Effectiveness of performance feedback from a supervisor versus a non-supervisor in promoting paraprofessionals' implementation of basic fire-evacuation training.

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EFFECTIVENESS OF PERFORMANCE FEEDBACK FROM A SUPERVISOR VERSUS A NON-SUPERVISOR IN PROMOTING PARAPROFESSIONALS' IMPLEMENTATION OF BASIC FIRE-EVACUATION TRAINING

A Dissertation Presented

By

CHRISTOPHER J. FOX

Submitted to the Graduate School of the University of Massachusetts in partial fulfillment of the requirements for the degree of DOCTOR OF PHILOSOPHY

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Psychology
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ACKNOWLEDGEMENTS

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ABSTRACT

Effectiveness of Performance Feedback from a Supervisor Versus a Non-Supervisor in Prompting Paraprofessionals' Implementation of Basic Fire-Evacuation Training

September 1983

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Prue and Fairbank (1981) have identified parameters on which feedback procedures should be analyzed. This study investigated one parameter, the source of feedback. It was expected that feedback from supervisors would exert more control over paraprofessionals' behavior than feedback from non-supervisors. Paraprofessionals from six residences at a state school for mentally retarded persons were trained to work in pairs to teach their clients to leave the residence when a fire alarm sounded. Twenty-eight paraprofessionals participated; their ages ranged from 21 to 55, thirteen were women and fifteen men. Subjects were taught how to conduct fire-evacuation training, given the equipment they needed, and specific schedules. The dependent variable was the number of training trials each team did. The independent variable was a feedback memo on the team's performance from one of the two sources. The research design was a multiple-baseline across teams with the order of presentation of feedback sources counterbalanced. Training sessions were scheduled twice a week, but were only conducted when there was
enough staff, about two-thirds of the time. A methodological refinement was made during the intervention; feedback on a team's performance began to be sent to each team member rather than the team as one. Data were analyzed graphically and statistically. Results showed that each team did more training after feedback was introduced, but there were no differences across feedback sources. Delivering feedback to individuals improved several teams' performances. All clients who received feedback made progress. Four conclusions were drawn: (1) Feedback from different sources can control the behavior of paraprofessionals working in an institution for mentally retarded persons; (2) written feedback is more effective if delivered in a manner that ensures that each subject always sees it; (3) it is not effective to rely on antecedents to manage paraprofessionals' behavior; and (4) much work remains to be done on teaching mentally retarded persons fire-evacuation skills.
TABLE OF CONTENTS

ABSTRACT ........................................................................ vi
LIST OF TABLES ................................................................. x
LIST OF FIGURES ............................................................... xi
Chapter
I. INTRODUCTION ............................................................. 1
   Management of Paraprofessionals ........................................... 1
   Performance Feedback ....................................................... 2
   A Functional Analysis of Feedback ...................................... 5
   Feedback Dimensions ...................................................... 6
   Sources of Feedback ....................................................... 7
      Self-Feedback ............................................................. 8
      Feedback from Peers .................................................... 11
      Feedback from Supervisors ......................................... 14
      Feedback from Others, Unrelated to the Recipient ............. 17
      Comparisons of Different Feedback Sources .................... 19
      Other Literature ....................................................... 23
   Delivery of Feedback ..................................................... 25
      Feedback to a Group about the Group's Performance ........... 26
      Feedback to Each Group Member About the Group's ........ 30
         Performance .......................................................... 30
   Summary .......................................................................... 32
   Research Question ......................................................... 32

II. METHODS ...................................................................... 34
   Background Information .................................................. 34
      The General Experimental Environment ......................... 34
      Fire-Evacuation Training .............................................. 37
   Subjects .......................................................................... 39
   Relevant Others ............................................................ 40
      Clients ........................................................................ 40
      Supervisors and Non-Supervisors ................................... 41
      Observers .................................................................... 41
   Setting ............................................................................ 42
   Apparatus and Materials .................................................. 43
      Forms .......................................................................... 43
      Fire Alarms .................................................................. 43
   Measurement .................................................................... 44
      Dependent Variable ..................................................... 44
      Supplementary Measures ............................................. 44
      Data Analysis ............................................................. 46
LIST OF TABLES

1. Unobtrusive Observation Procedure ................................................. 54
2. Sequential Analysis ............................................................................... 62
3. Simplified Time-Series Analysis ......................................................... 64
4. Client Progress ..................................................................................... 69
5. Teams' Opportunities to Conduct Scheduled Training ......................... 72
6. Compliance with Intervention Procedures ............................................ 73
LIST OF FIGURES

1. Relationship Between Paraprofessionals, Their Immediate Supervisors, and Clients at the State School ............ 35
2A. Cumulative Number of Training Trials Each Team Conducted .... 56
2B. Continuation of 2A. .................................................. 57
3. Cumulative Number of Sessions at Which Teams Conducted 4 or More Training Trials .......................... 59
4. The Effect of Delivering Feedback to the Group Versus the Individual ...................................................... 67
The move to provide residential and habilitation services to moderately, severely, and profoundly retarded persons in the least restrictive environments possible has created many challenges for administrators, professionals, and paraprofessionals. A current concern is teaching retarded persons how to behave during emergencies (Haney and Jones, 1982; Matson, 1981; Risley and Cuvo, 1980). This concern creates a multi-faceted challenge: retarded persons must learn safety skills, staff must learn to teach their retarded clients these skills, and staff must be managed to conduct the training. The focus of this research was on managing three-person teams of paraprofessionals to conduct basic fire-evacuation training.

Management of Paraprofessionals

Management efforts attempt to modify behavior already in the subjects' repertoire; training attempts to occasion behavior not in the subjects' repertoire (Miller and Lewin, 1980). Subjects must be able to perform a target response, such as paraprofessionals teaching fire-evacuation skills, before it can be managed. Once they can perform the target response, a management procedure may be used to insure it occurs with the properly prescribed frequency and schedule, with the proper clients, and according to some specified procedure.
For the purposes of this paper paraprofessionals are those staff who provide direct-care, supervision, and basic instruction to their mentally retarded clients. Much literature documents effective procedures for managing paraprofessionals' behavior. Procedures have included equipment refinement (Andrasik and McNamara, 1977), scheduling activities (e.g., Coles and Blunden, 1981, exp. I; Quilitch, 1975), performance feedback (e.g., Brown, Willis and Reid, 1981; Coles and Blunden, 1981, exp. II; Panyan, Boozer and Morris, 1970), rewarding exemplary performance monetarily (Katz, Johnson and Gelfand, 1972; Pomerleau, Bobrove and Smith, 1973) or with the opportunity to have desirable days off (e.g., Iwata, Baily, Brown and Foshee, 1976).

Performance feedback has been the most popular procedure used to manage workers' behaviors (Andrasik, 1979; Prue and Fairbank, 1981), probably because it has been shown repeatedly to be effective and simple to use, requiring few additional resources (e.g., Ford, 1980; Sulzer-Azaroff, 1978). For those reasons, feedback was the management procedure used in this research.

Performance Feedback

Feedback procedures provide subjects with objective information on their performance of a target behavior--information that previously had been available less often, if at all. Thus, in the context of organizational behavior management, feedback may be defined as: providing the subjects with more frequent, timely, and objective information on their prior performance of a target response.
Some performance feedback may be available simply as a result of performing certain operations in the work environment. This research and the literature reviewed were concerned primarily with performance feedback which is not ordinarily available. Usually, generating this type of "artificial" feedback requires a constant behavioral input.

Feedback procedures have been shown effective in managing the target behaviors of diverse subjects including foremen in industrial settings (e.g., Chandler, 1977; Sulzer-Azaroff and De Santa Maria, 1980), factory workers (e.g., Emmert, 1978; Zohar, Cohen and Azar, 1980), restaurant workers (e.g., Komaki, Blood and Holder, 1980), human service professionals (e.g., Ford, 1980; Fredericksen, Richter, Johnson and Solomon, 1982), and human service paraprofessionals (e.g., Brown et al., 1981; Panyan et al., 1970). Paraprofessionals' behaviors which have been effectively managed via feedback procedures have included time off task (Brown et al., 1981), implementation of client programs (Coles and Blunden, 1981, exp. II; Greene et al., 1978; Kreitner, Reif and Morris, 1977; Welsch, Ludwig, Radiker and Krapfl, 1973), and submission of written suggestions (Quilitch, 1978).

The performance feedback procedures used with paraprofessionals have varied. For example, Panyan et al. (1970) had unit psychologists verbally review paraprofessionals' weekly performance with them and publicly post a large chart showing the number of training programs the paraprofessionals had conducted and documented the previous week. It is not clear from this report if the feedback was calculated for each paraprofessional or for all on a ward. This feedback procedure resulted in
a large increase in the number of programs conducted and documented on each ward.

Many studies have reported successfully controlling paraprofessionals' behavior when the performance feedback has been publicly posted while varying other aspects of the system used by Panyan et al. (1970) such as the setting and subjects (Kreitner et al., 1977), feedback schedule (Green et al., 1978), and the target behavior (Shook, Johnson and Uhlman, 1978).

There is evidence that paraprofessionals do not care for publicly posted feedback (Burgio, Whitman and Reid, 1983), but other types have been shown to be effective. Brown et al. (1981) delivered verbal feedback to individual paraprofessionals several times a day to increase the frequency with which they interacted with their severely or profoundly mentally retarded clients. Coles and Blunden (1981, experiment 2) provided daily individual written and verbal performance feedback to encourage paraprofessionals to consistently implement client activity programs.

A variety of performance feedback procedures have been shown effective in managing diverse behaviors. A theoretical understanding and component analyses of feedback procedures could shed light on why they so often control behavior, and presumably how their effect(s) could be heightened.
The question must be asked: "Why does providing subjects with objective information on their performance of a target behavior so often exert control over that behavior?" Skinner (1953) has suggested reasons at both the individual and phylogenetic levels. In a discussion of operant behavior he has said, "The consequences of behavior may 'feedback' into the [individual] organism. When they do so, they may change the probability that the behavior which produced them will occur again" (Skinner, 1953, p. 59). Thus, the stimuli referred to as feedback may reinforce certain behaviors. Skinner has also used the term to help explain the reinforcing effects of certain stimuli with which the individual has no known history, saying, "A capacity to be reinforced by any feed-back from the environment would be biologically advantageous, since it would prepare the organism to manipulate the environment successfully before a given state of deprivation developed" (Skinner, 1953, p. 83). Peterson (1982) has contended and cited evidence that, "Given the proper history of conditioning, it [feedback] could be a conditioned reinforcer, a conditional punisher, a discriminative stimulus, a conditioned stimulus in a respondent paradigm, or an establishing stimulus" (Peterson, 1982, p. 101). In sum, what is often referred to as feedback is a stimulus or set of stimuli to which many subjects are or can be conditioned.

Skinner has said something else that is relevant to this study and a functional analysis of feedback. "The organism must be stimulated by the consequences of its behavior if conditioning is to take place"
(Skinner, 1953, p. 67). This is important to keep in mind when working in any environment, but especially so when working in a complex environment, i.e., one in which the subjects are exposed to multiple competing contingencies. In such an environment, feedback would probably function as a cue or differential reinforcer—helping subjects decide to which contingencies they should respond.

Feedback Dimensions

According to Prue and Fairbank (1981, pp. 4-11), feedback procedures may vary on five dimensions; the recipient of feedback (e.g., the paraprofessional vs. the paraprofessional's supervisor), the content of the feedback (e.g., the subject's performance vs. the subject's and a pair of co-workers' performance), the delivery mechanism (e.g., feedback may be posted or verbal), its temporal characteristics, specifically the duration (e.g., posted feedback may be up for one hour, or a whole week) and contiguity to the target response, and finally its source (e.g., feedback could be supervisor or self-delivered). The schedule, relating the frequency and regularity with which feedback is delivered to the subject(s)' performance of the target behavior is another important dimension of any feedback procedure.

Each of these dimensions should be researched to learn more about how to control behavior via feedback procedures. The source of feedback was the dimension on which this study focused. This choice was based on the suggestion that, in general, component analyses of feedback are lacking (Brown et al., 1981), and specifically, that research on the effects of different sources of feedback is lacking and may be helpful
(Fairbank and Prue, 1982; Greller, 1980; Hegarty, 1974; Prue and Fairbank, 1981). Research on the effects of different sources of feedback may be of pragmatic help to organizations in determining by whom or from what level within an organization workers' behavior may be managed most effectively. From a scientific perspective, it should be useful to begin analyzing feedback sources because such data may shed light on the common conditioning history or different histories which produce roughly similar behavior by subjects.

Sources of Feedback

The source of feedback may be defined as the person whom the feedback recipient labels as the source from which the feedback originates. A paraprofessional working with retarded clients could receive feedback from a number of sources but the following seem the most likely alternatives: (1) The paraprofessionals may give themselves feedback; they may review data reflecting the clients' progress or may complete a checklist that rates their effort. (2) The paraprofessionals' peers may give them feedback by watching them perform their training and then verbally reviewing with them what elements of the training sequence they performed optimally and which could be improved. (3) The paraprofessionals' supervisors may give them feedback by collecting data on the clients' progress and regularly sharing it with the paraprofessionals, or by posting a large chart depicting how often the paraprofessionals have conducted training. (4) Staff not formally related to the paraprofessional such as experts in the content area of the work (e.g., a
physical therapist may consult on an ambulation program), or management consultants may also give the paraprofessionals feedback on the quality, quantity, or outcome (i.e., client progress) of their work. Of course, paraprofessionals also may receive feedback on their performance of a target behavior from any combination of these sources.

Feedback from diverse sources has been found to be effective in managing behavior. The following reviews literature on the four sources of feedback judged likely to be relevant to paraprofessionals working with retarded clients.

Self-Feedback

There is a fairly substantial literature on the effects of self-delivered feedback. The primary reason why this source of feedback has been selected so often is because it requires minimal resources (Broden, Hall and Mitts, 1971; Lamal and Benfield, 1978). Some problems have been noted with self-feedback, specifically that the subjects' recording may be inaccurate (Broden et al., 1971, Exp. I), and that the effect may attenuate with time (Broden et al., 1971, Exp. II). However, other research has shown that subjects have recorded accurately (Winett, Neale and Grier, 1979) and that the effects of self-monitoring persisted (Lamal and Benfield, 1978; Winett et al., 1979).

Komaki et al. (1980) taught employees of a fast food restaurant to be friendly; smile at and talk with customers. After training, clerks self-recorded their friendly behavior on a checklist which they completed at the end of their work-shift. The employee's direct supervisor was also asked to praise, at least once a day, each employee she spotted
being friendly to a customer. This intervention was successful in the cash-register area of the restaurant but the effect was not replicated in the dining room area.

The Komaki et al. (1980) study is typical of several that involve self-feedback and rely on the subjects to record their data accurately. For example, Williamson, Calpin, DiLorenzo, Garris and Petti (1981) investigated the effect of self-feedback and token rewards, exchangeable for 1:1 time with a teacher. The target behaviors were a nine-year old boy's hyperactive arm and leg movement which had not been controlled by treatment with dexedrine. (Dexedrine treatment had improved the boy's on-task and lunchroom behaviors.) The boy wore mechanical "large scale integrated" activity monitors on his wrists. During baseline, only the experimenter could read the monitors, by placing a magnet over them. During treatment, the subject could read the devices himself, by pushing a button on the monitors.

The results showed that the frequency of the boy's arm movements decreased by one-third to one-half of the baseline rate. Interestingly, this change seems to have generalized across muscle groups, to his legs, and across settings, to a freestyle area where he never received feedback.

A recent study attempted to assess the effects of self-feedback in the absence of "external influences" (Cohen, Polsgrave, Rieth and Heinen, 1981, see p. 126). This study assessed self-monitoring and self-monitoring plus public posting to increase six underachieving grade school students' time on task, and decrease one of those students'
disruptive behavior. The self-monitoring procedure was unusual in that subjects were supposed to record any time they were on task (six students) or quiet (one student) by making a check on a piece of paper, a potentially disruptive procedure. Bar graphs of each student's self-monitoring data were posted in the classroom. The two procedures were both moderately effective in decreasing the student's disruptive behaviors and somewhat effective in increasing on-task behavior. A package procedure, including self-monitoring, public posting, and token reinforcement contingent on the target responses, was more effective, by far, than the other two procedures. It should be noted that the accuracy of the student's records was never checked.

Broden et al. (1971) reported on two experiments which investigated the effects of (unmonitored) self-feedback on one eighth-grader's study behavior (experiment 1) and another's talkouts during math period (experiment 2). In the first experiment, the subject was to score his behavior, by marking a paper with a "+" for studying or a "-" for not studying, whenever he thought of it. The student's records were shown to be a poor match to objective records gathered by a trained observer, yet the student's grades improved, from the D to the C range. The student in the second experiment was asked to put a mark on a piece of paper whenever he talked out without permission. The results showed self-monitoring was initially effective in suppressing the rate of unauthorized talk-outs, though again the student's records did not closely correspond to an objective observer's. After a return to baseline about thirty-six days into the study the effect of self-monitoring was not
recovered. A salient difference between this subject and the one in the first experiment, for whom the effect of self-monitoring did not diminish, was that he had not asked for help while the subject of the first experiment had. Presumably, the latter subject may have cooperated more.

A case study by Lamal and Benfield (1978) showed the effectiveness of self-feedback on the tardy and off-task behaviors of a draftsman. Following a multiple baseline format, the subject was asked first to write down the time he arrived at work. This resulted in an immediate and dramatic reduction in tardiness. Next, he recorded the amount of time he spent on each job. This simple intervention increased working time by 30 percent. The intervention's effectiveness persisted. The authors suggested that the effect was due to the subject perceiving "... potential aversive consequences for failure to meet acceptable levels of performance" (Lamal and Benfield, 1978, p. 147).

Feedback From Peers

Two recent studies by the same set of researchers and in the same public school class for children with academic and behavioral deficits have examined the effects of teacher-mediated peer feedback. Ragland, Kerr and Strain (1981), in their work with socially withdrawn children noted that feedback is usually given by those in authority, but that involving peers as mediators of feedback might be beneficial. They contended that peers are an abundant resource that could allow target students to receive feedback from a number of sources rather than just
one or two authorities. Additionally (Kerr, Strain and Ragland, 1982), peers often control contingencies that are important to the subject.

In the former study (Ragland et al., 1981), the authors wanted to increase three boys' social behaviors, specifically, the amount of time during a recess period, the boys spent playing ball or jumping rope with peers. Their teacher, who had extensive experience in implementing behavior modification programs, set goals for each student in the class. For the three subjects, playing with other students at recess was the goal. After a baseline period, the teacher announced the goals. Thus, the effects of the peer feedback intervention were confounded with the effects of the teacher-set goal condition, because teacher-set goals were not part of the baseline condition. Immediately before each ensuing recess period, the teacher gathered the class, named each subject one at a time and had students vote, one at a time, on whether or not the goal had been met. Students voting "yes" had to give an example of the subject playing with another student.

An ABAB withdrawal design was used to evaluate the effects of goals and peer feedback. A modest increase was evident in all subjects' targeted social behaviors during the intervention phases. The return to baseline resulted in the subject's social behaviors returning to baseline levels. The students were extremely accurate judges of the subjects' social behaviors--their voting records usually matched the trained research assistants' observations. The authors noted that the timing of the feedback, immediately before recess, may have facilitated the effect by functioning as a timely cue. They also presented
anecdotal reports of subjects saying they wanted to earn positive feedback, and of class member reminding subjects of the contingencies.

This group's next study (Kerr et al., 1982) sought to clarify the relative effect of student goals and peer feedback and also examined if the procedure (goals and peer feedback) could be used to decelerate student behaviors. Four 11-year old boys, with high rates of negative social behaviors and extremely low rates of positive social behaviors were the subjects of this study. The authors attempted to decrease the boys' negative social behaviors (hitting, teasing, or taking objects from peers) during a twenty-five minute recess period.

The first intervention was a teacher-set goal, for each subject to: "Not argue, tease, fight with, or be cruel to classmates during recess" (Kerr et al., 1982, p. 281). The effect of this intervention was studied in an ABAB withdrawal design. Teacher-set goals produced consistent, but minimal decreases in subjects' negative social behaviors. The second intervention, goals plus peer feedback, was implemented as the system had been in Ragland et al. (1981). Peers publically and individually voted on whether each subject had attained his goal. One change was made in the system. A token fine was dispensed to subjects or any classmates who discussed feedback outside of the feedback session immediately before recess. This process was instituted after subjects were observed trying to influence the feedback system by bribing their peers.

The effect of this intervention was also evaluated via an ABAB withdrawal design in which conditions of goals only and goals plus
teacher-mediated peer feedback were alternated. The results showed large and consistent decreases in the subjects' negative social behaviors only when goals plus feedback were in effect. Small but consistent increases in positive social behaviors were observed for each boy.

This author has been unable to locate literature addressing the topic of feedback solely from peers within an organization setting.

**Feedback From Supervisors**

Evidence of the effectiveness of feedback from supervisors is available in organizational settings. Chandler (1977) presented an interesting case study (A-B design). Daily graphic and verbal feedback from a department manager were utilized to decrease a shift supervisor's negative comments and increase his shift's performance. The feedback focused only on the department's daily production during that supervisor's shift. The department manager told the shift supervisor he was monitoring his negative verbal comments as well, but never presented data on that behavior. Surprisingly, both behaviors improved. In fact, almost no negative comments were recorded within a week after the intervention started.

Quilitch (1978) also presented a case study (BAB design) suggesting the effectiveness of an immediate supervisor's feedback to employees. Feedback consisted of posting replies, signed by the employee's supervisor, to written suggestions. Removal of this intervention resulted in a decrease in the number of suggestions received each week. Reinstatement of the feedback contingency resulted in a modest increase
in the number of suggestions received, but this level did not match the one originally attained.

The baseline output of four crews working in a textile mill was 10 to 20 percent below company standards. Emmert (1978) looked at the effects of publicly posted group feedback versus publicly posted group feedback plus individual verbal feedback from an immediate supervisor (foreman) as means to improve the four crews' performances. It should be noted that Emmert did not make clear the source of the group feedback, nor if the workers knew the source. Additionally, the foremen's delivery of verbal feedback went unmonitored.

An A-B-C design, with the second intervention (C, group and individual feedback) introduced in a multiple-baseline fashion across crews, was used to evaluate the interventions. Unfortunately, the results are difficult to interpret, due to accelerating trends during the first intervention (group feedback, the B phase), the author's decision to block data over one week periods, and staff turnover resulting in temporary performance dips as new staff were trained.

As have others, Coles and Blunden (1981, exp. I) showed that training paraprofessionals to engage their retarded clients in activities and scheduling them to do so yielded an immediate and dramatic increase in the number of clients judged to be engaged. However, the effect did not maintain. Thus, a second goal was set (Coles and Blunden, 1981, exp. 2), for ward staff to maintain the behaviors obtained in the first experiment; that is to consistently engage their retarded clients in activities. The experimenters worked with supervisors from
three levels above the ward staff, the ward managers, unit managers, and facility manager. All supervisors were responsible for observing the ward staff, those at higher levels observed less frequently. They were also responsible for sending a report of their observations to persons one level above and one below their own rank. Thus, ward staff received daily feedback from the ward managers, who received weekly feedback from the unit manager, and so on. This strategy proved successful.

Brown et al. (1981) also investigated the effects of feedback from supervisors. They attempted to encourage first-shift paraprofessionals to engage in more social interactions with their clients at any time and second shift paraprofessionals to engage in more social interactions with their clients while performing their regular duties, for example helping a client get dressed or washed-up. They compared immediate supervisors' simple descriptions of the staff's social interactions with their retarded clients, for example, "I saw you talking to John about his appearance," with this type of feedback plus praise, for example, "I saw you talking to John about his appearance, that's so important!" A multiple baseline across the two shifts, with an alternation of interventions on the second shift, was used to evaluate the results. Thus, first shift experienced baseline, feedback, then feedback plus approval. Second shift experienced baseline, feedback, feedback plus approval, feedback, then feedback plus approval.

Feedback plus approval was shown to be marginally effective with the first shift and substantially more effective than simple feedback with the second shift. Simple feedback produced no change over the
baseline level of social interactions initiated by first shift staff. Collateral data on first and second shift staffs' mean percent of being rated off task showed a substantial drop for both shifts when simple feedback was introduced. These improvements maintained during the feedback plus approval phase.

Feedback From Others, Unrelated to the Recipient

A number of studies provide indirect information on this source of feedback however, none were found which addressed it directly. For example, Zohar, Cohen, and Azar (1980) attempted to encourage workers in a noisy factory to wear ear protection by having an audiologist supply workers with daily audiograms measuring the threshold of sound they could hear before and after work. Audiograms were taken from a sample of workers who had or had not worn ear protection. The results were given to the workers whose hearing had been tested and also publicly posted. This system dramatically increased the experimental group's use of earplugs. Interestingly, the experimental group had a high rate of turnover but the use of earplugs maintained and even increased during the five month follow-up period, during which no feedback was delivered. The authors suggested that the intervention had produced a change in the group's norms. Curiously, members of the control group, working in a different building, wore earplugs almost as often as members of the experimental group during the baseline and treatment phases. They wore protective equipment more often in treatment too. However, the control group's earplug use declined dramatically during follow-up.
Subjects received feedback from observers in a study examining the effects of modeling and immediate and delayed feedback (Krumhus and Mallott, 1980). Subjects were college tutors working with children needing remedial reading help. The dependent measure was the percent of opportunities in which tutors used descriptive praise as a consequence for a tutor's correct responses. Feedback was delivered immediately before or after a tutorial by an observer who reviewed with the tutor a tape of that tutor's most recent session and presented three examples and three non-examples of appropriate descriptive praise. Results are difficult to interpret because the modeling intervention was implemented before either type of feedback and boosted the use of descriptive praise. It is clear pre- or post-session feedback was adequate to maintain the target behavior.

Members of a safety committee provided written feedback to laboratory supervisors on the frequency and category of safety hazards, such as improperly stored chemicals, in their laboratory (Sulzer-Azaroff, 1978). A multiple baseline across thirty laboratories showed twenty improved, eight had as many hazards, and two had more hazards after the inspection and feedback system was introduced. The relationship of the safety officers (source of feedback) to the laboratory supervisors (recipients) was unclear, but both groups were described as highly competent professionals. The author explicitly states (Sulzer-Azaroff, 1978, p. 19) that feedback recipients were chosen because they controlled many contingencies for the staff working in their lab and thus
could facilitate compliance by all laboratory personnel with designated safe practices.

Comparisons of Different Feedback Sources

Several studies have compared the effectiveness of different sources of feedback. Winett et al. (1979), working on energy conservation, did a rough comparison of self versus experimenter generated feedback. Written feedback from the experimenter was more effective. Subjects in that condition reduced their energy use by 13%, almost twice as much as subjects in the self-monitoring condition. Subjects in the self-monitoring condition, however, did not have the opportunity to give themselves feedback on how much money they were saving; those receiving feedback from the experimenter got that information. Also, self-monitoring subjects graphed their data only 50 percent of the time, while the other subjects received a graph each day. Thus, this comparison of feedback sources was confounded.

Kim and Hamner (1976) examined the effects of performance feedback and goal setting on workers' productivity and job satisfaction. This study was conducted on over one hundred unionized, blue collar employees working in four midwestern phone company plants. The authors formed four groups: (a) goal setting alone and goal setting plus, (b) feedback and praise from the worker's immediate supervisor, (c) self-feedback, or (d) supervisor and self-feedback and supervisor praise. There were five dependent variables. Three were objective measures: cost performance, absenteeism, and safety. One was a subjective performance measure: quality of service, and one was job satisfaction. The nonequivalent
control group design (Campbell and Stanley, 1966, p. 47) was employed. This design permits comparison between the performances of naturally occurring groups (i.e., in which subjects are not randomly assigned). Experimental groups received a pre-test, one of the four interventions, and post-test. The control group received the pre and post-test only.

Unfortunately, this comparison of feedback sources was confounded. Those receiving supervisor feedback also were supposed to receive praise on their performance from the supervisor once a week. Subjects in the self-feedback condition were not scheduled to receive praise. Also, while the self-feedback subjects gave themselves a written rating, the mechanism for delivering supervisor feedback was unclear. The authors said, "... [supervisor] feedback was operationally defined as having work groups receive information from their foreman ..." (Kim and Hamner, 1976, p. 50). In addition, the timing or contiguity of feedback to performance clearly varied systematically across groups. Those receiving self-feedback completed their self-ratings at the end of their work week. Supervisor feedback was delivered at the beginning of each work week.

The results showed that the source of feedback (for groups B and C) did not differentially affect any of the dependent measures. In general, the shotgun approach represented by group D, goal setting plus supervisor and self-feedback, plus supervisor praise, produced the largest improvements on the four performance measures.

Ivancevich and McMahon (1982) conducted a similar study using over two hundred engineers working at six different locations. Their goal
was to examine the differential effects of goal setting combined with supervisor or self-generated feedback on productivity. There were five experimental groups: (a) goal setting and supervisor feedback, (b) goal setting and supervisor feedback plus praise, (c) goal setting and self-generated feedback, (d) supervisor feedback only, and (e) co-worker feedback only. The control group had no goals set and received no feedback but did receive a standard quarterly performance review during the study.

The authors operationalized their interventions as follows: Goal setting = quarterly performance objectives given to each engineer by their supervisor. Supervisor feedback = quarterly report from supervisor on how many engineers met their goals. Praise = positive comments from supervisor to engineer on their performance. Self-generated feedback = subjects completed quarterly reports on their goal accomplishments and submitted those forms to their supervisor. Feedback from co-workers = Quarterly meetings of 10-12 engineers plus monthly meetings of 2-3 engineers at which engineers did self-appraisals of their goal accomplishment and commented on each other's work. During the control group's performance reviews there was no reference to specific goals. The effects of these variables were measured on four performance and three attitudinal variables.

The results showed that in general, goal setting produced superior results compared to no goal setting while feedback produced superior results compared to no-feedback. Most relevant to this literature review was the result showing that the group receiving self-generated
feedback (group C) performed statistically significantly better than the
groups receiving supervisor feedback (groups A and B) on three of the
four performance measures and two of the three attitudinal measures.
Unfortunately, these results are confounded because the self-generated
feedback group had to work on their forms throughout the quarter and the
supervisor feedback group did not (Ivancevich and McMahon, 1982, p.
364).

A comparison of the effects of receiving performance feedback from
a content expert versus receiving it from peers was reported by Hayman
(1981). In that study sixty-four graduate students learning micro-
counselling skills were randomly assigned to one of three groups: feedback from an expert, feedback from peers, or the control group, which received no feedback. There were three target skills: asks open questions, paraphrasing, and responds to feelings and emotions. The experimental groups viewed a videotape of each skill, read up on it, and heard a fifteen minute lecture/discussion by a trained supervisor. They then practiced the skills in triads and were videotaped demonstrating each skill. The supervisor feedback groups received feedback on their demonstration of each skill in the following manner: "The supervisor stopped the tape after each counsellor response, gave positive reinforcement [term misused] and talked about the skill" (Hayman, 1981, p. 199). In place of this, the peer feedback group had a group discussion, then watched their videotape. The supervisor stopped the videotape after each of the counselor responses, but did not comment on it--instead inviting peers to critique each other. The control group did
not learn micro-counseling skills. They spent this time in regular classroom activities but were videotaped on each skill. Experienced raters watched the videotapes and scored the subjects' demonstration of each skill, using a Likert type scale. The experimental design used was the post-test only control group design (Campbell and Stanley, 1966, p. 25).

The results showed that on all three target behaviors the peer feedback group scored significantly better than the control group. There was no statistically significant difference between the supervisor feedback group and the control group. Overall, the peer feedback group was scored statistically significantly higher than the supervisor feedback group.

The results are interesting but are confounded by two factors. The number of feedback sources may have differed across the experimental groups; those receiving supervisor feedback had only one source. Those in the peer feedback condition had two potential sources—the two peers in their triad. Also, the experts were of questionable competence. Their only listed qualifications were that they were enrolled in an "Educational Specialist" graduate course and had been taught to teach micro-counselling skills.

Other Literature

Other literature exists on sources of feedback in the organizational, personnel, and social psychology areas. Only those studies most relevant to the present one have been reviewed because the differences in methods and underlying assumptions make comparisons difficult. This
project could most accurately be characterized as an Organizational Behavior Management (OBM) type study. OBM is a branch of Applied Behavior Analysis (ABA). ABA studies can be differentiated from other areas of psychology by their reliance on repeated direct measurement of target behaviors, the use of single-subject type experimental designs which allow the experimenter to demonstrate functional control of the subject's performance of the target behavior, and adherence to the principles of behavior in deciding on worthy research questions or interpreting results.

An example of a study that investigated feedback sources, but which was judged too different in approach to be helpful, was presented by Hellieson (1979). That study investigated the relationship between the importance attributed to certain sources of feedback by teachers and principals in order to determine whether teachers rated as very effective by principals labeled different feedback sources as important than teachers rated low in effectiveness. Data from questionnaires asking 177 teachers to rate sources of feedback according to their importance were correlated to their principals' ratings of effectiveness. Teachers rated as very effective thought feedback from the principals, students' test results, and self evaluations were more important than did teachers rated as minimally effective.

There are several problems with this study. First, teacher effectiveness was never verified via observations or student gain scores. More importantly, the study focused on teachers' reports of what feedback sources were important; no attempt was made to see if there was a
correlation between sources rated as important and those which exerted control over the teachers' behavior.

Another study in this category was presented by Hegarty (1974). Supervisors received feedback in the form of subordinates' ratings of their behavior on a Likert type scale. Feedback was delivered in summary form by the experimenter at one 60-90 minute meeting. This resulted in statistically significant positive changes in the subordinates' ratings of their supervisors' behavior. This outcome was entirely in line with the author's stated purpose, "...[to] determine whether feedback of subordinates' ratings to their supervisor leads to subordinates perceiving positive changes in their supervisors' subsequent behavior" (Hegarty, 1974, p. 764).

While interesting, the total lack of validation efforts such as some measure of a change in the supervisors' behavior and the reliance on statistical rather than clinical evaluation techniques reduces this study's utility. This type of research is perhaps best viewed as an exploratory effort in a new area. The author seems to view the work that way, concluding with a suggestion for future research on, "...[the] comparative effects of feedback from different sources" (Hegarty, 1974, p. 766).

**Delivery of Feedback**

This project focused on the effect of different sources of feedback on the performance of small groups of trained paraprofessionals
working with their retarded clients. One important determinant of the group's reaction to the feedback may be how it was delivered to the group. If the focus had been on individuals' behavior, the most likely way to feedback information would have been to give each individual information about his or her performance. Because the focus was on small groups, there were at least four options for delivering feedback to group members. Feedback could have been delivered: (1) to the group (as one unit) about each individual's performance (providing information on task performance could be broken down into individual components); (2) to the group about the group's performance; (3) to each group member about each individual's performance; and (4) to each group member about the group's performance. Of course, these options also could be combined to produce additional ones. The first and third of these options were not viable in this research because the target behavior (conduct basic fire-evacuation training) required an interdependent approach, making it impossible to sort out individual contributions.

Feedback to a Group about the Group's Performance

No studies were found which reported on the effects of giving feedback alone to a group based on the group's performance (option 2). Shook et al. (1978, experiments I and II) used a contingency very close to this with staff working with retarded persons. The subjects of experiment I were 15 part-time "therapists" working at a center for multi-handicapped children. All were psychology students at a nearby university. The target response (in both experiments) was the number of
child behavior graphs completed. None of the subjects in either experiment had been completing any of their graphs. Three procedures were examined in the first experiment: (a) reduced effort, in which the experimenter posted the graphs, (b) reduced effort and instructions, in which staff also were given written instructions on how to and why they should complete graphs. The instructions were publicly posted and all staff were required to sign them; and (c) reduced effort, instructions, and group feedback, in which data on the percent of graphs completed by the fifteen subjects were posted on the same bulletin board as the instructions. Staff also were required to sign the group feedback memo which the experimenters updated daily. Oddly, the target subjects did not know that the posted group feedback was related to their performance. The feedback was explained via a memo which read, "Of a sample drawn from employees the following had current graphs" (Shook et al., 1978, p. 208). The authors go on to explain that the sample consisted of the composite data for the fifteen target subjects. The experimental design was an ABCDA, where A=baseline, and B, C, and D correspond in order to the three interventions described above.

The results showed that during the first baseline none of the fifteen subjects were completing any graphs. During the next phase, experimenter posted graphs, one subject regularly graphed client behavior. When instructions were added to experimenter posting, about half the subjects graphed client behavior. This effect did not maintain however, and the number of subjects having current graphs stabilized at three. When group feedback was added, the number graphing stayed at
three. (It should be noted this condition was in effect for only three sessions.) Upon a return to baseline, all subjects stopped graphing.

In the second experiment, Shook et al. (1978) worked in the same setting with six new subjects all of whom fit the description of subjects in the first study, i.e., psychology students with zero rates of graphing client behaviors. The authors did not utilize the reduced effort condition, examining instead: (a) instructions (as in exp. I); (b) instructions and group feedback (as in exp. I); (c) instructions, group and individual feedback in which the percent of graphs kept up to date by each subject was publicly posted and updated every working day; and (d) instructions, group and individual feedback, and reinforcement, in which the subjects also received brief verbal praise from one of the experimenters contingent on graphing. Also if they kept their graphs current 80 percent of the time, a staff party was given in their honor. The experimental design was an ABCDBEB, in which A=baseline, B=instructions, C=instructions and group feedback, D=C plus individual feedback, and E=D plus reinforcement.

The results showed that the subjects' likelihood of completing client graphs was affected minimally by instructions or instructions plus group feedback. Adding individual feedback resulted in about half the subjects regularly meeting the graphing goal. Adding reinforcement resulted in two-thirds of the subjects regularly meeting the goal.

These two experiments are interesting and suggest that providing a group with feedback based on the group's performance is not very effective. However, because the target subjects did not know the group
feedback portrayed their behavior it is not surprising that that intervention was minimally effective. The method of group feedback used in these studies is analogous to an insurance company regularly reporting that a subset of drivers was responsible for half of all accidents without identifying the guilty subset. It seems likely that if the target subjects had been identified they would have completed more graphs during the group feedback condition.

Reid, Schuh-Wear, and Brannon (1978) delivered feedback and other consequences to three groups depending on each group's performance. This work was done with more than fifty paraprofessionals working first or second shift in three units in an institution for retarded persons. Besides performance feedback, all staff in a unit received a desirable work schedule (every other weekend off) if the total number of staff absences in that unit was under a certain criterion for the prior four week period. The experimenters explained their procedure as follows: "A chart [bar graph] was posted on each unit to indicate how many absences had occurred for that . . . period. A line was drawn . . . to indicate the criterion level of absences allowed. Next to each portion of the bar . . . the name of the person absent was recorded" (Reid et al., 1978, p. 256). The experimental design used was a multiple baseline across the three units. Data were presented for both first and second shifts on each ward, and showed a modest but statistically and clinically significant reduction of absenteeism for five of the six shifts.
Feedback to Each Group Member about the Group's Performance

No studies were found that reported on the effects of giving feedback alone to each member of a group on the group's performance (option 4). Slavin, Wodarski, and Blackburn (1981, experiments I and II) used a related contingency arrangement. (In these studies, group members = apartments and groups = apartment buildings.) They addressed the excess use of electricity in master metered apartments; and cite estimates that people living in individually metered apartments use approximately 35% less electricity. The participants in study I were middle to upper middle class families living in three adjoining apartment towers. Each tower had 40-63 units, and each had its own meter. A package approach was used in attempting to decrease the amount of electricity used in one tower at a time. First, all residents of a tower were invited to a meeting at which the importance of conservation was stressed and energy saving tips reviewed. Second, each unit in the tower received a letter asking residents to conserve electricity and explaining a rebate procedure in which the cash value of any electricity savings would be divided equally among all units in a tower and distributed every two weeks. Third, the rebate procedure was implemented. The rebate procedure was supplemented by a feedback letter to each unit. It reported the amount of electricity the tower could have been expected to use (based on the weather and past usage patterns), the actual amount used, the savings (if any), and the cash value of the savings. A check for the unit's share of the savings was included with the letter. The intervention was
introduced in one tower at a time according to the multiple baseline format.

The results showed the amount of electricity used decreased by an average of 11.2 percent in tower 1, 1.7 percent in tower 2, and 4.0 percent in tower 3 for an overall average reduction of 5.6 percent per tower. The reductions achieved are worthwhile but do not approach the estimated 35 percent waste margin. Each apartment received an average of $1.78 with each feedback letter. Thus they averaged 89¢ a week.

The authors noted that 89¢ a week was not much of a reward and thus varied the pay-off schedule slightly in a similar experiment in three adjoining mastered metered apartment towers with 82-88 units each (Slavin et al., 1981, exp. II). The participants were described as largely lower middle class families. The procedures were the same as in experiment I with two exceptions: (1) only half of the money saved was rebated; and (2) participants (apartment units) could earn a one-time only bonus of $5.00 if their tower's electricity use was 10% less than the predicted amount for a two week period.

The results showed the amount of electricity used decreased by an average of 9.5 percent in tower 1, 4.7 percent in tower 2, and 8.3 percent in tower 3. Towers one and three earned the one-time only cash bonus. Not counting the cash bonus, each unit was rebated an average of 36¢ a week. Overall, these towers decreased their use of electricity by 7.5 percent, 2 percent more than had those in experiment I, but the estimated 35 percent waste margin still was not approached.
Summary

Much research has been conducted using feedback to control behavior but few studies have systematically examined the effects of the source of feedback. All sources of feedback that are relevant to the subject population in this experiment have been shown to be capable of controlling behavior. All of the comparisons of feedback sources that were reviewed were confounded, making it difficult to know if different feedback sources produce different behavioral outcomes. Differences in the effectiveness of feedback sources could have practical and scientific importance.

The effect of different sources of feedback on the likelihood that small work groups conducted basic fire-evacuation training was examined in this project. Focusing on small groups obscured the effect of the interventions on the behavior of the individual subjects. In this case the unit of interest was the group. Some jobs must be performed by more than one person. Basic fire-evacuation was such a job. By studying small groups, in which one person's performance is interdependent with another's, this work may help set the occasion for more complex further research on the performance of work groups.

Research Question

This project compared the effects of feedback from a supervisor in control of contingencies likely to be important to paraprofessionals (such as work assignments, evaluation ratings, and granting of days off), with feedback from another person of roughly similar rank within
the organization who did not have control of such contingencies. It was expected that the person controlling important contingencies would be the more effective source of feedback, i.e., would produce a greater positive change in the number of fire-evacuation training programs conducted by small groups of paraprofessionals. Showing this elemental relation between the source of feedback and behavior would provide a valuable addition to the organizational behavior management literature.
CHAPTER II

METHOD

Background Information

Before reviewing the experimental methods, the environment in which the research occurred will be described and literature on fire-evacuation skill-training discussed.

The General Experimental Environment

This work was conducted at a public residential state school for mentally retarded persons located in rural western Massachusetts. Its population has decreased dramatically in the past 15 years, from a high of 1,500 to 450 today. This drop in population reflects the national movement to provide mentally retarded persons with community-based services.

The paraprofessional staff provides direct services to the clients at the state school. The services provided depend on the clients' skills and disabilities, and range from infrequent monitoring and verbal guidance to intensive supervision and highly structured teaching programs. Paraprofessionals fall into two job categories, Mental Retardation Assistants (MRAs) and Mental Retardation Technicians (MRTs). The MRA position is the entry level; the MRT position is one step higher. The relationship between these two job categories, their immediate supervisors, and the clients are schematically presented in Figure 1.
Figure 1. Relationship between paraprofessionals, their immediate supervisors, and clients at the state school.
The state school also has a full complement of professional, administrative, and maintenance personnel.

The state school was reorganized one year ago. Structurally, three major changes occurred. (1) There are now four units each responsible for about 115 clients and with similar residential options (including large locked buildings and smaller, unlocked group residences). Formerly there had been seven units of varying size and residential options. (2) The salaries for the MRA and MRT positions were upgraded. (3) The school programs and therapeutic services are now administered centrally rather than within the units. Overall, the reorganization was an attempt to improve services to clients by trimming the unit bureaucracy while setting the occasion to attract and keep qualified personnel working directly with clients.

The state school adheres to the philosophies of active treatment and least restrictive environment. Adherence to the active treatment philosophy is operationalized by providing all clients with the educational, vocational, and therapeutic services called for in their service plan. The philosophy of providing services to clients in the least restrictive environment is operationalized by the facility's placement activities.

Clients' movement to less restrictive residences, in the community, or on grounds, had been contingent on the availability of a site and assurances that the required educational, vocational, and therapeutic services would be offered there. Recently, several factors have slowed the rate of placements. Foremost have been funding reductions
for community programs and changes in the state and federal building codes. Building codes now require those living in community style buildings (group residences), to be able to take lifesaving actions in the event of a fire emergency.

To be eligible for placement in a group residence, federal regulations require a mentally retarded person to be ambulatory, receiving active treatment, and, "Capable of following directions and taking appropriate action for self-preservation under emergency conditions" (note 1). State regulations are more specific, operationalizing basic fire-evacuation skills. They require the client to, "have the capability, both mentally and physically, to take action to preserve one's own life. Specifically to egress the building within two and one-half (2-1/2) minutes" (note 2). The state regulations go on to review the procedure for testing clients' self-preservation capabilities and stress that staff must "isolate themselves from the occupants" (clients), that during tests one point in the main exit route may be blocked (to simulate a hazardous condition), and that tests may be scheduled at the discretion of the building official, but must occur at least quarterly. If a test is failed, the building official can require the client to move back to an institutional style building in which the person would presumably be safer.

Fire-Evacuation Training

Fire-evacuation training refers to teaching a subset of all fire-safety skills, specifically, those needed to leave a building that is presumably burning. In residential care facilities, such as
institutions for the retarded or nursing homes, a lack of fire-evacuation training is often cited as a factor contributing to injury or death in fire (e.g., Bell, 1980a; Edelman, Herz and Bickman, 1980). Fire-evacuation training in these facilities appears to be correlated to a reduction of fire-related injuries or deaths (e.g., Bell, 1980b; Haber, 1980, case 3).

Many component skills may be used to escape a fire: walking, crawling, opening doors, sniffing for smoke, and going to a specified outdoor area are just a few of the possibilities. Many factors must be taken into account when deciding which skills should be taught. If the environment is fire-resistant, the staff are well trained with respect to their role in a fire-emergency, and the building occupants seldom or never engage in fire-starting behaviors, then only basic fire-evacuation skills may be required. As any of the above factors moves away from the ideal condition, the likelihood that a dangerous fire may occur increases and thus the need for the building occupants to have more sophisticated fire-evacuation skills increases.

Other factors to consider in deciding which fire-evacuation skills to teach are the occupants' general learning abilities and the behaviors in which they usually engage. When the occupants' learning abilities are low, leading to a diagnosis of severe or profound mental retardation, and they engage in behaviors, such as self-stimulation or non-cooperation, that may interfere with their response to a fire-evacuation cue, then it is more likely that they will be taught only the basic fire-evacuation skills called for in the state regulations.
The subjects (staff) of this experiment attempted to teach the state school clients basic fire-evacuation skills for several reasons. All but one of the twenty-six clients who received training were labeled severely or profoundly retarded. Over one-half of them could be described as presenting high rates of self-stimulatory or non-compliant behavior. The environments in which the clients lived were fairly well protected from fires; certain staff and client behaviors were closely monitored, for example, smoking was only allowed in certain areas; staff were responsible for maintaining the storage of flammable materials and supervising clients such that fires were unlikely to start, and staff and clients were required to practice mock fire-evacuations regularly. Additionally, all buildings were equipped with smoke detectors, interconnected fire alarms (throughout a building and across buildings), and every building had at least three standard exits and two means of egress from every floor.

Subjects

The members of six fire-evacuation training teams were the subjects of this experiment. The teams were organized for this research project. Each team was composed of three Mental Retardation Assistants or Technicians (hereafter paraprofessionals), two primary trainers and an alternate who participated when one of the others was unavailable (absent, changed jobs, etc.).

A total of twenty-eight paraprofessionals participated in the project. Thirteen were women. Of these six were primary trainers and
seven were alternates. Fifteen men participated, nine primary trainers and six alternates. Subjects' ages ranged from twenty-one to fifty-five years, their length of employment at the state school ranged from one to twenty-one years. Nine subjects participated for the entire study, the others for varying lengths of time. Ten subjects dropped out of the study; of these five received promotions, two transferred to other equivalent jobs on grounds, one was transferred against her wishes to another equivalent job on grounds to even out staffing across units, one took a leave of absence to go into the Army Reserve, and one left the state school for another job.

Subjects were assigned to work on the fire-evacuation training teams by their unit directors, but had to volunteer to be part of the study. Training teams were formed based on the experimenter's suggestions that team members hold a paraprofessional position, work on the same shift, and in the same residence.

Relevant Others

Clients

A total of twenty-six clients received training as part of this project. Clients were referred for training by unit directors based on criteria supplied by the experimenter. The clients lacked fire-evacuation skills and lived in, or were scheduled to move to, a building in which occupants had to be able to evacuate independently under real or simulated emergency conditions. Their ages ranged from mid twenties to early sixties and their length of institutionalization from ten to
forty years. Clients' levels of retardation were not assessed but all
were diagnosed as severely to profoundly retarded. Few had more than
rudimentary language skills. None were physically handicapped.

Supervisors and Non-Supervisors

Residential Program Coordinators (RPCs) provided the supervisory
source of feedback for the project. Each of the six teams' RPC partici-
pated. RPCs were three levels above the subjects in this state school's
staff hierarchy (see Figure 1). RPCs spent very little time in the
residences, but had input into staff schedules, employee evaluations,
and granting time off.

The non-supervisory source of feedback was provided by two people,
one from the Staff Development Department, the other from the Compliance
Office. Neither was in a position to influence personnel activities in
the units where subjects worked. Both of these people had an interest
in this project, the person from staff development because she coordi-
nated staff training in teaching fire-evacuation, the person from the
compliance office because he was responsible for monitoring fire drills
at the institution.

Observers

Observations were performed by the experimenter, an undergraduate,
and four institutional staff, one from each of the four units. Observ-
ers went through a brief training program that taught them to conduct
observations according to a specific format (see below).
Setting

This project was conducted at a state school which was previously described. The fire evacuation teams worked in two types of settings: four teams worked in "cottages", the other two in large institutional style buildings. The cottages were two story buildings in which twelve to fifteen clients lived and were more home-like than traditional institutional buildings. They consisted of a kitchen, dining room, living room, a number of private or semi-private bedrooms and a small staff office in which client records were stored.

One of the institutional style buildings was an old two story structure in which thirty clients lived; the other was a newer and larger three story building in which sixty-three clients lived. The two institutional style buildings had a number of bedrooms for two to four clients, large dining rooms, large day halls, and separate offices for supervisory and medical staff. The institutional style buildings were larger than the cottages, thus their average evacuation route was longer.

The newer institutional building was divided into two areas, each with its own supervisors (Assistant Residential Team Leaders and Residential Team Leaders) and separate staffs. The team working in that building worked on the third floor. Its Residential Program Coordinator had an office on the first floor, near the main stairs and elevator. Thus these team members probably saw their RPC (supervisory source of feedback) more often than members of any other team.
Apparatus and Materials

Forms

Two types of data sheets were developed. One was used by training team members and observers to record the number of fire-evacuation training trials that teams conducted and the clients' performance on each step of the task (Appendix 1). The other was used by observers to record the teams' performance of fire-evacuation training (Appendix 2).

Written feedback forms were used by supervisors and non-supervisors to provide subjects with performance feedback (Appendix 3). (These forms are explained in detail in the procedure section.)

Fire Alarms

Each team had a portable fire-alarm that it used for fire-evacuation training. The sound provided by the portable alarms was, at close range, as loud as the building alarm, but was continuous whereas the building alarms sounded an alternating off-on pattern. About halfway through the project each team received a portable tape recorder and a tape of their building alarm to replace the portable alarms. This was done in an attempt to facilitate generalization by the clients from fire-evacuation training to the monthly fire-drills at which they were to evacuate independently.
### Measurement

**Dependent Variable**

The dependent variable was the number of fire-evacuation training trials each team conducted per training session. One fire-evacuation training trial consisted of the staff cueing the client to evacuate by turning on the alarm, providing the client with the minimum amount of prompting needed to get him or her to go outside as quickly as possible, and rewarding the client once he or she got outside. One training trial could take from thirty seconds to about four minutes depending on the client and the length of the evacuation route.

Teams were scheduled to conduct two training sessions a week, during which they were to do at least four training trials with each of two clients, for a total of eight training trials a session and sixteen training trials a week. When legitimate problems arose, such as client illness, a client's refusal to participate, or staff shortages which prevented training, the number of training trials assigned for the week was lowered.

**Supplementary Measures**

**Clients' fire-evacuation skills.** This was measured two ways; by the number of prompts each client required to evacuate during training sessions, and by the rating (independent or not independent) the client received at monthly group fire-drills conducted in their residence.

**Opportunities to do training.** Teams were scheduled to conduct training twice a week. In order for an opportunity to do training to
exist several conditions had to be met: (a) at least two trained staff had to be present, (b) at least one of the clients scheduled for training had to be present, and (c) a sufficient number of other paraprofessionals had to be present to supervise the clients not receiving training. In cottages at least one other paraprofessional had to be present, in the older institutional style building at least three other paraprofessionals had to be present, and in the newer institutional style building five other paraprofessionals were required.

Compliance with intervention procedures. These data were collected to determine if the supervisors and non-supervisors were implementing the independent variable as planned. They were supposed to provide subjects with brief written feedback each week according to a format which the experimenter had taught them. This was checked three ways: (a) by reviewing a copy of the supervisor's or non-supervisor's feedback at least once a month, (b) by asking each subject once during each intervention phase if they were receiving written feedback, and (c) by asking subjects who were participating at the end of the project how often they'd received written feedback.

Subjects' labeling of the feedback procedures. After the intervention period, subjects were asked to complete a fifteen item survey covering demographic data and their response to the feedback procedures (Appendix 4). This survey asked questions including which feedback source the subject preferred, if they would rather have received a different type of feedback (e.g., verbal), and if they thought the feedback they received accurately reflected their team's performance.
Typical management procedures. A random sample \( n=85 \) of all paraprofessionals working at the state school was asked to complete a nine item survey shortly after the intervention period had been completed (Appendix 5). This survey asked questions such as, "Who arranges your holiday or vacation schedule?" and, "How often is your performance of jobs for which you've received special training evaluated?"

Program implementation difficulty. After the intervention was completed, professionals working in the residences were asked to complete a nine-item survey (Appendix 6). This survey probed for the kinds of problems (if any) that professionals experienced when trying to get paraprofessionals to implement client programs in the residences.

Cost data. The cost of providing subjects with weekly written feedback was estimated by asking supervisors and non-supervisors how much time per week they spent delivering feedback.

Data Analysis

Data collected on the dependent variable were analyzed graphically (Parsonson and Baer, 1978) and statistically via a sequential analysis, a Bayesian statistical procedure described in Dixon and Massey (1969) and via a simplified time series analysis format for small data sets (Tryon, 1982). Data collected on the supplementary measures were treated in a simple descriptive fashion.

Experimental Design

The design was a multiple-baseline conducted across teams, with the order of presentation of the two feedback sources counterbalanced.
Five of the six teams experienced both interventions. Two teams experienced baseline, feedback from a supervisor, then feedback from a non-supervisor; three experienced baseline baseline, feedback from a non-supervisor, then feedback from a supervisor. The sixth team experienced feedback from supervisor 1 (RPC), then feedback from supervisor 2, the Residential Team Leader who was one rank below the RPC. There were two reasons for this deviation: (1) The first supervisor was not complying with the intervention procedure, necessitating the use of the second supervisor, and (2) when it was time to switch this team to the "feedback from a supervisor" condition the experimenter was informed that the unit had made several changes in the way the team functioned. The major changes were that the unit expanded both the number of clients and trainers involved by pooling resources across their three cottages, only one of which participated in this experiment. After this change the experimental subjects worked with non-designated clients as often as not, were assigned roughly double the amount of training (sessions were longer), and worked with clients from two of the three cottages in any given session.

Procedure

Pre-Baseline

Before asking the teams of subjects to conduct fire-evacuation training with their clients, the experimenter tried to ensure that all antecedent conditions that would enable the subjects to be successful were in place. These included: (1) Negotiating schedules (two one-hour
sessions per week) when the training could occur through the unit personnel who scheduled staff and client activities. (2) Having unit directors identify five clients who needed fire-evacuation skills and living in the residence in which the team worked. (3) Training subjects in the specific operations they had to perform to teach fire-evacuation skills. (4) Placing the data sheets and portable fire-alarm (later tape-recorder) in a spot in the residence to which the subjects had easy access and showing them the location. (5) Supervising each team's first two training sessions (every effort was made to have all three team members at these sessions). At supervision sessions the experimenter tried to prompt the subjects' performance less and less with each training trial while continuing to give them verbal feedback on their efforts. And (6) informing each subject verbally and in writing of their schedule, client assignments, how much training they were supposed to do at each session, and that they were expected to conduct training as a team without the experimenter present. During all training and experimental sessions, teams were responsible for completing a data sheet for each client receiving training.

Baseline

Once a team completed its pre-baseline activities, it entered baseline. Teams were told they would be observed at one of their first sessions by the experimenter and a research assistant. At the first session during which subjects were observed, the experimenter showed them the "Staff Performance" data sheet (Appendix 2) and explained that
the observers would be scoring their performance and occasionally giving them tips on how to improve it.

During this condition, and all that followed, the experimenter checked each team's records once a week. This involved locating the folder in which the blank and completed data sheets were stored, calculating how many training trials the team had reported conducting the previous week, and replenishing its supply of blank data sheets (if needed).

**Intervention**

Following the baseline period, subjects began to receive written feedback on their fire-evacuation training efforts. The written feedback reported the number of training trials the team had been assigned and the number and percent done for the previous week. It also included the teams' totals to that date and a comment one to three sentences long on staff performance and client progress. At first, only one written feedback form was sent to each team, and team members were asked to read it then pass it along to another team member. After four to eight weeks, it became apparent that some subjects on two teams were rarely seeing the written feedback, so the procedure was changed (Appendix 9) so that every week a feedback form was mailed to each subject. Every team member received the same feedback.

Two teams at a time entered the intervention phase. The experimenter determined which team would receive which feedback source first by flipping a coin twice. The first flip determined which team and the
second which intervention would be matched. The other team was assigned the other source. The experimenter then met with the people who were to give feedback, explained the research project as one which was trying to maximize the effects of staff training, enlisted their support, and showed them how to give written feedback (instructions found in Appendix 7). The experimenter met individually with the people giving feedback for half an hour a week for the next two weeks to help them complete the feedback form. For each week after that the experimenter sent them a short memo and the feedback forms. The memo gave them a few tips on how they could complete that week's feedback form based on the data their team had filed and any observations made of the team. They then completed the written feedback forms and delivered them to their team via the state school's on-grounds mail system.

To make the different interventions clearly discriminable to the subjects, the experimenter announced each change in procedure, between baseline and feedback conditions, and between the two feedback conditions, verbally and via a memo (e.g., Appendix 8). Additionally, the people who provided feedback came along with the experimenter and made an unannounced observation of a training session during the first three weeks of that intervention.

Subjects were always given the opportunity to ask questions about what the changes would mean for them and why they were being made. When the change was made between baseline and the first intervention, the experimenter gave the rationale that the administration was looking for ways to maximize the benefits of teaching paraprofessionals special
skills. When the change was between the sources of feedback, the rationale given was that the original source was too busy, but the new source had volunteered to help out.

Follow-up

One follow-up measure was taken two months after the experiment ended. The number of opportunities to conduct training, the number of training trials conducted, and client skill levels were checked. Evidence of regular written feedback was checked for in the teams' fire-evacuation records and the teams' supervisors were quizzed as to their management activities.

Observations

Protocol

The first observation, which occurred during baseline, was announced. All other observations were unannounced and occurred at one-fourth to one-third of a team's scheduled training sessions. Observers were trained to arrive at the scheduled time, tell the first team member they saw that they were there to observe fire-evacuation training, and ask if training was going to occur. If the team members said no, the observer would ask why not, record the reason given, and leave. If the team member said yes, the observer would stay and record how many training trials were conducted, the clients' performance, and the teams' behavior during each training trial.
Inter-Observer Agreement Data

Two observers were present at approximately eight percent of the recorded training sessions to permit inter-observer agreement data to be collected (about three percent of all sessions conducted). Those data were used to estimate the reliability of the observations according to the formula: Agreements divided by agreements plus disagreements times 100. All inter-observer agreement estimates, save one, were 100 percent. The other one was 80 percent, one observer recorded a training team as conducting five training sessions and the second recording four. The reason for this high rate of agreement was the obviousness of the dependent variable. Recall that an alarm sounded for each training trial, thus there was little doubt as to how many training trials had occurred.

The reliability of teams' data was checked in two ways. First, data from a sample of all sessions at which observers had been present were examined and the number of training trials recorded by the team were compared to the number recorded by the observer. These data were also estimated to be almost 100 percent reliable using the inter-observer agreement formula given above, again due to the non-subtle nature of the target behavior.

The accuracy of teams' reported data (i.e., when no observer was present) were checked unobtrusively by the experimenter. He observed residences from a distance at the scheduled training times and looked for a team member waiting outside for a client practicing evacuating. This type of observation yielded a gross estimate of the reliability of
reported data. Each team's records were checked this way at least once. All reported data appeared to be accurate. (See Table 1 for a more detailed description of this procedure.)
### TABLE 1

**UNOBTRUSIVE OBSERVATION PROCEDURE**

Observe Residences at Scheduled Time from a Distance:

<table>
<thead>
<tr>
<th>Possible Observations</th>
<th>Possible Types of Team Data Reported</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Team member observed outside</td>
<td>a. Report training that included a team member going outside.</td>
</tr>
<tr>
<td>2. No team member observed outside</td>
<td>b. Report training that did not include a team member going outside.</td>
</tr>
<tr>
<td></td>
<td>c. No training recorded.</td>
</tr>
</tbody>
</table>

Possible Combinations of Above and Interpretation:

1 & a: Accurate recording of training occurrence (but not necessarily of the number of training trials recorded)

1 & b: Inaccurate recording of training

1 & c = Training not recorded

2 & a = Inaccurate records, possible falsification of data

2 & b = Recording of training appears accurate

2 & c = Recording of training appears accurate
CHAPTER III

RESULTS

The Dependent Variable

The number of training trials each team conducted per training session was the key measure. These data were collected from July 1982 to April 1983.

Feedback from a Supervisor versus a Non-supervisor

Feedback from a supervisor and a non-supervisor was equally effective in increasing the number of fire-evacuation training trials conducted (Figures 2A and 2B). Only team six's performance of fire-evacuation training was not clearly tapering off during the latter stages of baseline. All teams' performances improved during feedback regardless of source. Teams one and two conducted more training trials per session when receiving feedback from a non-supervisor; teams three and five when receiving feedback from a supervisor. Team six showed no differential effect as a function of feedback source. Team four, which never received feedback from a non-supervisor, conducted more training trials when receiving feedback from its second supervisor. With the exception of team one, the teams' performances improved over time; that is, across the intervention phases. The order of presentation did not seem to matter. Teams five and three improved under non-supervisor then supervisor feedback, teams two and six under the reverse order.
Figure 2. Cumulative number of training trials each team conducted.
Feedback from:
Supervisor
Non-Supervisor

Baseline
Team 2

Team 6

Baseline
Team 4

Cumulative Number of Training Trials Conducted

KEY
↑ = Fdbk. to indv. started.
① = Unit controlled schedule started, teams 4 and 5.
③ = Unauthorized memo urging training.
* Numbers refer to the average number of training trials conducted.

Figure 2 (continued)
Because the number of training trials conducted could vary from the number assigned, graphic data on the effect of the source of feedback are presented in two forms: the cumulative number of training trials each team conducted (figures 2A and 2B), and the cumulative number of training sessions during which a team conducted at least four training trials (Figure 3). The latter figure is included because teams did not always have the opportunity to meet the goal of conducting eight training trials per session because clients sometimes refused to complete all or a portion of the four scheduled trials. As it was never the case that both clients refused training during a session, the opportunity to do four trials always existed.

The data in Figure 3 also suggest that the effect of the two feedback sources was equivalent. They show that teams one, two and six were most likely to conduct at least four training trials when receiving feedback from a non-supervisor; team three when receiving feedback from its supervisor, while team five indicated no trend in either direction. Team four never received feedback from a non-supervisor, but always conducted at least four training trials per session when receiving feedback from its first or second supervisor.

A sequential analysis (Dixon and Massey, 1969) was performed on each team's data. The purpose of the sequential analysis is to allow the experimenter to make a decision, after as few observations as possible, to accept the null or alternate hypothesis. Data must be in a binary form for this analysis. These data were classified as representing training sessions at which at least four training trials had been
Figure 3. Cumulative number of sessions at which teams conducted four or more training trials.
completed (good sessions) or those at which less had been done (bad sessions). It was important to avoid a type-2 error (accepting a false null hypothesis) because of the potential benefits which could accrue to staff and clients from an increased amount of fire-evacuation training. Thus, beta was set at .01. No practical problems were likely to occur if the null hypothesis was falsely rejected, so alpha was set at the standard level, .05.

The alternative hypothesis had to be quantified for this test. It was constructed to take into account each team's performance during the last ten data points of the phase against which a later phase was being tested. The quantification of these hypotheses was consistent whether a team's first intervention performance was being tested against its baseline, or its second intervention against its first. For example, for teams that received feedback from a non-supervisor first (teams one, three, and five) it was hypothesized that the probability of a good session when they were receiving feedback from a supervisor should exceed by one-half the difference between the ideal outcome (p good session = 1.0) and the probability obtained when receiving feedback from a non-supervisor. Thus, if the probability of a team conducting a good session during the last 10 sessions of feedback from a non-supervisor was .8 (as was the case with team three), then the probability calculated during feedback from a supervisor had to be at least .90. For teams that received feedback from a supervisor first (teams two and six) the alternative hypothesis was reversed when their second intervention was being compared to their first. Thus if the probability of one of
these teams conducting a good session during the last 10 sessions of feedback from a supervisor was .7 (as was the case for team two), then the probability calculated during feedback from a non-supervisor could not exceed .40.

The test was used primarily to determine when enough data had been collected during the second intervention phase. When the sequential analysis was used (post hoc) to test each team's data from its intervention against its baseline performance each team showed a statistically significant improvement contingent upon receiving feedback (Table 2). The sequential analysis was used to test data from each team's second intervention phase as they were gathered. However, because practicality demanded a termination of data collection the results of these were inconclusive for all teams; neither hypothesis could be accepted (Table 2).

The data obtained during the intervention phases were also tested with a simplified time series analysis for small data sets (Tryon, 1982). This test requires five calculations. (1) The sum of the squared successive differences is found (e.g., score two minus score one squared, plus score three minus score two sum squared, etc.). Call that sum "A". (2) Twice the sum of the squared difference of each score from the series' mean is found. Call that "B". (3) "C" is found by subtracting \( \frac{A}{B} \) from one. (4) C's standard error is found according to the formula: \( S_c = \sqrt{\frac{N-2}{(N-1)(N+1)}} \). (5) Finally, the series' Z score is found by dividing "C" by its standard error. A significant Z score is taken as evidence of a trend.
# TABLE 2
## SEQUENTIAL ANALYSIS

<table>
<thead>
<tr>
<th>Team</th>
<th>Question</th>
<th>Baseline to Feedback from Non-Supervisor</th>
<th>Feedback from Non-Supervisor to Supervisor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A. P. good session of last 10 in first phase</td>
<td>.7</td>
<td>.9</td>
</tr>
<tr>
<td></td>
<td>B. Stat. Sig. reached # obs.?</td>
<td>Yes/19*</td>
<td>Feedback superior</td>
</tr>
<tr>
<td></td>
<td>C. Implication?</td>
<td>Feedback superior</td>
<td>No/9</td>
</tr>
<tr>
<td>5</td>
<td>A.</td>
<td>.6</td>
<td>.9</td>
</tr>
<tr>
<td></td>
<td>B.</td>
<td>Yes/21**</td>
<td>No/19</td>
</tr>
<tr>
<td></td>
<td>C.</td>
<td>Feedback superior</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>A.</td>
<td>.2</td>
<td>.8</td>
</tr>
<tr>
<td></td>
<td>B.</td>
<td>Yes/11</td>
<td>No/16</td>
</tr>
<tr>
<td></td>
<td>C.</td>
<td>Feedback superior</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Team</th>
<th>Question</th>
<th>Baseline to Feedback from Supervisor</th>
<th>Feedback from Supervisor to Non-Supervisor</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>A.</td>
<td>.2</td>
<td>.7</td>
</tr>
<tr>
<td></td>
<td>B.</td>
<td>Yes/5</td>
<td>No/9</td>
</tr>
<tr>
<td></td>
<td>C.</td>
<td>Feedback superior</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>A.</td>
<td>.5</td>
<td>.9</td>
</tr>
<tr>
<td></td>
<td>B.</td>
<td>Yes/11</td>
<td>No/15</td>
</tr>
<tr>
<td></td>
<td>C.</td>
<td>Feedback superior</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Team</th>
<th>Question</th>
<th>Baseline to Feedback from Supervisor 1</th>
<th>Feedback from Supervisor 1 to Supervisor 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>A.</td>
<td>.3</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>B.</td>
<td>Yes/4</td>
<td>N.A. can't improve</td>
</tr>
<tr>
<td></td>
<td>C.</td>
<td>Feedback superior</td>
<td>-</td>
</tr>
</tbody>
</table>

*Sig. not reached until 5 observations into intervention 2.
**Sig. not reached until one observation into intervention 2.
The general strategy for conducting that test is to check the first data set (i.e., the first intervention phase) for any trends. If none are evident, then the aggregate set (i.e., the first and second intervention phases) can be checked for the presence of trends.

The time series analysis (Table 3) revealed an upward trend in the first intervention phase for teams three, five, and six. Thus, the aggregate set consisting of data from both intervention phases cannot be compared for those teams. Teams one and two's data did not show a trend during the first intervention phase, neither did either's aggregate set show a trend attributable to the source of feedback. Team four's data showed no trend while they were receiving feedback from their first supervisor. A test of the aggregate set consisting of data collected while it was receiving feedback from its first and second supervisor also revealed no trend.

**Feedback to the Group versus Individuals**

Inspection of Figures 2A and 2B shows that five of the team's performances improved over time (excepting team one). The improvements seemed to correlate with the switch to delivering feedback to individuals. Also, team one's moderate deterioration in performance clearly was independent of this change. Figure 4 highlights the effects of changing the recipient of feedback. It suggests teams two, three, four and five's improvements are related to the change. The time series analysis (Table 3) could not legitimately check if team two's performance improvement was attributable to individual feedback because a
**TABLE 3**  
**SIMPLIFIED TIME SERIES ANALYSIS**

<table>
<thead>
<tr>
<th>Data Set--Feedback from:</th>
<th>Z</th>
<th>Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Team 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Non-supervisor to group (points 2-10)</td>
<td>.47 (NS)*</td>
<td>No trend, OK to test with following sets appended.</td>
</tr>
<tr>
<td>b) Non-supervisor to group and individuals (points 1-14)</td>
<td>.27 (NS)</td>
<td>No trend (1) no remarkable effect of feedback to individuals, (2) OK to test with following sets appended.</td>
</tr>
<tr>
<td>c) Non-supervisor and supervisor, both intervention phases (points 1-23)</td>
<td>.95 (NS)</td>
<td>No trend across the two interventions.</td>
</tr>
<tr>
<td><strong>Team 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Supervisor to group (points 1-17)</td>
<td>2.29 (sig)</td>
<td>Trend, (1) Team's performance improved over time, (2) can't test with following sets appended.</td>
</tr>
<tr>
<td>b) Supervisor to group and individuals (points 1-23)</td>
<td>.49 (NS)</td>
<td>No trend, OK to test with following sets appended.</td>
</tr>
<tr>
<td>c) Supervisor and non-supervisor, both intervention phases (points 1-32)</td>
<td>.09 (NS)</td>
<td>No trend across the two interventions.</td>
</tr>
<tr>
<td><strong>Team 3</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Non-supervisor to group (points 1-8)</td>
<td>.62 (NS)</td>
<td>No trend, OK to test with following sets appended.</td>
</tr>
<tr>
<td>b) Non-supervisor to group and individual (points 1-15)</td>
<td>3.27 (sig)</td>
<td>Trend, (1) team's performance improved when feedback delivered to individuals, (2) can't test with following sets appended.</td>
</tr>
<tr>
<td>Data Set--Feedback from:</td>
<td>Z</td>
<td>Implications</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------------</td>
<td>-------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Team 4</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Supervisor 1 to Group (points 1-12)</td>
<td>1.09</td>
<td>(NS) No trend, OK to test with following sets appended.</td>
</tr>
<tr>
<td>b) Supervisors 1 and 2 to Group (points 1-19)</td>
<td>.31</td>
<td>(NS) No trend, (1) Supervisor 2 had no remarkable effect, (2) OK to test with following sets appended.</td>
</tr>
<tr>
<td>c) Supervisors 1 and 2 to group and individual (points 1-35)</td>
<td>1.51</td>
<td>(NS) No trend, no remarkable effect of feedback to individuals.</td>
</tr>
<tr>
<td>d) Supervisor 2, experimenter controlled schedule and assignments (points 13-23)</td>
<td>1.14</td>
<td>(NS) No trend, OK to test with following sets appended.</td>
</tr>
<tr>
<td>e) Supervisor 2, experimenter and unit controlled schedule and assignments (points 13-35)</td>
<td>.87</td>
<td>(NS) No trend, no remarkable effect of unit controlled schedule</td>
</tr>
<tr>
<td><strong>Team 5</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Non-supervisor to group (points 1-13)</td>
<td>1.13</td>
<td>(NS) No trend, OK to test with following sets appended.</td>
</tr>
<tr>
<td>b) Non-supervisor to group and individuals (points 1-20)</td>
<td>2.35</td>
<td>(sig) Trend, (1) Team's performance improved when feedback delivered to individuals, (2) can't test with following sets appended.</td>
</tr>
<tr>
<td>c) Supervisor to individuals under experimenter and unit controlled schedules and assignments (points 21-39)</td>
<td>1.79</td>
<td>(sig) Trend, team's performance improved over time, may be correlated with unit control of schedule and assignment</td>
</tr>
<tr>
<td>Data Set--Feedback from:</td>
<td>Z</td>
<td>Implications</td>
</tr>
<tr>
<td>------------------------</td>
<td>-------</td>
<td>-------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Team 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Supervisor to group (points 1-7)</td>
<td>-</td>
<td>Test not recommended for data sets with less than 8 points.</td>
</tr>
<tr>
<td>b) Supervisor to group and individual (points 1-15)</td>
<td>2.34 (sig)</td>
<td>Trend, (1) test may be picking up excess variability, visual analysis does not show a trend, (2) not OK to test with following sets.</td>
</tr>
</tbody>
</table>

*NS = not significant at .05 level.
Figure 4. The effect of delivering feedback to the group vs. the individual.
trend was evident when the supervisor was giving feedback to the group (i.e., the team's performance was improving). The time-series analysis indicates teams three and five's improvements could be correlated with the switch to delivering feedback to individuals and team four's could not.

Supplementary Data

Other data were collected to help put the data on the dependent variable in context. These data add information which allow more insight into the practical problems and theoretical issues involved with this type of research in general, and this research project in particular.

Clients' Fire-Evacuation Skills

Many of the clients who participated were severely impaired. Thus, it was not expected that all would learn to evacuate independently during this project. Every client who participated in fire-evacuation training and who did not consistently refuse training, required fewer prompts to evacuate at the end of the project (Table 4). Nine of the twenty-six clients who participated learned to evacuate independently from their bedrooms to ground level outdoors within 2-1/2 minutes, and could find an alternate exit if one was blocked. The generality of the clients' behavioral gains were checked at their residences unannounced monthly fire drills. Of those nine clients, three independently exited during their residences' two most recent (through March) unannounced monthly fire drills. Two other clients, who were
### TABLE 4

**CLIENT PROGRESS**

<table>
<thead>
<tr>
<th>Team</th>
<th>Client</th>
<th>Characteristics</th>
<th>( X ) # Prompts to Evacuate During Training</th>
<th>Performance During Unannounced Monthly Fire Drills Last Two Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>HS</td>
<td>Female, 25 years, P*</td>
<td>2, 2</td>
<td>Prompted, Prompted</td>
</tr>
<tr>
<td></td>
<td>HJ</td>
<td>Male, 25 years, P</td>
<td>2.5, 1</td>
<td>Prompted, Prompted</td>
</tr>
<tr>
<td></td>
<td>VA</td>
<td>Female, 60 years, M</td>
<td>1 Refused/Discontinued</td>
<td>Prompted, Prompted</td>
</tr>
<tr>
<td>2.</td>
<td>MD</td>
<td>Female, 20 years, P</td>
<td>1, 0</td>
<td>Prompted, 1-Independent</td>
</tr>
<tr>
<td></td>
<td>FK</td>
<td>Male, 25 years, P</td>
<td>2, .75</td>
<td>Prompted, Prompted</td>
</tr>
<tr>
<td></td>
<td>DB</td>
<td>Male, 25 years, P</td>
<td>3, 1</td>
<td>Prompted, Prompted</td>
</tr>
<tr>
<td>3.</td>
<td>GG</td>
<td>Male, 20 years, S</td>
<td>2, 1</td>
<td>Prompted, Prompted</td>
</tr>
<tr>
<td></td>
<td>DF</td>
<td>Female, 25 years, P</td>
<td>2, 1</td>
<td>Prompted, 1-Independent</td>
</tr>
<tr>
<td></td>
<td>KS</td>
<td>Male, 25 years, S</td>
<td>.5, 0</td>
<td>Prompted, Prompted</td>
</tr>
<tr>
<td></td>
<td>DM</td>
<td>Male, 30 years, S</td>
<td>2, Refused consistently</td>
<td>Prompted, Prompted</td>
</tr>
<tr>
<td></td>
<td>WS</td>
<td>Female, 60 years, S</td>
<td>1, 0</td>
<td>Prompted, 1-Independent</td>
</tr>
<tr>
<td></td>
<td>KT</td>
<td>Male, 30 years, S</td>
<td>1, 0</td>
<td>Prompted, 1-Independent</td>
</tr>
<tr>
<td>4.</td>
<td>RD</td>
<td>Male, 30 years, P</td>
<td>2, 0</td>
<td>Prompted, 2-Independent</td>
</tr>
<tr>
<td></td>
<td>MM</td>
<td>Female, 65 years, S</td>
<td>1, 0</td>
<td>1-Independent, 1-Independent</td>
</tr>
<tr>
<td>Team</td>
<td>Client</td>
<td>Characteristics</td>
<td># Prompts to Evacuate During Training</td>
<td>Performance During Monthly Fire Drills Last Two Pre-Training</td>
</tr>
<tr>
<td>------</td>
<td>--------</td>
<td>-----------------</td>
<td>---------------------------------------</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td>4.</td>
<td>WC</td>
<td>Male, 30 years, S</td>
<td>.5</td>
<td>1-Independent</td>
</tr>
<tr>
<td></td>
<td>BC</td>
<td>Male, 30 years, P</td>
<td>2</td>
<td>Prompted</td>
</tr>
<tr>
<td></td>
<td>ME</td>
<td>Female, 60 years, S</td>
<td>0, Refused</td>
<td>1-Independent</td>
</tr>
<tr>
<td></td>
<td>LJ</td>
<td>Male, 30 years, P</td>
<td>2</td>
<td>Prompted</td>
</tr>
<tr>
<td>5.</td>
<td>AF</td>
<td>Male, 65 years, S</td>
<td>2</td>
<td>Prompted</td>
</tr>
<tr>
<td></td>
<td>PH</td>
<td>Male, 65 years, S</td>
<td>3</td>
<td>Prompted</td>
</tr>
<tr>
<td></td>
<td>EE</td>
<td>Male, 30 years, S</td>
<td>1</td>
<td>Prompted</td>
</tr>
<tr>
<td></td>
<td>LR</td>
<td>Male, 30 years, S</td>
<td>2</td>
<td>Prompted</td>
</tr>
<tr>
<td></td>
<td>FA</td>
<td>Female, 30 years, P</td>
<td>3</td>
<td>Prompted</td>
</tr>
<tr>
<td>6.</td>
<td>RK</td>
<td>Male, 30 years, P</td>
<td>3</td>
<td>Prompted</td>
</tr>
<tr>
<td></td>
<td>BS</td>
<td>Female, 25 years, P</td>
<td>4</td>
<td>Prompted</td>
</tr>
<tr>
<td></td>
<td>VT</td>
<td>Female, 65 years, S</td>
<td>1</td>
<td>No record (moved in)</td>
</tr>
</tbody>
</table>

*P=profoundly
S=severely mentally retarded
M=mildly
still receiving some prompts during training, also exited independently during their residence's two most recent fire drills.

**Opportunities to Do Training**

Training opportunities varied widely across teams and within teams (Table 5). Overall, enough staff were on hand for training to occur at about two-thirds of all scheduled sessions. Staffing problems were evenly distributed across time; teams three and six had their worst staffing difficulties during baseline, teams four and five during their first intervention, and teams one and two during their second intervention phases.

**Compliance with Intervention Procedures**

Persons sending feedback had their feedback memos checked once a month and were asked if they were having difficulty following the feedback protocol. Six of the eight sources had no problem, however, team two's supervisor was not always able to send out his feedback memos on time and team four's first supervisor repeatedly neglected to follow the experimental procedure (Table 6). Four of the teams' members reported they received feedback regularly during both intervention phases. However, two of three team members on teams three and four reported they rarely saw a feedback memo during their team's first intervention phase. The problem on team three was that the person to whom the feedback was mailed was not sharing it; this was solved by the switch to delivering feedback to individuals. On team four, the first supervisor apparently followed the experimental procedures for a couple of weeks then "marched
TABLE 5
TEAMS' OPPORTUNITIES TO CONDUCT SCHEDULED TRAINING

<table>
<thead>
<tr>
<th>Feedback from:</th>
<th>Baseline</th>
<th>Non-Supervisor</th>
<th>Supervisor</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Team 1</td>
<td># Opp. 14/31 = 45%*</td>
<td># Schd. 14/27 = 52%</td>
<td># Opp. 9/22 = 48%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Team 5</td>
<td># Opp. 19/24 = 79% (60%)</td>
<td># Schd. 20/33 = 61% (70%)</td>
<td># Opp. 19/22 = 86% (80%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Team 3</td>
<td># Opp. 23/40 = 58% (70%)</td>
<td># Schd. 15/20 = 75% (70%)</td>
<td># Opp. 16/22 = 73% (90%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Subtotal A</td>
<td>149/241 = 62%</td>
<td>241/465 = 66%</td>
<td>465/156 = 70%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Team 2</td>
<td># Opp. 14/21 = 67% (80%)</td>
<td># Schd. 23/31 = 74% (80%)</td>
<td># Opp. 9/18 = 50% (30%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Team 6</td>
<td># Opp. 27/40 = 68% (90%)</td>
<td># Schd. 15/20 = 75% (80%)</td>
<td># Opp. 15/20 = 75% (70%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Team 4</td>
<td># Opp. 18/26 = 69% (70%)</td>
<td># Schd. 12/20 = 60% (50%)</td>
<td># Opp. 23/28 = 82% (100%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Baseline</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supervisor 1</td>
<td>53/74 = 72%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supervisor 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Subtotal B</td>
<td>156/224 = 70%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grand Total Overall</td>
<td>305/465 = 66%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Percentages in parentheses equal the percentage of opportunities in the last ten scheduled sessions of the phase.
### TABLE 6
COMPLIANCE WITH INTERVENTION PROCEDURES

<table>
<thead>
<tr>
<th>Phase + Feedback from:</th>
<th>Team</th>
<th>Non-Supervisor</th>
<th>Supervisor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>A.</td>
<td>OK</td>
<td>OK</td>
</tr>
<tr>
<td></td>
<td>B.</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>C.</td>
<td></td>
<td>One S=weekly, one=monthly*</td>
</tr>
<tr>
<td>5.</td>
<td>A.</td>
<td>OK</td>
<td>OK</td>
</tr>
<tr>
<td></td>
<td>B.</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>C.</td>
<td></td>
<td>Two Ss=weekly</td>
</tr>
<tr>
<td>3.</td>
<td>A.</td>
<td>OK</td>
<td>OK (one complaint from subject re: feedback unfair)</td>
</tr>
<tr>
<td></td>
<td>B.</td>
<td>33% (100% later)</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>C.</td>
<td></td>
<td>Two Ss=weekly</td>
</tr>
</tbody>
</table>

**Key**
A = Results of monthly check of source's feedback  
B = Percentage of subjects reporting receiving feedback regularly  
C = Subjects' description of feedback schedule at end of project  

*Not all subjects completed surveys at the end of the project.*
to a different drummer." He reported delivering the feedback verbally, in writing, or not at all on different weeks, subsequently another supervisor was enlisted to take his place.

Subjects' Labelling of Feedback

Fourteen of the eighteen subjects who were participating at the end of the study completed a voluntary and anonymous survey on the feedback system. Eleven of the respondents said they always read the feedback, three said they usually did. Six respondents characterized the written feedback they had received as "extremely useful," six as "somewhat useful," and two as "neutral." Ten of the respondents said it made no difference to them who provided the feedback, two preferred the supervisory source, and one did not respond. Eleven of the subjects said they would like to receive consistent written feedback on other tasks they performed. Eleven subjects also indicated that they would have preferred receiving written and verbal feedback. Eight of the fourteen respondents characterized the feedback as "always fair," five said it was "usually fair," and one said they didn't know if it was fair or unfair. Finally, subjects did not consistently select one alternative when asked why their team had been likely to conduct more training when it was receiving feedback. (The most frequently selected answer to that question was, "It was probably just a coincidence.")

Typical Management Procedures

Thirty-three of eighty-five MRAs/MRTs (who were not subjects) responded to a request to complete the six item survey on management
practices. There were three major findings of interest here. (1) RPCs (the supervisory source of feedback) were almost never selected as the supervisor who told these staff what they needed to get done at work each day or evaluated their day to day performance. RPCs were selected by 22 percent of the respondents as being the supervisor who arranged their holiday or vacation schedule. (2) In general, the respondents' immediate supervisors (the Assistant Residential Team Leaders) told them what to do, evaluated their performance, and arranged their holiday or vacation schedules. (3) Almost 50 percent of the staff (13 of 27) who responded to a question asking how often their performance of special jobs (like fire-evacuation training) was evaluated said it never was. The second most frequent answer was that their performance was evaluated monthly. No one said their performance was evaluated daily or weekly.

Program Implementation Difficulty

A total of 27 professionals at the state school were asked to complete a brief survey on "Program Implementation." Sixteen professionals responded. All said they attempted to get programs implemented by the paraprofessional (MRA/MRT) staff working in the residences. All said they experienced difficulty getting programs implemented and most (11 of 16) labeled the amount of difficulty as moderate to great.

Cost Data

Cost data were not formally collected. When asked over the phone, staff who provided subjects with feedback said that their participation
(to fill out and mail the weekly feedback memos) took 10-20 minutes per week.
CHAPTER IV
DISCUSSION

Evaluation of Results

The results will be evaluated in light of the original research question, then the theoretical and practical implications of this study will be discussed. Also, several conclusions will be drawn, the study's limitations identified, and future research suggested.

The Research Question

Contrary to expectations, source of feedback did not produce differential effects. Both sources produced marked improvements in the six teams' performance, while neither consistently produced superior effects. Several factors may have contributed to this outcome. The contingencies controlled by the supervisors may not have been powerful enough to produce a difference. Because of the special nature of this project, the acting superintendent of the state school had insisted that prior to the implementation of the feedback phase subjects be informed that no record of their performance would ever be used in a staff evaluation unless they requested it. Thus, some of the supervisors' power was neutralized. Also, the supervisors did not have the power unilaterally to hire, fire, or give raises. As in all state run facilities, control of employees is diffused over several supervisory levels and arbitration systems are available for staff to dispute decisions (i.e., exert counter control).
Another factor contributing to these results may have been that subjects did not discriminate between the two feedback sources' ability to control important contingencies influencing them. The paraprofessionals who participated in this study may have grouped all professional/administrative types into one category rather than discriminating their different roles and functions.

The lack of apparent differences as a function of sources may have been due to the small sample size. With only six teams, a nearly perfect replication would have been needed to demonstrate unequivocally that one source of feedback was superior to the other. Given the nature of applied research, with its many variables beyond the experimenter's control, that type of clearcut result could only be expected if one procedure (source) was far more powerful than the other. It seems that any differences that might have existed in the control exerted by the two feedback sources were relatively subtle. In applied work, often only procedures that reliably produce powerful results are useful.

A task characteristic that may have obscured a difference in the two sources' ability to control paraprofessionals' behavior was that two people were required to conduct training. Because of absenteeism and staff turnover, at least three different pairs of subjects worked together on each team over the course of the study. Because some team members may have been more influenced by (certain sources of) feedback and their performance was mutually interdependent it would be reasonable to assume that the data obtained would reflect an average of their performance (cf., Burnstein & Wolff, 1964). Thus any greater
variability that may have been evident had the responding unit been an individual rather than a team was masked. This point is especially relevant for those tasks that involve people working together interdependently.

The dependent variable in this study was the number of fire-evacuation training trials that teams conducted. The specificity of the teams' assignments may have masked the intervention's effects somewhat and thus contributed to the findings of no difference. Recall that the goal was for each team to conduct eight training trials at a training session. All teams met or exceeded the goal during each intervention phase and had been told they could do as many additional training trials as they wished (clients permitting). However, if no goal had been set, it is possible a difference may have been obtained in the amount of training done under the different feedback sources.

During baseline all teams conducted some training. All but team two had a period during baseline when they conducted training at three sessions in a row. This may have been related to the unannounced observations. Subjects were aware that they would be observed from time to time, and of the purposes of the observations (to provide feedback on the quality of their work and to follow up on the results of their client training). However, it was not standard institutional practice for observers to arrive unannounced to watch paraprofessionals work, and it may have taken subjects some time to adapt to the event. Subjects may originally have suspected that the observers would report back to their supervisors and that they would get in trouble for not conducting
training (although there was no evidence of this). If the baseline records were affected by such reactivity, the effect seems to have diminished over time as the amount and frequency of training by five of the six teams clearly decreased as the baselines progressed.

Baseline conditions prevailed for teams three and six for more than their first twenty sessions, a period spanning four and one-half months. Horner and Baer (1978) have discussed difficulties that may arise from extended baselines, including extinction and masking the power of the independent variable. They note that failure to produce an effect after a long baseline creates an ambiguous situation; it may be due to either the independent variable's lack of power or to the conditions that prevailed during the extended baseline. Team three's performance at the start of its first intervention phase matched its baseline average. However, this team was one of the two (team four was the other) some of whose members reported not receiving feedback regularly when it was being delivered to the group. When feedback on the team's performance began to be delivered to individuals, the effects of the intervention began to take hold, apparently either overpowering the contingencies prevailing in team three's environment or introducing all team members to the intervention. This change enhanced the effects among several other teams as well.

Presenting teams with written feedback on their performance of fire-evacuation training improved their performance. Several subjects voluntarily reported that they didn't mind having their performance monitored because the feedback was positive and consistent. Several
also volunteered that they preferred conducting fire-evacuation training to their regular assignments, such as working in the institution's day programs. (Full day programs for all state school clients had only become a reality during this project.) As of September 1982, paraprofessionals were required to work in their programs each Monday through Friday; first shift staff participated from 9:30-2:45 and second shift staff from 3:00-4:00. It is difficult to determine how much of the improvement reflected staff's escaping a non-preferred job. However, because baselines extended past September, two teams (numbers two and three) conducted all their training at times that did not coincide with the on-grounds programs, and another's (team five's) schedule called for them to conduct half their training on Saturdays. This was not judged likely to be a controlling variable.

Not being able to show that one source of feedback is more effective than another might be disappointing. However, what the data do seem to suggest is that it may be possible to utilize feedback from varied sources. The data also suggest that it is important to ensure that each group member receives the feedback even when it is related to the group's performance.

**Theoretical Contributions**

Performance feedback may serve as a cue for one behavior and as a reinforcer for another (Peterson, 1982; Prue & Fairbank, 1981). This study was not designed to investigate those effects. Rather, it extended the use of feedback to the behavior of small groups, providing a
systematic replication of the general finding that consistent, objective performance feedback can powerfully control behavior.

The positive effects associated with the change to delivering feedback to individuals were probably related to the enriched schedule with which some team members received feedback. If, especially in the beginning of an intervention, subjects rarely or never come in contact with the change in contingencies, then one would hardly expect their behavior to change.

The basic premise of this work was that feedback from supervisors might be a more powerful conditioned reinforcer than feedback from non-supervisory sources. This was not demonstrated, perhaps because para-professionals in this institution rarely receive performance feedback from any source. This may have heightened the effect of feedback from non-supervisors and worked, along with the factors that might have neutralized supervisors' power (discussed earlier) to negate any differences.

Organizational behavior management (OBM) is a relatively new branch of applied behavior analysis. Given the relatively small (but rapidly growing) amount of work in this area, and the emphasis in work settings on "the bottom line," it is perhaps not surprising that a functional analysis of behavior in the workplace has taken a back seat to demonstrations that this or that procedure (usually feedback) can control behavior. OBM studies often focus on the implementation of a (proven) procedure in order to control a new target behavior not analyze behavior. This study constitutes a component analysis of one aspect of
performance feedback. Thus, although hampered by conditions the experimenter could not control, it contributes towards a functional analysis of behavior in the workplace.

**Practical Implications**

There are several practical implications of this work. The first is that performance feedback may, at least in some cases, come from different sources within an organization yet still effectively control behavior. Secondly, it seems fairly clear that delivering feedback to each of the members of a team is likely to be more effective than is delivering feedback to the group as a single behaving unit. This may only hold for written feedback or other forms where there is a danger of some group members not coming into contact with the contingencies. It remains to be tested if orally presented feedback would be differentially effective if delivered to the group, for example at a group meeting, or if the same message was delivered one to one.

The fact that almost one-third of the clients who participated made clinically worthwhile progress under normal institutional conditions has implications for involving paraprofessionals in training severely and profoundly mentally retarded persons in general, and in fire-evacuation skills in particular. In the present study, some clients, particularly those on team one, made only a small amount of progress. This was not surprising, given the clients' deficits and the inconsistency with which training was implemented (due to staffing problems). Five clients who participated received ratings of independent on unannounced residential fire drills. Their progress should
enhance the likelihood that they would escape injury in case of a fire.

This study also adds to the literature on program implementation. As has been noted (Murphy and Remmyi, 1979; Quilitch, 1975; Reppucci and Saunders, 1974; Stoltz, 1981), a technology of (client) behavior change programs exists. Yet far less work has been done on managing the implementation of those programs in existing environments on any scale other than with single case demonstrations. This study demonstrated how paraprofessionals working in teams might be encouraged to implement programs designed to produce beneficial change in their clientele.

Conclusions

1. Feedback from different sources can control the behavior of paraprofessionals working in institutions for the retarded. In this study, teams of paraprofessionals received feedback from different sources: non-supervisors, supervisors three levels above them, and, in one case, a supervisor two levels above them (team four only). All three sources were able to increase or maintain teams' implementation of basic fire-evacuation training. Improvements in clients' behavior on unannounced residential fire drills attest to the fact that training occurred successfully. Additionally, this work is perhaps one of the first to address the effectiveness of different sources of feedback from an OBM perspective, a need identified by Prue and Fairbank (1981).

2. Feedback is more powerful if delivered to individual subjects, even if the feedback content is related to the performance of the group. The author has found no other studies in which information based
on the performance of the group was fed back to the group in written form. This procedure was used initially, but was found to be problematic in that some subjects reported they were not receiving feedback consistently. Shifting to delivering feedback to each member of the group solved that problem and enhanced performance.

The author has located no other studies in which simple feedback was presented to each group member for the purposes of changing their behavior. If viewed as a "group contingency," this arrangement is comparable to those reported by Slavin et al. (1981, exps. I and II) which were reviewed earlier. Dietz and Repp (1973, exp. II) also used this type of group contingency. They decreased unauthorized talk-outs in class by mentally retarded students by delivering candy to each individual contingent on the group's keeping its talk-outs below a certain criterion. Marholin and Gray (1976) also used this arrangement when trying to improve restaurant cashiers' accuracy on a cash-register used by a number of them. They required each cashier to pay an equivalent share of the total amount undercharged by all cashiers who operated the register, a procedure which proved effective.

3. Relying solely on management of antecedent conditions to influence paraprofessionals' performance is not especially effective. This study adds to the many others that have demonstrated that putting antecedent conditions in place such as staff training, scheduling, specific client assignments, output goals, equipment availability, and unannounced observations may only control paraprofessionals' training activities to a limited extent (cf. Coles and Blunden, 1981, exp. I; Panyan
et al., 1970; Quilitch, 1975; and Shook et al., 1978). This is not to dismiss antecedent stimuli; they may, under some circumstances, control these behaviors adequately and clearly can serve to boost performance, at least temporarily.

4. Much work remains to be done on training fire-evacuation skills among mentally retarded persons. Although it was not its primary focus, this work extends the literature on fire-evacuation training with mentally retarded people. This author knows of only two published reports in which mentally retarded persons were taught skills related to fire-evacuation. Matson (1980, exp. I) worked with five mentally retarded adults who were able to speak in short sentences, and to shower and dress themselves. He taught them to recite the behaviors in which they should engage if a fire were to break out in their residence while they were in bed (e.g., crawl to the door). As Matson acknowledged (1980, p. 403), subjects were not required to perform the fire-evacuation behaviors.

Haney and Jones (1982) taught one moderately and three severely retarded adolescents to evacuate from a bedroom in their residence (different from their own). Verbal prompts and a tape-recording of the house fire-alarm were used to cue and praise, and edibles to reward evacuation. Their study is very important because subjects were taught to respond to different conditions such as hot air coming under their door, or encountering (a picture of) fire in the hallway. One of the trainees mastered all four conditions presented and another mastered three. Two of the four trainees maintained their skills up to 13 weeks
later. All trainees required small amounts of additional training to evacuate from a novel setting (their own bedroom).

The present study focused on more basic skills than those taught by Haney and Jones (1982), but did show that paraprofessionals could teach even profoundly retarded persons to evacuate and that these skills in some cases transferred from training to test situations (fire-drills).

Limitations

This research could have been improved in several ways. Three variables related to the feedback system may not have been controlled adequately. First the timing of feedback was not standardized. A team scheduled to conduct fire-evacuation training on Wednesdays and Fridays might receive feedback on its performance for the prior week on Monday, Tuesday, or Wednesday depending primarily on how busy the persons providing feedback were. (This was only a problem with supervisors. Non-supervisors seemed to have jobs that were less crisis oriented, allowing them to follow a more precise schedule.)

Second, the means by which the feedback was delivered to the residence varied. Non-supervisors always mailed theirs according to the experimental protocol. Three of the six supervisors who participated admitted that on one or more occasions they had either brought the feedback over themselves or had someone else bring it over. This is not surprising as there was a fair amount of traffic between their offices and the residences.
Third, the content of the feedback memos was not carefully controlled. After three persons giving feedback had gone through the three week training and supervision period their feedback rates were only occasionally monitored. The rules for determining the numerical portion of the feedback were straightforward, however there was latitude in how the written comments section might be prepared and the content of the comments was only occasionally reviewed. A better way of comparing the two sources of feedback may have been to have both sources of feedback send the same message given a certain performance level.

A methodological refinement was made during the study--switching from delivering feedback to the group to every subject in the group. This switch was correlated with improvement in the performance of several teams. The study would have been methodologically more precise had one or the other means of delivering feedback been in place all along.

The experimenter was involved in data collection especially with team three. The reason for his involvement as the primary observer for team three was that the observer assigned to that area from the institution was reported to, and admitted, actively encouraging team members to conduct more training several times during baseline. Encouragement of that sort by observers was not permitted. After those incidents that observer only served as a reliability observer. Of course, because the experimenter was aware of the conditions in effect he too had an opportunity to bias results in that area.
Future Research

Future research on the effectiveness of different sources of performance feedback would benefit from: (1) ensuring the feedback system varies only on the source dimension; (2) involving individual subjects rather than teams; (3) objectively identifying and measuring the amount of "power" the different sources hold over the subjects and the subjects' past histories with the sources. If these measures were taken, a more definitive answer could be offered to the basic question concerning the effectiveness of different sources of feedback.
REFERENCE NOTES

1 Federal building code for rooming and lodging houses.

2 State of Massachusetts building code for rooming and lodging houses.
REFERENCES


Bell, J. R. Hospital fire shows value of planning, design, training. Fire Journal, March 1980b, 74, 65-71, 83.


APPENDIX 1

FIRE EVACUATION DATA SHEET FOR F-BUILDING

Client's Name ___________________________ Date ____________

Staff: a) ___________________________ b) ___________________________

Time of Day: a) start ____________ b) finish ____________

Weather: a) rain/sun b) dark/light c) app. temp. d) building ______

After cue to evacuate was given, client:

1. Got up from bed or chair
2. Went to bedroom door
3. Opened bedroom door
4. Went into living area
5. Turned left/right and walked to fire door
6. Opened the fire door
7. Walked to stairs
8. Descended stairs to first landing
9. Descended stairs to bottom floor
10. Turned left/right and walked to fire exit door
11. Opened fire exit door
12.Exited building
13. Walked across landing and down stairs
14. Went to person with rewards
15. Went to designated gathering area
16. Waited 2 minutes at designated gathering area

Total time from alarm on to client outside

Signal used to cue client to exit: a) yell "fire", b) building alarm, c) portable alarm

Rate the client's behavior during training: 1 2 3 4 5

cooperative resistant VP=Verbal prompts (talking)

Your comments: ___________________________

Rewards used: ___________________________

SCORING KEY

I=Independent (no prompts) VP=Verbal prompts (talking)

GP=Gestural prompts (pointing, modeling or signing)

PP=Physical prompt (touching)

DNP=Client did not perform this step

NO=Not observed

X=No opportunity for client to do this

7-27-82
CF:sjd
APPENDIX 2

STAFF PERFORMANCE OF SELF-PRESERVATION TRAINING.

<table>
<thead>
<tr>
<th>Your name</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff's name a)</td>
<td>b)</td>
</tr>
<tr>
<td>Client's name</td>
<td>Building</td>
</tr>
<tr>
<td>Time at:</td>
<td>Start</td>
</tr>
</tbody>
</table>

When conducting self-preservation training, did the staff:

<table>
<thead>
<tr>
<th>Trials</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Have data sheets, portable alarm, timer, and rewards for the client?</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>2.</td>
<td>Review recent data on the client's performance of self-preservation skills?</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>3.</td>
<td>Cue the client to evacuate by sounding the alarm or shouting &quot;fire&quot;?</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>4.</td>
<td>Prompt the client to leave immediately unless probing for independence?</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>5.</td>
<td>Only prompt the client at the beginning of the trial or when the client a) made an error b) stopped moving for more than five seconds, or c) began to self-stimulate?</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>6.</td>
<td>Perform any step for the client rather than delivering a prompt?</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>7.</td>
<td>Walk behind the client as he or she evacuated?</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>8.</td>
<td>Offer the client a reward as soon as he or she got to the rewarder?</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>9.</td>
<td>Record the client's performance within one minute of finishing the trial?</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>10.</td>
<td>Repeat the sequence until the client had done four trials? (more if working on program #1)</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

Comments (if training was not conducted, tell why)

Scoring Key

| Y=Yes, this was done | N=No, this was not done | X=Staff had no opportunity to do this | NO=Not observed |

Are prompts being faded? 

Is reward being faded? 

100
APPENDIX 3

TO: ___________________________ FROM: ___________________________

Written Feedback on Self-Preservation Training

TEAM MEMBERS: Please read and sign this memo

Last week's performance
Number of self-preservation training programs assigned to this team last week ______;
Number completed ______;
Percent completed ______;

Overall performance
Number of self-preservation training programs assigned to this team since I started monitoring it ______;
Number completed ______;
Percent completed ______.

Comments on staff performance and client progress ________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

101
APPENDIX 4

FEEDBACK SURVEY

For the past few months you have received written feedback on your team's performance of self-preservation training. I am interested in finding out how you feel about getting such feedback. Please take a few minutes and answer the following questions.

You do not have to sign your name, as this survey is anonymous. Please indicate the self-preservation team with which you work in question 1 of Part I.

I. Background Information

1. With which self-preservation training team do you work?
   a) Cottage-2   b) F-Building   c) Cottage-3   d) Cottage-8
   e) G-3   f) Cottage-4

2. What is your sex?   a) Male   b) Female

3. What is your age range?
   a) 20-29   b) 30-39   c) 40-49   d) 50-59   e) 60 or over

4. How long have you worked at the State School?
   a) less than 1 year   b) 1-4 years   c) 5-10 years)
   d) 10-20 years   e) more than 20 years

5. How long have you worked in the residence in which you now work?
   a) less than 1 year   b) 1-4 years   c) 5-10 years
   d) 10-20 years   e) more than 20 years

II. Survey Questions - Circle the best answer

1. In the past month, how often did you receive written feedback on your team's performance of self-preservation training?
   a) every day   b) weekly   c) once a month   d) never
   Comment: (optional)
2. Do you read the feedback you receive?
   a) Never    b) Occasionally    c) Half of the time    d) Usually    e) Always
   Comment: (Optional)

3. Do you consider the written feedback:
   a) Extremely useful    b) Somewhat useful    c) Neutral    d) Somewhat of a nuisance    e) An extreme nuisance
   Comment: (Optional)

4. Did you prefer receiving feedback from: a)    b) , or did it make c) no difference?
   Please explain your answer:

5. Your team received written feedback on its performance of self-preservation training. Would you have preferred receiving:
   a) verbal feedback    b) verbal and written feedback    c) no feedback
   Comment: (Optional)

6. Your team was more likely to conduct self-preservation training when you were receiving feedback. Why was this the case?
   a) I knew if self-preservation training was done we'd be praised for it.
   b) It was probably just a coincidence.
   c) I knew if self-preservation training wasn't done, somehow we might get in trouble.
   d) Receiving the feedback helped us to remember to conduct self-preservation training.
   e) I know if self-preservation training wasn't done, others would know it.
   f) Other, please explain:

7. Would you like to receive consistent, written feedback on other aspects of your work performance?
   a) No    b) Yes    c) Depends on the job    d) Depends on who gives the feedback
   Comment: (Optional)
8. Do you think the feedback you received was fair, that is, did it accurately reflect your team's performance?
   a) always   b) usually   c) sometimes   d) never
   e) I don't know
   Comment: (Optional) ____________________________________________

9. You received two types of written feedback, (1) Numerical--You did 100% of your assigned training programs, and (2) Written comments:
   a) I preferred the written comments
   b) I liked neither kind of feedback
   c) I preferred the numerical section
   d) I liked both kinds of feedback
   Comments: (Optional) ____________________________________________

10. Any other comments: ____________________________________________

Thank you for your help!
APPENDIX 5

An Anonymous Survey of Mental Retardation Assistants and Technicians

To further improve the quality of management received by Mental Retardation Assistants and Mental Retardation Technicians, please complete the following survey. Your participation in this survey is voluntary; if you do not want to complete the survey, you do not have to. Also, you are not asked to sign your name; this survey is anonymous.

A summary of the results will be freely available through Chris Fox, to anyone wishing to see them. The purpose of this survey is to aid continuing efforts to improve management practices and better serve our clients.

If you are willing to participate, complete the survey and mail it to me by ________________ in the attached envelope. Completing this survey should take no more than three minutes of your time.

Thank you.

CF:sjd
I. **Background Information** (circle your answers)


2. Your position? a) MRA  b) MRT

3. How long have you worked at the State School? a) less than 1 year, b) 1-2 years, c) 3-5 years, d) 5-10 years, e) more than 10 years.

II. **Survey Questions.** Circle your answers. The abbreviations are explained in the key below.

<table>
<thead>
<tr>
<th>ARTL</th>
<th>Assistant Residential Team Leader</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTL</td>
<td>Residential Team Leader</td>
</tr>
<tr>
<td>RPC</td>
<td>Residential Program Coordinator</td>
</tr>
<tr>
<td>AC</td>
<td>Area charge— for example, the senior Mental Retardation Technician</td>
</tr>
<tr>
<td>Other</td>
<td>someone not listed; please write down their position.</td>
</tr>
</tbody>
</table>

1. Who usually tells you what you need to get done at work each day? (For example, take a client to a dentist's appointment or attend a client's annual review meeting) a) ARTL, b) RTL, c) RPC, d) AC, e) Other ___________________, f) No one.

2. Who usually lets you know if your performance of your day-to-day job assignments is satisfactory or unsatisfactory? a) ARTL, b) RTL, c) RPC, d) AC, e) Other ________, f) No one.

3. How often is your performance of day-to-day assignments usually evaluated? a) daily, b) weekly, c) monthly, d) every three months, e) other ____________________.

4. Who arranges your holiday or vacation schedule? a) ARTL, b) RTL, c) RPC, d) AC, e) Other ____________________.

5. Who usually monitors your performance of special jobs for which you have received special training, such as implementation of a behavior program or teaching your clients some new skills? a) ARTL, b) RTL, c) RPC, d) AC, e) Other ________, f) No one.

6. How often is your performance of special jobs for which you have received special training usually evaluated? a) daily, b) weekly, c) monthly, d) every three months, e) Other ________________, f) Never.
APPENDIX 6

Program Implementation Survey

I am attempting to determine what professionals experience when getting client programs they have developed implemented by Mental Retardation Assistants and Technicians in the residences. Please help out by taking a few minutes to complete this survey.

A summary of the results will be available from Chris Fox. The purpose of this survey is to aid continuing efforts to improve management practices and better serve our clients.

You do not have to sign your name as the survey is anonymous. But please indicate your position.

Your job title: __________________________________________

Circle the best answer or answers or fill in the blank.

1. Do you ever attempt to get client programs you have developed implemented by MRAs or MRTs in the residences?
   a) Yes   b) No (if you answer no don't bother to complete this survey, but do hand it in)
   Comment: (Optional) __________________________________________

2. Do you experience difficulty when trying to get client programs you have developed implemented by MRAs or MRTs in the residences?
   a) Yes   b) No

3. If you answered yes to question two please indicate how much difficulty you have:
   a) none   b) a little   c) moderate   d) great   e) very great
   Comment: (Optional) __________________________________________

4. a) Does the amount of difficulty vary?
    a) yes   b) no
4. b) If you answered yes to question 4a please indicate when it is most likely that the MRAs or MRTs will conduct programs that you've developed. (You may circle more than one answer.)

1) when the program yields good results right away
2) when you've ordered them to do it
3) when their supervisor orders them to do it
4) when a popular client is involved
5) when the program goals are extremely important.

Other, please explain: ____________________________________________________________

Comment: (Optional) ____________________________________________________________

5. What types of difficulty do you experience when trying to get client programs you have developed implemented by MRAs or MRTs in the residences?

a) None
b) They forget to do it
c) They refuse to do it
d) They do it, but not the right way
e) Other, please explain: ________________________________________________________

Comment: (Optional) ____________________________________________________________

6. When MRAs or MRTs are helping to conduct your client programs, what kind of tasks do you ask them to do?

a) Teach new skills
b) Collect data
c) Other, please explain: ________________________________________________________

Comment: (Optional) ____________________________________________________________

7. What do you do to try and increase the likelihood that MRAs or MRTs in the residence will conduct client programs that you develop? (e.g., send a memo to the unit director)

Step 1: ______________________________________________________________
Step 2: ______________________________________________________________
Step 3: ______________________________________________________________
Step 4: ______________________________________________________________

Others, please list: ____________________________________________________________

Comment: (Optional) ____________________________________________________________
8. What do you do when a client program you've developed is not being implemented in the residence?

Step 1: ____________________________________________
Step 2: ____________________________________________
Step 3: ____________________________________________
Step 4: ____________________________________________

Others, please list: ____________________________________________

Comments: (Optional) ____________________________________________

Thanks for your help.
MEMORANDUM

To: Residential Program Coordinators and Others Delivering Written Feedback to Self-Preservation Training Teams:

From: Chris Fox

Date: February 3, 1983 (copy of original sent November 16, 1982)

Re: Process of Giving Written Feedback

In order to standardize the process of delivering feedback please refer to the attached checklist when filling out your written feedback forms. If you have any questions or concerns on this checklist, please contact me immediately. I can be reached via mail at Staff Development or by phone at UMass (545-0794).
Checklist for delivering written feedback to your self-preservation training team.

When you have received the previous week's self-preservation training data sheets you should:

1. **Address the feedback sheet** (at the very top of the page)

2. **Summarize the team's "last week's performance"**
   Ordinarily each team is assigned 16 training programs a week, eight each with two clients. Sometimes staff absences, special events, or client illness will reduce the number of training programs a team can be assigned. To conduct training two staff who have completed self-preservation training have to be present as well as enough other staff to supervise those clients not being trained.

3. **Summarize the team's "overall performance"**
   This is your running record of how many programs the team has done since you started monitoring them and giving them feedback.

4. **Make comments on staff performance and client progress**
   Write a couple of sentences mentioning: a) the number of training trials the team conducted last week, b) how it compares with their previous performance, and c) their clients' progress.
   Always praise staff for conducting programs. Indicate improvement is needed if less than 100% of the team's assigned programs were conducted, but do it in a nice way.

5. **Mail your written feedback to the team ASAP**
   Address one feedback sheet to each of the team members. It is critical that all team members receive a copy of your written feedback.

6. **Make a carbon copy of your feedback for your records.**

7. **How many minutes did it take you to fill out and mail the written feedback forms? _____**

8. **Did you talk to any team members about self-preservation training during the last week? (circle one): YES NO**
   If you circled yes, please briefly describe what happened (for example: "bumped into one team member and told them how pleased I was with their work on self-preservation," or "I met with the whole self-preservation training team to ask why they were not conducting more training.")
APPENDIX 8

MEMORANDUM

To: Self-Preservation Training Team in Cottage 2
From: Chris Fox
Date: February 6, 1983
Re: Change in Self-Preservation Training Procedure

Starting today, Mike Forgue has agreed to monitor the progress of your team. Mike is the Residential Program Coordinator for Cottage 2. He will review your data each week and give you written feedback on the number of self-preservation training programs you conduct and your clients' progress. Mike will attend a training session in the near future to get a first hand look at your group conducting self-preservation training.

As you know, this is part of a special project examining the effects of staff training. Because it is a special project, no record of your performance will ever be used in a staff evaluation unless you request it.

Thank you for your continued efforts to teach your clients self-preservation skills.

CF:sjd

cc: Mike Forgue
    Daisy Syriac
    Cathy Leu
    Tom O'Neil
APPENDIX 9

MEMORANDUM

To: Residential Program Coordinators and Team Leaders and Others
From: Chris Fox
Date: December 22, 1982
Re: Change in Process of Giving Written Feedback

Starting the week of Monday, January 3, 1983, I would like you to change how you deliver written feedback. Rather than sending one sheet addressed to the whole group, please mail one sheet to each team member. Each team member should receive the same feedback memo, thus it would be fine to send carbon or xerox copies of the memo.

I will arrange a meeting with you in the near future to discuss this change.

Thank you for your continued cooperation.

CF:sjd