applications of large-scale behavioral supervision procedures, implemented teacher in-service training, participative management, and supervisory prompts and feedback as intervention strategies to increase student interaction with functional materials. Although data collection occurred on a very infrequent basis and may not have produced an adequate representation of events, results of this experiment did suggest that long-term behavior change had been achieved. This indicates that training of supervisory-level behavior change agents to provide performance and corrective feedback may be an effective means of monitoring and producing desired staff behavior.

Self-monitoring in conjunction with supervisor feedback has also been evaluated in residential settings (Richman, Riordan, Reiss, Pyles, & Bailey, 1988). Increases in on-task and on-schedule behavior were evidenced as a result of staff self-monitoring. However, due to inconsistencies in staff performance with self-monitoring alone, the addition of supervisor feedback produced more consistently improved performance, indicating that performance feedback can be an effective component of staff behavior change.
The present study replicated and extended the general procedures described by Zarcone et al. (1993) and Shore et al. (1995) by adapting the procedures for measurement of the effects of an intervention intended to alter staff behaviors in a residential setting. Although earlier studies have demonstrated the utility of multi-dimensional data collection and time-sampling (Zarcone et al., 1993; Shore et al., 1993) in the measurement of relatively static conditions, none has evaluated whether such data gathering procedures would be sensitive to changes in staff and/or resident behaviors following an intervention designed to affect the behavior of many individuals simultaneously. The intervention included components identified as effective behavior change strategies in several previous studies, including the provision of materials and schedules, modeling, and performance feedback (Quilitch, 1975; Johnson & Bailey, 1977).
CHAPTER II

Method

Participants and Setting.

Developmentally disabled adults residing in a state facility served as participants. Four homes were targeted for assessment and intervention. These homes were selected because all aspects of behavioral programming were the responsibility of the research staff. The participants were housed according to functioning level and the degree of impairment ranged from mild to profound mental retardation. The residents’ behavioral programming targeted the reduction of maladaptive behaviors including verbal disruption, physical aggression, physical disruption of the environment, self-injurious behavior, and stereotypy.

Direct care staff working on the homes at the time of observation also served as participants. Staff members all had high-school educations or a general education equivalent. The number of staff present during observations ranged from 0 to 6. Staff were responsible for carrying out training programs, implementing behavior reduction procedures and programs, and assisting residents with all activities of daily living.

Observation Procedures.

A data sheet was developed that targeted multiple indices of resident and staff behavior (Figure 11) The data sheet was modified from the previous studies (Zarcone et al, 1993; Shore et al, 1995) to exclude indices of resident and environment conditions as well as to extend staff activity measures. The procedure for scoring the data sheet was identical to the previous studies. The date, time and observer were noted above each data sheet and each time an individual was observed to engage in behavior corresponding to
an indexed behavior a hatch mark was entered in the appropriate column. Measures of resident behavior included *Appropriate Social, Appropriate Non-Social, Inappropriate and No Above Activity*. Measures of staff behavior included *Staff-Staff Interaction, Non-Resident Work, Off-Task and Resident Interaction*. Each broad category was comprised of relative subordinate measures (Figure 11) and each index of behavior was operationally defined (see Table 1 for scoring rules and procedures). Data also were collected on staff tenure, whether the television was on and if the scheduled activity was occurring at the time of observation. All observers were trained by the primary researcher on behavioral definitions and the observation procedures. Trainees conducted observations with the primary researcher (or a previously trained observer) and training criterion was met when interobserver agreement (IOA) between the trainer and trainee reached 90% or above (see below for IOA procedures).

Observations were conducted 1 to 5 times daily at random times between the hours of 9 a.m. and 9 p.m. Observers entered the home and began recording when the first resident was encountered. The first behavior observed within 10 s was indicated on the data sheet by the appropriate index. If no behavior was observed within 10 s, *No Above Activity* was scored for that resident. Observations continued in a clock-wise fashion, scoring each resident’s behavior during 10-s time samples, until all residents present had been observed. Subsequently, staff behaviors were observed and scored in the same manner. For each individual observed, observation onset and duration were monitored by the primary observer with a watch or timer Data collection procedures were identical in baseline and intervention.
Interobserver Agreement

Interobserver agreement (IOA) procedures were conducted during 21% of baseline observations and 25% of intervention observations. Two observers simultaneously entered the residence and began observing the first encountered resident. IOA coefficients were calculated by subtracting the total number of disagreements from the total number of agreements for each behavior observed. This number was then divided by the number of all possible entries on the data sheet, and multiplied by 100. The overall mean IOA was 96.6%, with a range of 75-100%. IOA was also calculated within each category, and the means are as follows: Appropriate Social, 97% (range 33%-100%); Appropriate Non-Social, 95% (range 33%-100%); Inappropriate, 83% (range 0%-100%); No Above Activity, (range 0%-100%); Off Task, 94% (range 0%-100%); Resident Interaction, 92% (range 0%-100%)

Intervention Procedures.

Prior to intervention, materials and scheduling needs were determined by inspection of the home for training materials and the presence of posted schedules, as well as interviews with direct care staff of each home and respective supervisor. Supervisor interviews included briefing on staff expectations, present scheduling of activities and availability of leisure items on residences. All supervisory staff were informed of all procedures prior to baseline, although direct contact staff were told that observations were targeting residents only. Two of the homes required the development of activity schedules and for two homes it was also necessary for the experimenter to provide the materials needed to conduct activities. Activities with the materials were modeled for the staff in a group training that occurred on the residence and was
conducted by the primary researcher. Activities were modeled for staff with residents and, some instances, role-played and scheduled activity times were inserviced with staff. Schedules were then posted in an area accessible to staff on each home.

Following training, observations were conducted as in baseline. However, at the beginning of observations, the activity that was scheduled to occur and whether that activity was actually occurring were recorded. At the conclusion of each observation, feedback was provided in the form of verbal praise and brief conversation relative to the activity if the residents and staff were engaged in the scheduled activity. If a scheduled activity was not observed, the observer retrieved the appropriate materials and modeled an appropriate scheduled activity with residents.

*Experimental Design.*

A multiple baseline design across the targeted residences was used to assess the effects of intervention. The number of observations conducted in each residence is as follows: Residence A: 9 baseline; 50 intervention; Residence B: 27 baseline, 13 intervention; Residence C: 34 baseline, 21 intervention; Residence D: 21 baseline, 39 intervention. Condition time for each residence is as follows: Residence A: 1.5 weeks baseline, 5 weeks intervention; Residence B: 3 weeks baseline, 2.5 weeks intervention; Residence C: 4 weeks baseline, 4 weeks intervention; Residence D: 3.5 weeks baseline, 3.5 weeks intervention. Although the data were analyzed in linear form, the data are represented in stacked bar format to more easily compare proportional effects and to summarize data due to multiple measures.
CHAPTER III

Results

Overall baseline and treatment measures for staff and resident behavior were calculated by adding the number of staff and residents involved in each index and dividing by the total number of residents/staff observed. These results are indicated in Figures 1 and 2 respectively. Data are reported below in terms of percentage change from baseline, calculated by dividing treatment measures by baseline measures, subtracting 1 from the result, and multiplying the remainder by 100. Actual percentage change for staff behavior are as follows: Total Resident Interaction increased 44%; Total Staff-Staff Interaction decreased 40%; Non-Resident Work increased 10%; Off-Task decreased 9%; Resident Care increased 17%; delivery of Praise increased from 0 to 1%; Redirection (no change); delivery of a Demand decreased 50%; Neutral Interaction increased 1180%.

Actual percentage change for resident behavior are as follows: Total Appropriate behavior increased 42%; Inappropriate behavior increased 21%; No Above Activity decreased 39%. Percentage change for resident subordinate categories are as follows: Receiving Care increased 14%; Conversation decreased 23%; Sharing Materials/Play (no change); Interacting with Leisure Items increased 56%; Watching TV increased
340%; \textit{Work} increased 30%; \textit{Self Injury} increased 80%; \textit{Aggression} remained 0; \textit{Property Destruction} remained 0; \textit{Disruptive Behavior} decreased 29%; \textit{Stereotypy} increased 22%.

Residence A baseline and treatment measures for resident and staff behavior are indicated in Figures 3 and 4 respectively. Actual percentage change for resident broad categories are as follows: Total \textit{Appropriate} behavior increased 174%; \textit{Inappropriate} behavior increased 46%; \textit{No Above Activity} decreased 69%. Percentage change for resident subordinate categories are as follows: \textit{Receiving Care} increased 80%; \textit{Conversation} decreased 100%; \textit{Sharing Materials/Play} increased from 0 to 1.4%; \textit{Interacting with Leisure Items} increased 1012%; \textit{Watching TV} decreased 60%; \textit{Work} increased from 0 to 2.4%; \textit{Self-Injury} increased from 0 to 1%; \textit{Aggression} remained 0; \textit{Property Destruction} remained 0; \textit{Disruptive Behavior} decreased 60%; \textit{Stereotypy} increased 57%.

Actual percentage change for staff behavior are as follows: Total \textit{Resident Interaction} increased 87%; Total \textit{Staff-Staff Interaction} decreased 61%; \textit{Non-Resident Work} decreased 8%; \textit{Off-Task} increased 3%; \textit{Resident Car} increased 144%; delivery of \textit{Praise} increased from 0 to 2.8%; \textit{Redirection} decreased 73%; presentation of a \textit{Demand} increased from 0 to 1.1%; \textit{Neutral Interaction} increased 144%.

Residence B baseline and treatment measures for resident and staff behavior are indicated in Figures 5 and 6 respectively. Actual percentage change for resident broad categories are as follows: Total \textit{Appropriate} behavior increased 157%; \textit{Inappropriate} behavior increased 3%; \textit{No Above Activity} decreased 35%. Percentage change for resident subordinate categories are as follows: \textit{Receiving Care} increased 87%; \textit{Conversation} decreased 100%; \textit{Sharing Materials/Play} remained 0; \textit{Interacting with Leisure Items}
increased 259%; Watching TV remained 0; Work increased from 0 to 1%; Self-Injury increased 28%; Aggression remained 0; Property Destruction remained 0; Disruptive Behavior decreased 65%; Stereotypy increased 14%.

Actual percentage change for staff behavior are as follows: Total Resident Interaction increased 27%; Total Staff-Staff Interaction decreased 26%; Non-Resident Work increased 121%; Off-Task decreased 98%; Resident Care decreased 34%; delivery of Praise increased from 0 to 2.8%; Redirection decreased 34%; presentation of a Demand decreased 47%; Neutral Interaction increased 95%

Residence C baseline and treatment measures for resident and staff behavior are indicated in Figures 7 and 8 respectively. Actual percentage change for resident broad categories are as follows: Total Appropriate behavior increased 25%; Inappropriate behavior increased 12%; No Above Activity decreased 33%. Percentage change for resident subordinate categories are as follows: Receiving Care increased 6.7%; Conversation (no change: 1%); Sharing Materials/Play remained 0; Interacting with Leisure Items increased 5%; Watching TV increased 600%; Work increased from 0 to 2.5%; Self Injury increased from 0 to 1%; Aggression remained 0; Property Destruction remained 0; Disruptive Behavior (no change: 1%); Stereotypy increased 9%.

Actual percentage change for staff behavior are as follows: Total Resident Interaction increased 19%; Total Staff-Staff Interaction decreased 83%; Non-Resident Work decreased 90%; Off-Task increased 20%; Resident Care increased 18%; delivery of Praise remained 0; Redirection increased 107%; presentation of a Demand remained 0; Neutral Interaction decreased 9%
Residence D baseline and treatment measures for resident and staff behavior are indicated in Figures 9 and 10 respectively. Actual percentage change for resident broad categories are as follows: Total *Appropriate* behavior increased 23%; *Inappropriate* behavior increased 58%; *No Above Activity* decreased 40%. Percentage change for resident subordinate categories are as follows: *Receiving Care* decreased 19%; *Conversation* increased 36%; *Sharing Materials/Play* (no change: 1%); *Interacting with Leisure Items* increased 33%; *Watching TV* increased 429%; *Work* (no change 1%); *Self-Injury* increased 100%; *Aggression* remained 0; *Property Destruction* remained 0; *Disruptive Behavior* (no change: 1%); *Stereotypy* increased 59%.

Actual percentage change for staff behavior are as follows: Total *Resident Interaction* decreased 12%; Total *Staff-Staff Interaction* decreased 1%; *Non-Resident Work* decreased 5%; *Off-Task* increased from 0 to 10.9%; * Resident Care* decreased 20%; delivery of *Praise* increased from 0 to 1%; *Redirection* increased 32%; presentation of a *Demand* decreased 68%; *Neutral Interaction* increased 32%.
CHAPTER IV

Discussion

The results of this study showed that it was possible to collect a significant quantity of useful information about the behaviors of residents and staff of a large residential facility using a momentary time sampling procedure. Additionally, the results indicated that a relatively unintrusive intervention package consisting of the development of activity schedules, training of staff on those schedules, providing feedback on schedule adherence, and modeling correct responding produced changes in a number of measured behaviors of staff and residents. These results replicated and extended findings of previous research efforts (Zarcone et al., 1993; Shore et al., 1995). Whereas previous studies showed this general method to be a useful and efficient way to evaluate “static” behaviors and conditions in large, naturalistic settings, the current study also revealed changes among behaviors of both staff and residents as a function of an intervention designed to have “residence-wide” effects. Thus, the results demonstrated that this assessment was sensitive to changes in behavior produced by a large-scale intervention.

Time and personnel constraints are also a consideration when conducting large-scale assessment procedures. This study demonstrates that this assessment can be completed within a few minutes by a single observer, and also can produce useful information regarding many individuals and behaviors. For example, observations of a single residence in the current study were typically completed within a 5-15 min time frame and produced information about the current activities of 2-5 staff members (across 9 broad categories) and 1-12 residents (across 3 broad categories and 11 subordinate categories).
The intervention produced several patterns of responding observed in the broad measurement categories that merit elaboration. Among the patterns of responding observed for staff behaviors were general increases in staff-resident interactions (except for Residence D), decreases in *Staff-Staff Interaction*, and differential effects across homes on *Off Task* behaviors. For residents, generalized increases in appropriate behaviors were observed, as well as increases in inappropriate behaviors, and decreases in no activity. These outcomes are discussed below:

*Staff Behaviors—Broad Categories.*

The results revealed increases in *Staff-Resident Interactions* across residences A, B, and C. Increases were most apparent in Residences A and B; however, baseline measures for Residences C and D showed better performance in all measures of staff and resident activity than did measures for Residences A and B. Thus, a possible explanation for differential effects of intervention is that staff interactions with clients already occurred at relatively high levels in Residences C and D and, thus, only moderate increases (or in the case of Residence D, a decrease) could occur as a function of treatment (i.e., a “ceiling effect”). Interestingly, Residences A and B shared common supervisory staff, as did the Residences C and D. Thus, differential baseline measures across these homes may have been, at least in part, due to differential management procedures.

Resident functioning level also may have differentially affected levels of *Staff-Resident Interaction* across residences. The residences that showed the most improvement (Residences A and B) served residents with profound mental retardation and who, by and large, did not display verbal behavior. The residences showing less
improvement served residents who were generally higher functioning, with some verbal and social skills. It is reasonable to conclude that staff may have been inclined to interact more frequently (both during baseline and intervention) with higher-functioning residents who are able to engage in discussions, meaningful play and leisure activities, and so on.

Another interesting outcome was a decrease in Staff-Staff Interaction across all homes during intervention. Although the variables responsible for this general effect are not clear, it is possible that staff members were less likely to interact with each other because they interacted more frequently with residents. For example, the greatest percentage point decrease in Staff-Staff Interaction was seen in Residence A (61 percentage points), where the largest percentage increase in staff interactions with residents was observed (87 percentage points). By contrast, the smallest percentage point decrease was seen in Residence D (21 percentage points), where staff interactions with residents also decreased by 12 percentage points.

Off Task behaviors showed little change when results were compiled across homes but showed variability across homes. For example, Off Task behaviors increased during intervention in Residences A, C, and D, but decreased dramatically in Residence B. The variables responsible for these effects were not clear, as no other measures covaried in such a manner. The most substantial increase in Off Task behavior was seen in Residence D where Off Task behavior was not observed in baseline but increased to 10.9% during intervention. One measure that appeared to covary with this increase was a decrease in Resident Interaction, suggesting that staff spent more time engaged in non-work related behavior.

Staff Behaviors-Subordinate Categories.
Although overall indices of *Staff-Resident Interaction* increased (Figure 1), this was not consistent across homes (Residence D), and changes in the subordinate categories (e.g., *Resident Care, Praise, Redirection Neutral, Demand*), varied across homes. For example, on two of the residences (residences B and D), the percentage of demands presented to residents decreased. A possible account for these changes is the inclusion of specifically scheduled events in the revised activity schedules, resulting in an increase in positive interactions. That is, attending staff may have been more likely to interact with residents during scheduled activities, and the nature of many of those activities (e.g., leisure and recreation) may have been incompatible with the issuance of high levels of tasks.

The percentage of observations with *Neutral* interactions increased in all residences except one (Residence C). Although these types of interactions were not specifically incorporated into the intervention, the increase in scheduled activities with residents may have resulted in more general interactions. *Resident Care* increased most dramatically on Residence A (144% over baseline). Although this measure may be related to the fact that this residence served clients whose general functioning level was quite low (i.e., more staff assistance with activities of self-care, daily living, and so on may have been necessary), measures of *Resident Care* decreased for Residence B, which was home to residents of the same functioning level. Resident Care slightly increased and decreased in the homes with higher functioning residents (Residences C and D respectively.)

*Redirection* showed various patterns across conditions and residences. A substantial change in this measure was seen during treatment in Residence A, with a
decrease of 73% below baseline. The data for this residence also showed a 95% increase in *Neutral Interactions*. It is possible that the increase in neutral interactions may have resulted in less disruptive behavior that was perhaps attention maintained (*Disruption* decreased 60% below baseline) and therefore reduced the necessity for frequent redirection. Interestingly, the same pattern was observed on the other home (Residence B), where *Redirect* decreased 34%. Resident disruptive behavior decreased on this home (65% below baseline) and staff engaged in neutral interactions with residents increased (144%).

*Praise* increased during intervention on Residences B and D, accounting for the overall increase in this measure from 0 to 1 percentage point. Although *Praise* remained at an unacceptably low level, the positive change does suggest that intervention procedures may have produced occasions for staff to verbally praise residents during scheduled activities.

*Resident Behaviors—Broad Categories.*

*No Above Activity* accounted for the highest percentage change in resident behavior across all homes, decreasing from 47.8% to 29.2%. (Figure 2). This general change may be related to the overall increase in *Appropriate Behavior* (47 percentage points) as residents were interacting more with materials, staff, or other residents or were engaged in a scheduled activity. An interesting outcome was the unanticipated and general increase in the percentage of observations with *Inappropriate Behavior* during intervention periods. One possible account for this outcome is that an increase in staff interaction with residents produced increases in escape or avoidance behavior. For example, if staff-resident interactions had previously been characterized primarily by task
demands or reprimands, then staff interactions may have acquired aversive properties. Thus, interventions that increased staff’s interactions with residents might have the unintended effect of occasioning problematic escape or avoidance behaviors (this explanation, however, does not account for the data from Residence D, in which overall staff-resident interactions decreased and problem behaviors increased). One might expect that declines in such behaviors would have been observed had intervention and data collection continued for a more extended length of time.

Resident Behaviors—Subordinate Categories.

Measures of Stereotypy remained high throughout baseline and intervention, accounting for the highest percentage of Inappropriate Behavior. Hypothesized to be non-socially maintained (i.e., either self-stimulatory or maintained by attenuation of pain or discomfort) (Goh, Iwata, DeLeon, Lerman, Ulrich Smith, 1995), stereotypy may have persisted irrespective of increases in Appropriate Behavior unless the activity was incompatible with the behavior. The provision of leisure materials may be related to the increase in this measure as residents may have engaged in stereotypic behavior with the items. Future interventions targeting stereotypy may consider implementing activities designed specifically to compete with these behaviors.

Measures of Disruption were relatively low across all residences in both baseline and intervention; however, percentages of observations with Disruption decreased by 60% in Residence A and 65% in residence B during intervention. (Figures 3 and 5)

Self-Injury increased in all residences which, as previously discussed, could be related to increases in staff and resident interaction. It is interesting to note that, across all
residences and conditions (except Residence C during intervention) the presence of self-injury in either baseline or intervention covaried with presence of demands in staff data.

_Appropriate Behavior_ increased most notably on Residences A and B (174 % and 157 % respectively). According to baseline data, residents on the other two homes were already engaged in relatively high levels of appropriate activities. Although there were corresponding decreases in _No Above Activity_ on Residences A, C and D, _No Above Activity_ decreased the least on Residence B, despite the dramatic increase in _Appropriate_ measures. This may be suggestive of personnel issues such as low staff to resident ratio or temporary staff presence on this residence.

Although overall indices of _Appropriate Behavior_ increased across all residences, changes in the subordinate categories varied across homes. An interesting outcome is the contrast in intervention levels in _Interaction with Leisure Materials_. The provision of materials may have had a greater impact on the homes showing the most improvement (Residences A and B) as these homes had relatively few leisure items before intervention. Conversely, intervention data revealed minimal change in this measure for both Residences C and D, where considerable leisure items were present during baseline measurement. The levels of _Interaction with Leisure Materials_ reached by A and B during intervention are roughly the same as C and D (both before and after intervention), which supports the assertion that differences in amount of materials available during baseline account for differences in the magnitudes of treatment changes. _Watching T.V._ accounted for the greatest percentage increase on Residences C and D. Note that some of the previously scheduled activities on these residences included exercise activities directed by videos that may account for the increase in this index. Thus, the increase in
this measure may be related to intervention components of re-inservicing staff and posting schedules of the activities.

The percentage of residents engaged in Work increased slightly across all residences. The intervention package did include the scheduling of household tasks such as sweeping the floor or setting the table. Baseline observations of this measure revealed no work behavior on Residences A and B however, residents engaged in Work behavior were observed during intervention (2.4 % on Residence A and 1 % on Residence B).

Conversation increased and remained the same of Residences C and D respectively. which housed primarily verbal residents. The two homes showing decreases in this index (100 % each) were comprised of mostly non-verbal residents. Measures for Receiving Care increased overall by 14 % however, this increase was evident on only two of the residences (A and B) which were the lower functioning homes. Again, this may be related to this functioning level as residents on C and D could perform more care related tasks independent of staff assistance.

Although these data were presented in bar graph format, some results of the linear analysis warrant consideration with respect to the temporal distribution of behavior following intervention. In all residences except C, a decreasing trend in Inappropriate Behavior was observed toward the end of the condition which would support the assertion the some problematic behavior correlated to staff presence may have decreased after an extended period of time. Staff Off-Task behavior in Residence C gradually decreased (after 12 observations following intervention) to zero levels following intervention. Conversely, an immediate reduction in Off Task behavior was observed in
Residences A and B. Additionally, an immediate increase in Staff-Client Interaction was observed in Residence A.

Although these data suggest that the time sampling procedure is an effective way to obtain information on large groups of individuals, some limitations warrant consideration. One shortcoming of this study is the inability to account for behavior of individuals. A possible way to address this would be to include codes to represent specific individuals, allowing changes specific to individuals to be monitored. Another limitation of this study was the large number dependent measures, which interfered with the ability to obtain stability in baseline. Thus, it was difficult to precisely interpret the magnitude of effects of the intervention package. Furthermore, the intervention package made it difficult to determine if the effects resulted from one or more (or combination) of the components. This may subsequently be addressed by isolating each component by intervening with one variable at a time. Another shortcoming is the level of analysis presented in this study. Because the results are in aggregate form, some information is lost such as how changes occurred temporally. One advantage, however, to this presentation form is that the reviewer can quickly review and determine effects. Finally, it is possible that some reactivity may result from observer presence on the home, (as previous studies have indicated) however, in this study, observations were randomly conducted to reduce this possibility.

These findings have several implications for administrative staff of residential facilities. Ongoing assessment is a necessary component of measuring the effect of resident programming, caregiver performance and environmental conditions. In large residential facilities, where assessment targets multiple behaviors exhibited by both
individuals and groups, it is necessary to implement assessment procedures that can accurately capture a wide range of response measures. This assessment procedure appeared to be sensitive to changes in both staff and resident behavior and permitted the observation of multiple behaviors and individuals in a relatively short period of time. Also, the unintended effects of intervention could be valuable information to supervisory staff. For example, the increase in measures of stereotypy and self-injury may contra indicate typical procedures (such as non-contingent reinforcement or provision of materials) implemented to address problematic behavior In this study, it appeared that scheduling, modeling and performance feedback may have been effective procedures for increasing general appropriate resident and care giver behaviors

The current study replicated previous findings that a momentary time-sampling procedure can permit measurement of several important indices of staff and resident behavior and environmental conditions as well as identify changes in behavior following intervention.
Figure 1. Staff Activity Across Targeted Homes
Figure 2. Resident Activity Across Targeted Homes
Figure 3. Residence A: Resident Behavior
Figure 4. Residence A: Staff Behavior
Figure 5. Residence B: Resident Behavior
Figure 6. Residence B: Staff Behavior
Figure 7. Residence C: Resident Behavior
Figure 8. Residence C: Staff Behavior
Figure 9. Residence D: Resident Behavior
Figure 10. Residence D: Staff Behavior
## UNIT OBSERVATION FORM

<table>
<thead>
<tr>
<th>Observer:</th>
<th>Date:</th>
<th>Time:</th>
<th>2nd observer</th>
<th>Client Activity</th>
<th>Number of Clients present:</th>
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<tr>
<td>Home:</td>
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<td>Client Activity</td>
<td>Number of Clients present:</td>
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<td>Appropriate social</td>
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<td>• Receiving instruction/care</td>
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<td>• Conversation</td>
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<td>• Sharing materials/play</td>
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<td>Appropriate non-social</td>
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<td>• Interact w/ leisure materials</td>
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<td>• Attending to TV</td>
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<td>• Work related/chores</td>
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<td>• Self-Injury</td>
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<td>• Aggressing others</td>
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<td>• Stereotypy</td>
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<td>• Off-Task</td>
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<td>Staff Activity</td>
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</table>
Scoring Rules for Unit Observation

Procedure: Upon entering the home begin scoring the first resident/staff encountered. Indicate the first behavior observed within 10s per individual. Proceed clockwise throughout the zone until all individuals present are observed.

**Client Activity:** (First indicate the total number of residents present using hatch marks)

<table>
<thead>
<tr>
<th>Appropriate Social</th>
<th>The client is engaging in one of the following appropriate interactions with another individual:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conversation:</td>
<td>Resident is engaging in verbal interaction with another individual</td>
</tr>
<tr>
<td>Receiving Instructions/Care</td>
<td>Staff person or another resident is physically assisting or instructing the resident to perform a task</td>
</tr>
<tr>
<td>Sharing Play Materials</td>
<td>Resident is engaged in a game or activity or giving someone else materials</td>
</tr>
<tr>
<td><strong>Appropriate Non-Social</strong></td>
<td>Resident is engaging in one of the following inappropriate behaviors but is not interacting with other individuals:</td>
</tr>
<tr>
<td>Interact with Leisure Materials</td>
<td>Resident is engaged in leisure activity such as reading, playing solitary games, stringing beads, drawing, coloring, etc.</td>
</tr>
<tr>
<td>Attending to T.V.</td>
<td>Resident’s eyes are oriented toward the television and television is turned on.</td>
</tr>
<tr>
<td>Work or Related Chores</td>
<td>Resident is engaged in cleaning behaviors or required duties</td>
</tr>
<tr>
<td><strong>Inappropriate</strong></td>
<td>Resident is engaged in one of the following inappropriate behaviors:</td>
</tr>
<tr>
<td>Self-Injury</td>
<td>Resident is engaged in self-directed behavior that can produce harm</td>
</tr>
<tr>
<td>Aggression</td>
<td>Resident is engaged in other-directed behavior that can produce harm</td>
</tr>
<tr>
<td>Property Destruction</td>
<td>Resident is engaged in object-directed behavior that can produce damage to the object(s)</td>
</tr>
<tr>
<td>Disruption</td>
<td>Resident is engaged in verbal or non-object oriented disruptive behavior such as yelling, crying, cursing, spitting, etc.</td>
</tr>
<tr>
<td>Stereotypy</td>
<td>Resident is engaged in self-stimulatory behavior such as masturbation, hand waving, rocking, etc.</td>
</tr>
<tr>
<td><strong>No Activity</strong></td>
<td>Resident is not engaged in any observable behavior</td>
</tr>
</tbody>
</table>

**Staff Activity:** (First indicate the total number of staff present using hatch marks)

| Staff –Staff Interaction             | Staff member is engaged exclusively with two or more staff                                      |
| Resident Care                        | Staff is assisting resident with self-care, transition, mobility, etc.                           |
| Non-Resident Work                    | Staff is involved in maintenance of the facility, paperwork or interacting with other work related materials |
| Off-Task                             | Staff member is engaged in solitary activity not related to work such as smoking, watching television, reading etc. without attending to clients |
| **Resident Interaction**             | Staff member is engaged in one of the following interactions with resident(s):                  |
| Praise                               | Staff member is delivering a programmatic reinforcer/ social positive reinforcement               |
| Redirection                          | Staff member is redirecting a resident’s inappropriate behavior                                  |
| Demand                               | Staff member is presenting a demand to the resident                                             |
| Neutral                              | Staff member is interacting with a client, either verbally or non-verbally without observable purpose |
REFERENCES


