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Increasing staff use of sign language

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INCREASING STAFF USE OF SIGN LANGUAGE

A Thesis
Presented to
the Graduate Faculty of
the University of the Pacific

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts

by
Melanie Hepworth Neville
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This thesis, written and submitted by

Melanie Hepworth Neville

is approved for recommendation to the Committee on Graduate Studies, University of the Pacific.

Department Chairman or Dean:

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Thesis Committee:

[Signature] Chairman

Floyd O'Brien

Dated 11/17/82
ABSTRACT

This study examined the effectiveness of two procedures, a visual cue and performance posting, to modify the use of sign language by psychiatric technicians. The visual cue was first introduced alone, then paired with performance posting to encourage staff use of sign language with the developmentally disabled children in their charge. Application of the visual cue alone produced little change in staff sign usage. The visual cue plus performance posting condition increased staff use of sign language during mealtimes. Four weeks of follow-up data indicated that the use of sign language remained at a level well above baseline.
The most basic tools in behavior modification are direct care workers utilizing contingency management techniques (Loeber & Weisman, 1975). Thomas, Becker and Armstrong (1968) maintain that the most efficient way to change problem behavior is to modify reactions to that behavior in the natural environment. Herbert and Baer (1972) agree, noting that "the maintenance and generalization of a behavior change usually depends on supporting environments that continue to provide appropriate consequences" (p. 139). For developmentally disabled persons, the simplest, most direct way to modify environmental consequences is to change the behaviors of the direct care providers. For the majority of children, the direct care providers are their parents. Many children, however, are housed in institutional settings and receive the major portion of their care from paid attendants. Kazdin (1973) argues that successful program implementation in such a setting cannot occur unless appropriate behaviors of direct care staff are developed and maintained. Without their cooperation, efforts at planned behavior change are almost certainly doomed to fail.

Much attention has been given to the acquisition and maintenance of appropriate behaviors in developmentally disabled persons using behavior modification techniques. Less
research has focused on the issue of behavior change in direct care providers (Cossairt, Hall & Hopkins, 1973; Gardner, 1972; Glowgower & Sloop, 1976; Iwata, Bailey, Brown, Foshee & Alpern, 1976; Katz, Johnson & Gelfand, 1972; Panyan & Patterson, 1974; Parsonson, Baer & Baer, 1974; Pomer & Streeback, 1974).

In studies where direct care providers were given some intervention responsibility, much of the research indicates that "parents were trained..." or "staff were taught...", without including clear descriptions of the actual training techniques (Lovaas, Koegal, Simmons & Stevens, 1973; Mira, 1970; Thomas et al., 1968; Zeilberger, Sampen & Sloane, 1968). The researchers apparently experienced some success in modifying care provider behavior, but the specific procedures and reinforcers they used were not explained.

Some investigators complain that care providers neglect to follow prescribed behavioral procedures (Allen & Harris, 1966; Johnson, 1971), but Salinger, Feldman and Portnoy (1970) offer no sympathy:

While it may be tempting to appeal to lack of motivation to do the work required, lack of time due to other children in the household, and similar factors, we would undoubtedly do better to apply to the parent's behavior the same kind of analysis that we applied to their children's behavior (p. 20).
This advice could be easily generalized to all direct care providers.

Sajwaj (1973), in his parent training research, noted a lack of parental generalization from clinical instruction to home environments. In each instance a home behavioral analysis was performed, the results of which suggested practical revisions of the clinically prescribed behavior management techniques to fit specific parent needs. The therapists then modified the clinical procedures to include behaviors already in the parents' repertoire. The parents were more successful at following the revised programs and in each case, the child behaviors showed appropriate changes.

Staff compliance with behavioral programs could conceivably be mandated by program administration. This "required" performance mandate could provide an effective way of realizing behavior changes in direct care personnel. Managerial contingencies could include extra pay, preferred work shifts, bonus vacation time and promotions. An institutional staff survey of the desirability of various reinforcement procedures (Watson, 1976) showed a definite preference for extra salary as a consequence for compliance with prescribed behavioral programs. Katz et al. (1972), achieved a substantial increase in appropriate staff behaviors when they offered a contingent monetary bonus; however, they recognized that this type of intervention is often impractical and suggested less costly alternatives.
such as choice of work shifts, special recognition and promotions.

Even such inexpensive rewards require some manipulation of managerial contingencies. Securing administrative support seems particularly salient, as program managers often control preferred reinforcers beyond the reach of the consulting behavior analyst. Watson (1976) suggests the possibility of obtaining added administrative support using such reinforcers as favorable press and television coverage for project cooperation.

Realistically, the implementors of behavior change projects can seldom control managerial contingencies. This may be well in some instances as it eliminates the temptation of using this power to develop punishing consequences for noncooperative staff persons. Ferber, Keeley and Shemberg (1971) object to the manipulation of managerial aversives to consequate lack of staff compliance. They maintain that the right to the least restrictive modification method applies to staff behavior change projects as well as to the clients themselves, specifically supporting the use of discriminative stimuli or reinforcement procedures rather than an administrative order mandating cooperation. They suggest that researchers in this area seek to develop inexpensive, non-punitive yet effective methods for modifying staff behavior which do not require direct administrative involvement.
Where client behavior change maintains in the natural environment, an implicit reinforcement system usually exists for the change agents. For example, Hall (1972) cites instances where parents were reinforced by positive changes in the behavior of their children. Other research has found positive client behavior to be a powerful reinforcer (Loeber & Weisman, 1975; Panyan & Patterson, 1970). Such reinforcement may provide the basis for maintenance of care provider compliance with the prescribed behavioral program, thus facilitating further improvements in the natural environment. However, client progress of sufficient magnitude to provide effective staff reinforcement is often slow to develop. For this reason, precise application of previously trained behavioral procedures is often neglected or even completely abandoned.

Establishing effective reinforcers for staff and parents requires further research effort. In many instances, contingencies and reinforcers for increasing care provider participation may be found in research projects actually investigating other variables. Care provider cooperation in any investigation is often at a premium, and researchers may devise innovative reinforcement procedures to avoid the collapse of the project. These incidental contingencies, if even partially effective, provide information which may enhance the development of specific methods for programming appropriate care provider reactions. Barrett (1969), for
example, reported 35 days of training before parent cooperation was achieved, although specific manipulations utilized to facilitate this final compliance were not described.

In summary, Loeber and Weisman (1975) suggest that the use of discriminative stimuli and reinforcing consequences are the two most basic methods of modifying the behaviors of direct care providers. A variety of intervention techniques based on these methods have been reported, including the application of signal light cues, bug-in-the-ear devices, written, audio-visual and direct feedback, self monitoring, written instructions, posted reminders, readings, discussion groups, modeling and role play to facilitate the acquisition and maintenance of behavioral skills among care providers.

Reinforcers Requiring Managerial or Monetary Resources

Specific reinforcers noted in the literature include trading stamps (Holland & Plutchik, 1972; Hollander, Plutchik & Horner, 1973; Luthans & Kreitner, 1975), time off work (Watson, Gardner & Sanders, 1971; Loeber & Weisman, 1975; Watson, 1976), a lottery for preferred days off (Iwata et al., 1976), extended breaks (Luthans & Kreitner, 1975) and money (Katz et al., 1972; Loeber, 1971; Pedalino & Gamboa, 1974; Staats, Minke, Goodwin & Landeen, 1967; Watson, 1976). Pomerleau, Bobrove and Smith (1973) offered cash rewards contingent on patient improvement. Rinn, Vernon and Wise (1975) refunded ten dollars of an enrollment fee for attendance, punctuality, completed homework and
positive change in targeted behaviors. Patterson, McNeal and Phelps (1967) subtracted one dollar from the clinical fee for each recorded instance of parental reinforcement of appropriate child behavior. Pedalino and Gamboa (1974) distributed playing cards for appropriate behavioral advances, then paid twenty dollars cash to the staff member with the highest hand, while McNamara (1971) reinforced staff compliance with tokens which could be exchanged at the end of the day for beer.

Less Costly Interventions

Care providers have been reinforced with verbal praise and recognition from supervisors and peers (Loeber & Weisman, 1975; Luthans & Kreitner, 1975; Montegar, Reid, Madsen & Ewell, 1977; Watson et al., 1971; Welsch, Ludwig, Radiker & Krapfl, 1973). Shearer (Note 1) cites such innovative parental reinforcers as carrying water for a particular mother (transported in a wagon from a tavern a mile away) in return for demonstrated progress in the behavior of her daughter. Wagner (1968) sees frequent telephone contact as a necessary component to the maintenance of a home administered behavioral program. Loeber and Weisman (1975) suggest allowing the trainer a choice of client whenever possible. The opportunity to choose or revise specific treatment procedures has also been considered as a reinforcer to increase behavior management skills (Watson et al., 1971).
Evaluating Client Gains

Greene, Willis, Levy and Bailey (1978) criticize much of the staff training literature for failing to evaluate the training in terms of client performance. Accordingly, the behavior of the client remains the most relevant unit of analysis for determining the effectiveness of a program implementation and hence, techniques intended to encourage it. Unfortunately, most program implementation research has focused exclusively on the behavior of the staff... (p. 395).

Greene et al. (1978) contend that the ultimate recipients of the intervention should be the clients, and that behavioral programming to modify staff behavior is justified only through the positive behavior change in the clients they serve. Measuring the impact of the staff program on the client's behavior provides data to validate and justify the care provider intervention. Greene et al. acknowledge that there is no valid reason to expend valuable resources to change staff behavior unless this intervention will be positively reflected in the clients themselves.

Present Study

The current investigation attempted to develop an inexpensive procedure to change care provider behavior which could be utilized in settings where the researcher has no opportunity to manipulate managerial contingencies. Specifically, the study focused on increasing the frequency of the
use of sign language by institutional staff.

The use of sign language with hearing but non-verbal persons has been investigated in several studies (Bricker & Bricker, 1970; Hobson & Duncan, 1979; Sundberg, Milani & Partington, Note 2). Bricker (1972) suggests that sign language is an effective facilitator of oral language. Sundberg et al. (Note 2) contend that sign language is more easily acquired than oral language, as the response may be physically shaped, and the sign itself often resembles the object or idea it represents. For example, the sign "banana" is made by pointing upwards with an index finger to represent the banana while the forefinger and thumb of the other hand make peeling motions down the index finger.

Sundberg et al. (Note 2) demonstrated a substantial increase in client signing behavior when staff used sign language and reinforced client signing. These researchers, working in a school setting with mentally impaired clients, reported significant increases in teacher and university staff signing behaviors via request only, with no specified contingencies for compliance. This "automatic" cooperation does not occur in many research settings and suggests the existence of some implicit contingencies to facilitate staff compliance. Client signing increased dramatically when the staff used sign language, justifying the intervention in terms of "client gains" (Greene et al., 1978).

Public posting of performance data has been utilized
by several researchers (Greene et al., 1978; Panyan, Boozer & Morris, 1970; Quilitch, 1975; Welsch et al., 1973) as an effective method of increasing staff compliance to behavioral regimens. Pilot research on a program to increase staff signing with developmentally disabled children (Lee, Pool, Burdix, Trejo & Neville, Note 3) showed no definite increase using written instructions and a visual cue, but demonstrated an effect with a package intervention consisting of verbal instructions, modeling, prompting and posted data. Further research is needed to isolate the components producing the actual effect, and to develop procedures to maintain the increase over time.

Hopkins (1968) utilized a rather unique application of a visual cue. He was working to increase the smiling rate of two retarded boys through the use of edible reinforcement and a 22 x 28 cm sign attached to the front of each child. For example, in one experimental condition, the sign read: "If I smile - talk to me. If I look sad - ignore me." Hopkins (1968) measured changes in subject smiling. He included no actual data to show the effect of the cue on people passing by, but did mention that, at first, many failed to comply with the instructions on the sign. Hopkins (1968) then revised the procedure by having the experimenter ask each person the child would encounter to please read and follow the instructions on the sign. Compliance greatly increased under this condition, as did the smiling behavior of both boys. Further investigation is
required to assess the effects of such visual cues on staff behavior.

The current study was intended to increase staff signing behavior through the use of a visual cue which depicted several signs and was placed directly on the child, followed by the use of this cue paired with performance posting. It also sought to develop a self-monitoring procedure on the part of direct care staff to maintain the behavior change which required minimal administrative cost and no manipulation of managerial contingencies.

Method

Subjects. Staff subjects were nine psychiatric technicians in one unit of Stockton State Hospital's Child Development Program. During each session, data were collected on one or more of the staff persons who were on duty with the residents at that particular time. The average number of staff persons on whom data were collected during the experimental sessions was 1.5. Most staff at this institution had been previously exposed to sign language through workshops given by the hospital speech therapist. A basic sign language book was available on the unit and several color pictures illustrating specific signs had been painted directly on the walls throughout the Child Development Program.

One developmentally disabled male child, age six, was
selected from the unit to wear the visual cue on the basis of his pre-tested signing abilities. This selection was hoped to enhance the possibilities of staff being reinforced by noting positive changes in the rate of client signing. Many of the residents of the Child Development Program had been exposed to sign language through the efforts of the speech and recreational therapists.

Setting. Stockton State Hospital's Child Development Program was divided by general level of client functioning into three physically separate units, each consisting of two large dormitory sleeping rooms divided by a daytime activity room and a nursing station with an adjoining staff conference room. This study took place in Unit G-3, which housed the children with the lowest level of adaptive functioning.

Several visual cues for sign language were positioned throughout the unit prior to the current investigation. For example, above the drinking fountain in the G-3 dayroom was a painting of a girl demonstrating the sign "drink." Next to the dining room were pictures for "want more food, please" and "hungry." Just outside the program area were pictures of the signs "thank you" and "come again." In the main lobby was a mural depicting the sign "welcome," and above the drinking fountain was a picture of a boy signing "thirsty." These signs were painted on the walls of the hallways that were used at least five days per week by G-3
residents and program staff. The sign language pictures had been on the walls of the Child Development Program for over one year prior to the initiation of the present study.

**Design.** This study utilized a reversal design and two treatment conditions, a visual cue and performance posting. The design followed an A-B-BC-B-A-BC format (Herson & Barlow, 1976), where A signifies baseline, B is the visual cue and C indicates performance posting. This design permitted assessment of the effects of the visual cue alone, as well as the combined effects of the visual cue paired with performance posting.

**Measurement and reliability.** Direct observation data on staff and the child's use of sign language were collected by two psychology students. For the purpose of this study, the universe of signs was defined as those contained in the attached sign language booklet (Appendix C). Data collectors were trained prior to the study to recognize these specific signs. Sign usage was recorded using a frequency tally within one minute intervals for each session (Bailey, Note 4). Observation intervals were cued and synchronized across observers by a tape recorded signal and long corded ear phones.

Reliability measures were taken by a third observer in no less than 20% of the sessions within each experimental condition. The two regular observers did not know which person the reliability observer was watching during a given session.
Reliability of measurement was calculated following Bailey's (Note 4) guidelines for "Block by Block Agreement Percentage" (p. 118). Appendix D provides a more detailed description of this method of computing reliability scores. In the present investigation, reliability across observers for total sign usage ranged from 66.7% to 100% per session. The average whole session reliability score was 85.4%.

Most of the data were collected during breakfast hours, although seven early sessions were run during dinner. After the first treatment phase, data were taken only during breakfast; the data demonstrated no noticeable differences between breakfast and dinner sessions, and on-site experience showed both staff and residents to be most consistently present in the mornings.

Session length varied from 9 to 30 minutes, depending on the presence of staff and resident and the time it took to eat the particular meal. Mean session length was 18 minutes. A minimum of five data points were included in each experimental phase. More data were collected in conditions where signing levels varied greatly from session to session.

Procedure. Baseline data were collected on staff and resident signing and vocal language behaviors during meal-times. Vocal language was recorded during this phase to determine words most frequently used by staff in this setting. The signs for frequently occurring spoken words during baseline were utilized in the B (visual cue) phase of the experiment.
At the beginning of the baseline condition, staff were informed that data would be collected on sign language usage. This was done to separate the knowledge of observation effects from the proposed treatment (Greene et al., 1978). Staff were also given the location of a sign language booklet (Appendix C) and asked to pair sign language with the spoken word. Staff were requested not to ask the data takers to demonstrate signs (no modeling).

The introduction of a visual cue was the second phase of the study. Since data were collected at meal times, when the residents were normally wearing bibs, the visual cue consisted of a specially designed bib, printed on the front with drawings depicting three signs. Two of these signs ("spoon" and "wait") were selected by an analysis of the staff baseline data, determining the two most frequently occurring words (total of signs plus vocal language). These words were chosen because they were known to be established in the language repertoire of the staff involved. The third sign on the bib was a praise word, "nice." The bib was worn by the targeted resident during all B phase data collection sessions. At the beginning of this treatment phase, staff were told that the child was wearing the bib to make it easier for them to sign around him, and that seeing them sign should increase the child's use of sign language. They were also reminded of the sign language book on the unit and to pair signs with speech.
The third experimental phase (BC) was the visual cue in combination with performance posting. The performance poster was a large colorful graph (approximately 60 cm x 90 cm), clearly lettered to enhance its visibility. This poster was fixed to the wall of the nursing station, with the ordinate indicating the number of signs and the abscissa showing the sessions. With the implementation of condition BC, staff were informed of this data posting and requested to check it daily. The staff were asked to initial the chart each day to insure that they had actually been exposed to the posting condition. This procedure was explained to staff as a procedure to increase the sign language progress of the group. Staff were again reminded of the sign language booklet and of the importance of pairing signs with speech.

The fourth experimental phase consisted of a return to the visual cue only, re-introduced as before. This was done to demonstrate differences between the visual cue alone and the visual cue paired with performance posting. The return to B only phase was followed by a return to the baseline condition, which provided evidence of any experimental effect from the visual cue alone.

The final phase of this study was the return to the most effective treatment phase plus several procedures intended to maintain sign language use in the absence of the data collectors. Staff were provided with individual golf counters and asked to monitor their own signing behavior. They
were requested to update the performance poster daily with the data from their counters. Both of these new staff behaviors were monitored also by the data collectors during the first nine sessions of this final phase, with feedback and descriptive praise provided for increases in staff self-monitoring behaviors. As the staff became more skilled at monitoring their own responses, the data takers were faded out of the setting. Thus, the performance poster and application of the visual cue (bib) were gradually maintained by line staff.

Results

The mean total signs noted in a given session was determined across the number of staff observed to yield the signing rate of the typical staff member per minute. For example, if two staff were present for a 10 minute breakfast session and 30 signs were observed, the typical staff person signed a mean of 1.5 times every minute. If three staff were observed, but the meal lasted 20 minutes and 90 staff signs occurred, the figure would also be 1.5, since the typical staff person signed a mean of 1.5 words in one minute. This adjustment allows convenient comparisons to be made across staff persons, and was necessary given the variations in both meal length and the number of staff present. Results were graphed across all conditions with the mean number of signs by each staff person per ten minutes represented
across sessions. Data were then smoothed in running medians of three (Tukey, 1977) to clarify the effects (see Figure 1).

Baseline data were highly variable, with the mean signs in ten minutes per staff person ranging from 0 to 11 (n = 8). The mean number of signs per session during baseline was 4.5. For treatment B (visual cue phase), six data points were taken, with the mean sign usage decreasing slightly to 3.0 (range was 0 - 7). During the BC phase (visual cue plus performance posting), the average sign usage increased to 13.6 per ten minutes. Nine date points were collected during this condition, and the signing rate ranged from an average of 2 to 21.6 per ten minutes. A return to the visual cue only phase yielded an average sign usage of 6.2 (n = 5, range was 5 to 7). The second application of the A (baseline) phase produced a mean of 5.5 signs in ten minutes with a range of 4 to 7 (n = 5). The return to the most effective treatment condition (BC) increased the mean signing to 12.2 per ten minutes. Nine data points were collected during this phase, ranging from an average of 3.8 signs to 20. During the four weeks of followup (with both the visual cue and performance posting in effect), four mealtime sessions were observed, yielding a sign usage range from 3.8 to 20 in ten minutes. The average signing per staff in ten minutes during followup was 11.8.

Because of the variability of staff present, gaps were noted when individual staff data were represented across
Figure 1. Mean number of signs used in 10 minutes per typical staff across all experimental conditions. Data were smoothed in running medians of three (Tukey, 1977).
treatments. Thus, it is not possible to analyze individual effects. Nine different staff persons were involved during the 46 observation sessions. The number of sessions each staff person was observed ranged from only one to 17. The average number of observation sessions per staff person was 7.6. The number of staff present at any single session varied from 1 to 3.

Use of sign language by the target child (wearing the visual cue) was found to be extremely infrequent across all experimental conditions. The child did not sign at all during the baseline condition, although 16 signs were observed during the six condition B sessions. No signs from the child were noted during BC phase, but the second application of the B (visual cue) phase yielded six child signs across the five sessions. Again, no child signing was observed during the reversal phase, but four child signs were recorded during the final treatment and followup. None of the signs used by the child wearing the special bib were the ones visually cued for the staff. When session length is averaged to ten minutes, the child's mean signing was 0.5 for the initial B phase, 0.8 for the second application of condition B and 0.5 during followup.

The frequencies of the three visually cued signs were compared to any other signs occurring across treatment conditions. Nearly all the signs emitted by staff were other than the signs printed on the cue. (Subjective data from
observers indicated the most frequent signed phrases to be "sit down" and "stand up," which were repeated many times across children.

Discussion

This study assessed the effects of a visual cue and performance posting on staff use of sign language in an institutional setting. Results demonstrated an increase in signing when the visual cue was paired with performance posting, but not when the cue was used alone. Staff were requested to self-monitor their use of sign language, and this usage was maintained at levels above the baseline frequency during the four week followup.

The initial introduction of the visual cue was accompanied by a slight decrease in the use of sign language by staff. This is perplexing, as the visual cue was intended to increase sign usage on the unit. There may have been other factors in operation which served to limit the effectiveness of the visual cue. Initial baseline data points could have been inflated, since staff were informed of the purpose of the study prior to baseline measures (Greene et al., 1978). They may have anticipated the desired experimental effect and become more conscious of their signing efforts in the presence of the data collectors during baseline. As staff became accustomed to the presence of the data collectors, this reactive effect could have diminished. Perhaps the
introduction of the visual cue coincided with this decrease, reducing its apparent effectiveness. This explanation could be empirically investigated by replicating the investigation without informing staff of the purpose of the study.

Baseline data were quite variable. Closer analysis indicates that several of the staff used no signs at all during this period, although sign usage for these particular staff was noted in other experimental conditions. Perhaps those particular staff may not have mastered basic signing skills and therefore could not sign during the first data sessions even though they were aware of the purpose of the study. There may have been some sign language training effect over time, with the non-signing staff learning sign language by observing other staff or by studying the sign language booklet on the unit. There were anecdotal observations of staff members using the sign language booklet. These factors, in combination with the presence of the data takers and use of the visual cue, performance posting and self-monitoring procedures could have produced a substantial training effect. The extreme variability noted during initial baseline sessions was not apparent during the reversal condition, which also helps to substantiate this "skill acquisition" hypothesis.

Not only did the visual cue fail to increase the use of sign language over baseline levels, but the signs used during the visual cue phase did not reflect those actually
posted on the bib. Staff in this particular program were accustomed to the posting of sign language actions on the walls, etc. as explained in an earlier section of this paper. This over-exposure could have obscured any novelty effect which may have occurred in more cue free surroundings. Because of this possibility, the visual cue cannot be simply dismissed as an ineffective means of producing even temporary increases. Further investigation in a cue free environment might demonstrate some use for such a treatment to effect initial increases in staff signing behaviors.

A further application of Hopkins' (1968) research results might also prove worthwhile. He was able to achieve very little behavior change through application of a visual cue alone. Much better results were reported when the visual cue was paired with a verbal request to notice and comply with the instructions on the cue. Perhaps the visual cue utilized in the current investigation would have been more effective if paired with a specific verbal request, e.g., "Please try to use the signs pictured on the bib as much as possible."

The visual cue paired with performance posting produced a substantial increase in staff use of sign language. Since the prior application of the visual cue did not increase staff sign usage, it was most likely the performance posting alone which produced the staff signing improvements. An
interaction inherent in the experimental design, however (Herson & Barlow, 1976), precludes such direct interpretation. Since condition C (performance posting) was never presented without B (visual cue) it is unknown whether performance posting alone produced the effect. This study does show performance posting to be effective in the presence of the visual cue.

Other researchers in the use of feedback and performance posting (Greene et al., 1978; Panyan, et al., 1970; Quilitch, 1975; Welsch et al., 1973) have found these to be effective and useful tools in changing the behavior of direct care providers. Quilitch (1975) utilized both memos and workshops without increasing his dependent variables before implementing his performance posting condition. Although the feedback phase showed substantial data increases, Quilitch (1975) noted that "The memos and workshops, non-functional in themselves, might have been necessary pre-conditions for the scheduling and feedback to improve staff performance" (p. 62). In the present study, too, more research must be completed to assess the use of the performance posting alone.

Minimal use of sign language by the target child leaves this investigation vulnerable to criticism (Greene et al., 1978) for focusing on staff gains. Client behavior change could perhaps have been enhanced by analyzing the resident communicative behaviors during baseline and training staff
to recognize and reinforce signs the children would be likely to use, instead of simply striving to increase the use of sign language by staff. In the current study, the experimenter chose to work directly to shape staff signing behavior, beginning with a very small step to insure success, i.e., choosing signs from words which staff already use to facilitate sign language behavior in that setting. It may be projected that a staff sign more and their sign language repertoire increases, the residents' signing will begin to reflect this change as a result of staff modeling and requiring signs of the children (Sundberg et al., Note 2). As signing increases, there are greater chances of these gains being reinforced by appropriate environmental changes; for example, a child signing for "water" is given a drink. With the mutual reinforcement of a viable communication system, the signing behaviors would eventually be maintained without specific environmental manipulations.

In summary, a visual cue in combination with performance posting increased the use of sign language by institutional staff toward residents under their charge. The intervention was inexpensive to administer, and was maintained without the utilization of managerial contingencies. Throughout the final treatment phase, staff not only recorded their own signing behavior but laundered the visual cue bib and kept it consistently on the target child during mealtimes. During the four week followup, that bib was present on the
child each time the observers walked unannounced onto the unit at mealtime. This limited but successful use of self-monitoring and performance posting as a maintenance strategy deserves further investigation.
REFERENCE NOTES


REFERENCES

Allen, K. E. & Harris, F. R. Elimination of a child's excessive scratching by training the mother in reinforcement procedures. Behavior Research and Therapy, 1964, 4, 79-84.


Hopkins, B. L. Effects of candy and social reinforcement, instructions, and reinforcement schedule leaning on the modification and maintenance of smiling. *Journal of Applied Behavior Analysis*, 1968, 1, 121-129.


McNamara, J. R. Teacher and students as sources for behavior modification in the classroom. *Behavior Therapy,* 1971, 2, 205-213.

Mira, M. Results of a behavior modification training program of parents and teachers. *Behavior Research and Therapy,* 1972, 10, 29-34.


APPENDIX A

Research release signed by all staff participants as required by Stockton State Hospital's human subjects committee (following page).
TO: Child Development Program Staff, Unit G-3
FROM: Melanie Hepworth Neville

This is to inform you as per law that several students from the University of the Pacific will be in the dining room during breakfast and supper to take data on sign language. They are interested in increasing sign language usage among both staff and residents, and appreciate this opportunity to observe.

This is a research project (Masters' thesis) for a graduate student in Applied Behavior Analysis at the University of the Pacific, and has the approval of the Program 4 administration.

BASIC PROCEDURES: The regular bib worn during meals by one of your children will be replaced with one showing several sign language pictures to see if this makes it easier for you as staff to use signs around the residents. Another phase in the project includes the pictures on the bib, plus displaying a large poster on the nursing station to graph the sign language progress of both staff and children. By the end of the project, you as staff will be monitoring your own use of sign language, and the observers will leave the setting. Hopefully, this project will be completed within six weeks.

The overall purpose of this project is to increase basic sign language usage among G-3 staff and hence, residents.

There is no risk involved and no anticipated need for any medical compensation in relation to this research.

Although a final report on the research will be written and presented to the graduate faculty of the University of the Pacific, identification of individual staff involved will be kept in strictest confidence.

Thank you for your interest and cooperation!

Please sign and date below to indicate your consent to participate in the above described project. You should know that your participation in this project is entirely voluntary. Your signature here also indicates that this project was described to you verbally, and that you were given the opportunity to ask questions which were then answered to your satisfaction.

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APPENDIX C

Sign language booklet provided to staff on unit

(next six pages)

NOTE: This booklet was created with assistance from Stockton State Hospital Child Development Program staff as to which signs they would consider most useful in their interactions with the residents.
BALL

BEO

Book

BRING

CANDY

twist wrist

CAR

COME

hands make alternate circular
motions toward self-
one-hand gesture if okay

COOKIE

CRACKER

first taps near elbow twice

*see "not"

DOESN'T

*see "not"

DON'T

DRINK

*eat

tilt head back
as if drinking
FATHER

FOOD OR EAT

GET
grabbing motion
hands open to closed

GIVE
one hand or both

GO
hands make alternate circular motions
away from self

GOOD
ending both palms up

GRANDFATHER

GRANDMOTHER

HELP
fist is lifted up and out
by palm of other hand

HERE

HUNGRY

HURT
+ see "not"
ISN'T

LOOK

LOVE

+ see "my"
ME

MINE

MORE

MOTHER

MUST
(also: NEED, SHOULD, OUGHT, MUST TO)

MY
(also: MINE)

* see "must"

NEED

NO

NOT
(also: CAN'T, ISN'T, DOESN'T)
Addendum

NICE

WALK

UP

DOWN

FACE

touch left hand
with right, then
right with left.

HANDS

HURRY

or

QUICK

MILK
(close and open hand
as if "milking")

CEREAL
(scoop from
cupped hand to
mouth)

EGG
(as if breaking
an egg)

BREAD
(making slicing
motions as of cutting
bread)

MEAT
APPENDIX D

Reliability Calculation

The agreement percentages for the total number of signs were calculated across observers from each one minute interval. These samples were then added together across session length and averaged to yield an overall session reliability figure. This method of reliability calculation corrects for the possibility of having high agreement for the total number of responses without any assurance that the observers were actually noting the same occurrence of behavior. Consider these hypothetical data noting the number of signs observed in each interval:

<table>
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<th>INTERVALS</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>TOTAL</th>
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<tbody>
<tr>
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<td>1</td>
<td>2</td>
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<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>10</td>
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<tr>
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<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
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<td>2</td>
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<td>100%</td>
<td>100%</td>
<td>100%</td>
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<td>100%</td>
<td>100%</td>
<td>50%</td>
<td>100%</td>
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</table>

Perhaps both observers noted 10 signs for "spoon" during a given ten minute session. This may be considered by some to yield a 100% reliability level. However, when the ten minute session is broken into one minute intervals, it may be noted that the ten signs were recorded as occurring in slightly different intervals across the two observers. According to Bailey's (Note 4) formula, the more accurate overall session
reliability score would be 90%, calculated by summing, then determining the mean of the individual interval percentages.