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ABSTRACT

A STUDY OF THE USE OF HIGHER FUNCTIONING RETARDATES AS LANGUAGE ACQUISITION TRAINERS OF LOWER FUNCTIONING RETARDATES IN ATTENDANT SUPERVISED TRAINING SESSIONS ON INSTITUTIONAL WARDS

By

Martha Evelyn Snell Rowland

Within most institutions for the retarded are barriers which prevent adequate intellectual stimulation of its residents. These barriers include the low ratio of attendants to residents, the low ratio of education and speech professionals to residents, the inadequate preparation and motivation of attendants to train residents, and the administrative priorities which in practice generally do not result in adequate educational programming for residents. As a consequence of these factors, institutions for the retarded have been shown to retard even further the social, cognitive, and language skills of their residents.

The purpose of this study was to demonstrate and compare the effectiveness of a strategy for utilizing the higher functioning residents of an institution to train the lower functioning residents under the guidance of the attendant staff. Specifically this study sought to determine whether significant gains in language functioning and in the ability to respond to a standard measure of intelligence could be

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produced by retarded trainers who were trained to administer a developmentally ordered language program which incorporated principles of reinforcement and modeling (Group E). In order to determine the effectiveness of the instruction given to these retarded trainers and their supervising attendants in Group E, a control group (Group C) was employed where trainers were encouraged to provide their students with reinforcement on a non-contingent basis, verbal and tactual stimulation, training based on their own or their attendant's ideas, and play interaction.

Identical in both groups, the organization consisted of basic training units. Each of these units was composed of one supervising attendant who directed two trainable mentally retarded trainers. Each trainer in turn, was assigned to two profoundly retarded students, although all training was done with one student at a time. Each group included three of these training units or a total of three attendants, six trainers and twelve students. Trainers and students were paired together first and then randomly divided into the two groups. Attendants were randomly divided into two groups and then paired with two trainer-student triads.

The experiment consisted of three phases. Phase I, lasting two weeks, was an initial training period, which varied for Groups E and C. Phase II lasting three weeks, involved the training of attendants in the supervision of one triad at a time, while Phase III, lasting three weeks, involved each attendant supervising her two triads, with maintenance levels of supervision and instruction from experimental staff.

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During Phase I and II Group E trainers and attendants were trained to teach toward specific language goals by applying conditioning principles as embedded in the Modified Language Acquisition Program (MLAP). During this same time, Group C trainers were also given language training goals for their students, but without training in the use of this program or behavioral principles. Insofar as possible, all other training variables were made equivalent for the two groups. Thus, the independent variable was the application of a developmentally ordered language training program which incorporated the principles of reinforcement and modeling.

In both groups the daily training sessions between trainer and student lasted 20 minutes. Each trainer worked with one of his assigned students for a single session and then with the second student for another single session. Throughout the entire 8-week study each student received a mean of 13 hours of training. Except for brief demonstrations given to the trainers by attendants and experimental staff and for some extreme cases of behavior control, all the direct interaction with the students during these training sessions was done by the trainers.

The main dependent variables were measures of language ability (The Modified Language Acquisition Program Final Tests, MLAPFT) and intelligence (Cattell Infant Intelligence Scale). The design analyzed the pre-test, posttest scores on both dependent variables of all pairs of students trained by a single trainer, by a one-way analysis of variance of the index of response. The scores of the two students in a triad were combined in the analysis, since they were considered not to be independent, but to be, in part, a function of the skill of the trainer in the triad.

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A less formal dependent variable, the Behavioral Observational Record, BOR, was utilized to gather data in both groups regarding the instructional interactions between trainers and students in regular training sessions and between trainers and students and attendants and students in experimenter structured training sessions which utilized students new to trainers and attendants.

It was the main hypothesis of this study that the intensive training of Group E at the attendant and trainer levels in the use of reinforcement and modeling techniques and the Modified Language Acquisition Program would yield greater growth in language skills by the Group E students than by the Group C students who were paired with untrained retarded trainers and supervising attendants. This hypothesis was supported since the mean gain in language skills in Group E students was significantly greater than the gain in Group C.

It was further hypothesized that Group E students, being differentially reinforced for attending skills and early language skills commonly tested by infant intelligence tests, would demonstrate greater mean scores on the Cattell Infant Intelligence Scale than would the students in Group C. Although this hypothesis was not supported by a significant mental age gain difference in favor of Group E students, the results of the analysis did reveal that both groups of students made significant MA gains as compared to the expected zero gain for the population of older, profoundly retarded students from which they were drawn.

The series of questions posed to investigate the actual interactions between an instructor and a student was answered informally by

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an examination of the data gathered with the BOR. Some of these data were collected from three-minute observations made of each student and his trainer during regular training sessions at the end of each phase of the study. The remainder of the observations, also each three-minutes in length, was taken before and after the study in training sessions structured by the experimenter. These latter observations included not only trainers and students but also attendants and students from both groups. All students trained during these observations were new to the attendant and the trainer.

The results of these observations of attendants and of trainers in both groups are summarized:

A. In comparison to trainers using unstructured play methods of training with untrained attendant supervision, retarded trainers using operant and developmental language training techniques and supervised by attendants trained in the same skills, were observed to consistently and more frequently

1. present complete trials to students
2. have students attending to stimulus/presentations
3. evoke student responses
4. demonstrate appropriate reinforcement of student's responses
5. couple tangible reinforcers with praise
6. demonstrate appropriate prompting of students
7. provide consistent stimulus presentations and with appropriate repetition
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9. teach tasks appropriate to the students
10. successfully generalize their training skills to new students in experimenter structured training situations.

B. In comparison to untrained attendants, attendants skilled in the application of an operant, developmentally ordered language training program, were observed to consistently and more frequently

1. provide reinforcement and instruction to the retarded trainers they supervised
2. and to demonstrate a high quality of training skills when asked to instruct a student in a particular early language task (these training skills are described in A. 1. through A. 9).

A STUDY OF THE USE OF HIGHER FUNCTIONING RETARDATES AS LANGUAGE ACQUISITION TRAINERS OF LOWER FUNCTIONING RETARDATES IN ATTENDANT SUPERVISED TRAINING SESSIONS ON INSTITUTIONAL WARDS

By

Martha Evelyn Snell Rowland

A DISSERTATION

Submitted to
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in partial fulfillment of the requirements
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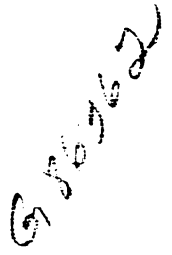
Department of Elementary and Special Education

1973



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Martha Evelyn Snell Rowland
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ACKNOWLEDGMENTS

The development, implementation and completion of this study reflects the cooperation and support of many people; some of whom will be acknowledged at this time.

Most grateful appreciation must be given to Dr. Edwin J. Keller, committee chairman, for his valuable guidance, continued encouragement and personal support. Gratitude is also strongly expressed toward Dr. Donald Burke, committee member, for his unfailing inspiration and for his assistance in testing and videotaping during the study. Appreciation is extended also to Dr. M. Ray Denny and Dr. Stephen Yelon, committee members.

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Thankfulness is extended to Linda Glendening and Andrew Porter for their continued assistance in the statistical analysis of the results of this study.

Most deep gratitude and appreciation must be extended to the many staff members of Howell State Hospital whose interest, support and

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participation made this study possible. Specifically this appreciation is extended to Dr. Detterbeck, Superintendent, for his interest in and approval to have the study take place at Howell; Dr. Robert Gutshall, Program Director, Mrs. Doris Holley, Social Worker, and Carol Lappin, Speech Therapist, for their assistance throughout the pilot work and study; the six attendants and twelve trainers who participated in this study and invested their energy, talents and enthusiasm.

It is important also to extend thanks to the experimental staff without whose invaluable assistance this study would not have been possible. Susan Miller and Nancy Williams deserve great thanks for their daily guidance of the Control Group during the eight weeks of the study and for their continual personal support. Penny Rogers must also be deeply thanked for her interest and participation in the development and use of the Behavioral Observational Record.

Finally deep and sincere appreciation is extended to my family and friends who offered personal encouragement throughout the years of doctoral work.

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CHAPTER I

PROBLEM AND REVIEW OF RELATED RESEARCH

In recent years there has been a growing recognition that public residential institutions for the mentally retarded, with populations of several thousands, are failing to provide for the learning needs of the residents. This study explores one approach to stimulating the growth of institutionalized retardates, using the resources currently available in such institutions. The approach used is that of training residents to train their fellow retardates, and of training the attendants to supervise this peer training program. Language development was chosen as the content of training on the assumption that communication skills form the bedrock of social and educational growth.

The difficulties in providing minimally adequate stimulation in large residential institutions are well documented. It is frequently cited in the literature and rather obvious upon observation that most institutions for the retarded are understaffed (Browning and Browning, 1971; Butterfield, 1969; Cleland and Swartz, 1969; Harmatz, 1973; Yarrow, 1961). Also many of the residents in such institutions are functioning below their potential levels because adequate intervention programs are not in operation (Centerwall and Centerwall, 1960; Tarjan, 1966; Yarrow, 1961). Surveys of institutionalized retardates in speech

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and language skills (Keane, 1972; Matthews, 1957; 1971; Sheehan, Martyn, and Kilburn, 1968; Yarrow, 1961) reported that these persons are highly deficient in vocabulary, sentence structure, articulation of speech, sounds, as well as conceptual and abstract language skills. Spradlin (1963a) reports that "57 to 72 percent of institutionalized mental retardates have speech defects (p. 3)."

For those readers not interested in a detailed review of the research related to this study, a summary of research is located at the end of this chapter.

Difficulties in the Implementation of Institutional Resident Training Programs

Attendant-Resident Ratio

Across the United States the number of full-time staff per 100 residents under care in public institutions for the mentally retarded has consistently reflected an increase over the last ten years; in 1970, as in 1969, there were less than two residents for each full-time employee (Mental Retardation Source Book, 1972). Since the overwhelming majority of employees are attendants, matrons and maintenance employees this number appears to indicate a high attendant-resident ratio. However, only attendants and the small number of special education staff should be regarded as those who might offer training to residents. Another factor that considerably lowers the ratio of attendants to residents is the single shift, five-day work week minus vacation, holiday, and sick-time leave; however, residents live in institutions 24 hours per day, seven days per week. (Butterfield, 1969.)

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According to the records of the Assistant Public Information Director of the Michigan Department of Mental Health, the total number of attendants working in the ten Michigan public institutions for the mentally retarded is 3,224, while the total number of mentally retarded residents living in these institutions is 8,514. (March, 1973 data.) Approximately half of the attendants are assigned to day shift (1612 attendants), while the other half are divided 2/3rds on afternoon shift (1075 attendants) and 1/3rd on midnight shift (537 attendants). Counting vacation, holiday, and sick time leave the average work week for the state employed attendant is about 4.4 days or 62 percent of a full 7 day week. Since residents are institutionalized 7 days per week and the attendants must be spread across the entire week rather than only 4.4 days, the number of attendants for each shift must be decreased by 38 percent; at Howell State Hospital, the state institution where the present study was done, there were 359 residents and 160 attendants. Table 1 shows the average attendant-resident ratio in whole numbers, corrected for shift and for work week, in Michigan institutions for the retarded and at Howell State Hospital. The attendant-resident ratio at Howell State Hospital is slightly better than the average Michigan public institution for the mentally retarded. In comparison to other states the mean attendant-resident ratio appears to be slightly below average. Michigan has 50.5 full-time staff per 100 residents in public institutions for the retarded in comparison to 57.3, the mean ratio for the United States (Mental Retardation Source Book, 1972).

Cleland and Swartz (1969) discuss the consequences of understaffing on the attendant's patience, energy and level of tolerance.

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Table 1. Attendant-Resident Ratios on Three Shifts: Averaged Across all Michigan Public Institutions for the Mentally Retarded and for Howell State Hospital.

	Day Shift*	After-noon Shift*	Mid-night Shift*	Day Ratio*	After-noon Ratio*	Mid-night Ratio*
Average Across all Michigan Inst.	999	667	333	1:8.5	1:12.7	1:25.5
Average for Howell State Hospital	50	33	17	1:7.1	1:10.8	1:21.1

*Corrected for the 4.5 day workweek for state employed attendants. (Information from Michigan Department of Mental Health, Assistant Public Information Director, Thomas G. Deloach, 1973).

> What occurs when he '(the attendent)' is overstimulated for long periods by countless patient demands is quite normal and something to which everyone is subject. When overloaded, even the most patient human being can become cross and irritable. Driven beyond reasonable endurance, physical restraint or even abuse may be resorted to by the harried employee seeking to restore reasonable stable conditions. Such an employee should cause the reader to consider employee turnover, why attendants sometimes seem only to want their patients to sit on a bench, and why attendants often think differently than top staff personnel. They do not really think as differently as most professionals believe, because professionals have too little awareness of the situation at the level of the ward. Under similar circumstances, physicians, social workers, psychologists, and nurses would all react the same way. (p. 220).

The authors suggest that to prevent this deterioration of morale and attendant's energy, an institutional administrator should adopt the policy of declaring a danger alert "quarantine" whenever the staff-resident ratio falls below recommended guidelines. Two sets of guidelines were cited:

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1. Accreditation Council for Facilities for the Mentally Retarded (AC/FMR) (Standards for Residential Facilities for the Mentally Retarded, 1971), strongly recommends that when living units are organized according to AC/FMR standards, the staff-resident ratio for 24-hour, seven day coverage of units by resident living personnel should be according to the following standards:

   a. for medical and surgical units, and for units including infants, children (to puberty), adolescents requiring considerable adult guidance and supervision, severely and profoundly retarded, moderately and severely physically handicapped, and residents who are aggressive, assaultive, or security risks, or who manifest severely hyperactive or psychotic-like behavior:

      First shift: 1 to 4
      Second shift: 1 to 4
      Third shift: 1 to 8
      Overall ratio (allowing for a 5-day work week, plus holiday, vacation, and sick time): 1 to 1.

   b. for units serving moderately retarded adolescents and adults requiring habit training:

      First shift: 1 to 8
      Second shift: 1 to 4
      Third shift: 1 to 8
      Overall ratio: 1 to 1.25

   c. for units serving residents in vocational training programs and adults who work in sheltered employment situations:

      First shift: 1 to 16
      Second shift: 1 to 8
      Third shift: 1 to 16
      Overall ratio: 1 to 2.25 (p. 35-36).

2. Industry's "span of control guide" which sets a ratio of one supervisor to seven employees is based upon experience rather than mere recommendations. This ratio, when generalized to institutions, would necessitate that, on a ward of 70 patients, there would be a force of 10 attendants or a ratio of 1 to 7. Whenever this ratio decreased on any ward on a given day beyond 1 to 10 a "behavioral quarantine" would be posted. "Undoubtedly," the authors say, "from the possible consequences given above, this situation itself can be as serious as smallpox." (p. 221).

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Professional Staff-Resident Ratio

Browning and Stover (1971) note that although some professionals deny it, the nursing and ward staff in most residential settings must assume primary responsibility for patient management and therefore for most effects of training treatments. Butterfield comments:

> Attendants are the main executors of institutional programs. They are faced with an incredibly wide array of responsibilities, ranging from being a substitute parent, janitor, and record-keeper to being part nurse, part physical therapist, part psychologist, and part educator. (p. 18).

He notes that only about 11 percent of persons employed in public institutions for the retarded are classified as professionals. The majority of these are nurses and teachers of all institutional personnel. Less than 2 percent are classified as social workers, psychologists, and psychiatrists. Butterfield (1969) further reveals that these professionals, as a group, are not among the most highly qualified in their fields. For example, many teachers, social workers and psychologists often have not completed the standard preparation program though most have an undergraduate degree.

In Michigan institutions for the mentally retarded, according to data obtained in March 1973 from the Assistant Public Information Director for the State Department of Mental Health, 54 professional teaching staff serve 8,514 residents. This ratio of 1 to 158 includes 8 teachers and principals without special education certification. Twenty-one speech therapists and audiologists, which include 4 nonprofessional audiological technicians, serve Michigan retarded residents

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on a 1 to 405 ratio. Neither the amount of education nor of speech services compares to that provided in community schools.

Preparation of Attendants as Resident Educators

In addition to the low proportions of attendants and professional staff to residents, another factor interferes with attendants providing training for residents in areas of self-care, language, behavior modifications, etc. Most attendants are not trained in the skills of special education, psychology, and speech therapy (Butterfield, 1969). Rather the traditional preservice and inservice training programs for institutional attendants include discussions, readings, lectures, and perhaps some supervised on-the-ward training in the areas of basic nursing skills. More recently, however, training time has been devoted in some institutions to skills of behavior modification and aspects of training the retarded in self care. (Bensberg, Barnett, and Hurder, 1964; Ashbaugh, 1971; Groves and Carroccio, 1971).

At Sunland Training Center in Miami, cottage parents were asked why such little training or stimulation was given to the young profoundly retarded residents. Their responses reflect common feelings among institutional personnel:

1. they had been told not to spoil the residents;
2. their job descriptions were to keep the residents clean, safe, and fed;
3. they had little extra time as there were constant housekeeping duties to perform;
4. there was not enough staff; and

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5. they felt that some of the residents could never learn, so training time would be wasted (Cortazzo, Bradtke, Kirkpatrick, and Rosenblatt, 1971).

Harmutz used a Behavioral Observational System which verified the informal feelings of institutional attendants recorded by Cortazzo, et al. After tabulating the categories of attendant behavior, and a rough frequency of their occurrence on a ward of 60 physically handicapped retarded children, Harmutz used a 12-button activated pen recorder to take an accurate running account of both duration and frequency of each of the behavioral categories listed below:

1. Physical care: washing, dressing, changing bedpans, giving drinks, changing diapers, etc.
2. Food activities: all the activities around feeding, i.e., getting food, preparing plate, feeding, etc.
3. Watching children: following assigned duty of watching children when out of their beds in the day room, on the porch, etc.
4. Medical care: giving medications, taking temperatures, changing dressings.
5. Verbal behavior I: talking to children.
6. Verbal behavior II: talking to other staff, visitors, volunteers, etc.
7. Paper work: reading and writing nursing notes, recording dates, looking at records, working in office on reports.
8. Playing with children: directly playing with one or more children. Play was loosely defined as engaging in entertaining activities of any kind.
9. Housekeeping activities: cleaning and picking up, making beds, folding diapers, working in clothes room, etc.
10. Transporting children: taking one or several children from one place to another (often off the ward).

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11. Lost time: this button was activated when the observers lost contact with the staff member under observation.

12. Non classifiable: the observed behavior did not fit into any of the categories available (p. 555-556).

Ten-minute observations were scheduled at random intervals overtime of day and day of week for each of the ward staff. The data collected reflected percentage of time staff engaged in each of the behavioral categories. When two behavioral categories occurred simultaneously both buttons were pushed yielding a total percentage over 100 percent.

The results in Table 2 indicate that a large amount of time was spent in housekeeping activities--most of which did not include contact with the children. In total, the non-child categories of paperwork, talking to other staff or visitors, housekeeping and lost time, made up 55 percent of the total time. The other half of the staff's time was spent with child-related activities: 24 percent with social interaction (talking with children, playing with children, and food activities) and 21 percent with nonsocial activities: (physical care, transportation of children, medical care, and watching children).

As Harmutz notes little child progress could be made as a result of attendant operated training programs when only 24 percent of their time could be devoted to these activities. Harmutz also suggests that the institutional expectations of complete reports, clean ward, etc. are those duties which perhaps are more visible and which are rewarded or which are reprimanded if not completed.

A possible solution to the problem of visibility is to employ the same principle to the benefit of the residents. If specific,

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visible, behavioral goals were set forth for the children's behavior and reinforcements of the staff were made contingent upon the child achieving those goals, no doubt this would effect a realignment of the staff time allocations (p. 557).

Table 2. Percentage of Time Staff Spent in Each Behavioral Category (Harmutz, p. 556, 1973).

Behavioral Category	Percentage of Time
Physical Care	12.7
Food Activities	15.0
Watching Children	13.9
Medical Care	.4
Verbal Behavior I	19.5
Verbal Behavior II	19.4
Paperwork	9.3
Playing with Children	7.6
Housekeeping Activities	36.5
Transporting Children	3.8
Lost Time	6.4
Nonclassifiable	.3
TOTAL	144.8

It has generally been true that despite the fact that attendants have more contact with residents on the ward than do any other group of institutional staff combined, Butterfield (1969) and Parker (1951) note that they typically have had no relevant specialized training as have nurses, teachers and social workers. Yet, as Keith (1972) remarks, "Any attempt to effect behavioral change within the retarded population requires that aides and others who deal directly with

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retarded children and adults must become teachers or facilitators, as opposed to custodians or guards (p. 44).

Motivating Attendants to Train Residents

Effective inservice training needs to be provided for institutional attendants which not only instructs them in techniques of teaching the retarded but also motivates them to use these techniques with residents. A number of researchers (Bricker, Morgan, and Grabowski, 1968; Distefano and Pryer, 1965; Ishiyama, Grover, and Paterson, 1966) have shown or discussed the importance of providing reinforcement to institutional staff as a means of increasing their involvement with the residents. Panyan, Boozer, and Morris (1970) recognized that even with intensive training the acquisition of self-help skills in the severely and profoundly retarded is still a gradual process. In their study the training performance of attendant personnel was reinforced by providing staff on four wards with a weekly posted feedback report of the number of training sessions conducted. The feedback sheets also listed the total possible sessions for training each skill, the number of sessions recorded and conducted, and the names of the staff members conducting the sessions. These feedback sheets, verified by intermittent check counts, were posted in conspicuous places in the institution halls for all to see. Rather than use a reversal design to analyze the effects of feedback, the design varied the length of baseline when no feedback was provided. This extended from 0 weeks on one ward to 4, 8, and 36 weeks on the other 3 wards. The results indicated that feedback sheets increased the percentage of training sessions conducted by the staff on

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Watson, Gardner and Sanders (1971) outline an extensive institutional ward inservice training program which not only provided attendants with skills they lacked in behavior modification, self help training (dressing, toileting, etc.) and social skills instruction (receptive and expressive language, play behavior, etc.) but also provided the attendants with reinforcement contingent upon their successful understanding and use of these new skills with residents on the wards. Three main sources of reinforcement were: (1) the authority and responsibility to make changes in the program goals and their implementation, (2) supervisor and peer recognition, and (3) time off from work. To resolve the staff shortage which often prevents the use of resident training skills once acquired, university students and volunteers, exposed to the same inservice training, were scheduled to assist on wards.

Methods of Inservice Training for Institutional Attendants

Bensberg, Barnett and Hurder (1964) regard the didactic nature of attendant training programs to be their major criticism.

> It is natural that we should teach the way we were taught. Consequently, whether a particular unit is taught by a nurse, a psychologist, or physician, too often the material is presented by lecture in technical jargon which has little or no impact upon the trainees (p. 149).

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They recommend an inservice training method which reduces classroom time and technical jargon, increases the quality and quantity of instruction on the ward, and uses ward supervisors as instructors with older employees as instructional assistants.

Burke and Rowland (1971) reported a method of inservice training employed to train institutional attendants of multiply-handicapped retarded residents which, though operated by noninstitutional special education consultants, did incorporate all the other recommendations of Bensberg et al., (1964). Their method was based on the following learning principles:

1. active involvement by the learner facilitates learning;
2. knowledge of results and reinforcement of success facilitates learning; and
3. opportunities to repeat and practice in the same and different situations facilitates original learning and its generalization.

Using a language development training scale, Burke and Rowland worked with attendants and residents during the feeding, bathing and dressing times to informally assess the language development level of the resident with direct testing and informal questioning of attendants. Depending on the type of care being given at the time of assessment, and the resident's language level, the consultants demonstrated a number of specific training procedures designed to stimulate further language development in the resident. Then, the attendant immediately imitated the training procedures while the consultant observed and provided verbal reinforcement to shape the performance of the attendant. Additional practice of the same and other training procedures was given to the

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attendant with the other residents in her care who either functioned at the same language level or at different levels.

McBride (1972) compared the observable changes in ward use of behavior modification principles by 44 institutional attendants trained either by traditional group lecture method or by an on-the-ward demonstration, shaping method (i.e., the Burke-Rowland method or the Active Response Inservice Training Method). The second group of attendants trained individually by experimenters were given verbal reinforcement for successive approximations in their use of behavioral language training procedures with their assigned residents. Since each attendant in this group was individually trained, the amount of time these attendants spent in training by the on-the-ward method was approximately one-eighth that of the traditional group method. The traditional group inservice method used lecture and group discussion plus some supervised ward experience with children from wards other than the attendant's own ward. Evaluation of both groups was done by tabulating, on a pretest, posttest basis, the frequency of particular behaviors related to behavior modification techniques and observed while the attendants worked on the ward during representative work periods. The categories of behavior tabulated included failure to use opportunity to reinforce, appropriate reinforcement administered, inappropriate reinforcement administered, acquired skills (appropriately ignores behavior; conscious change of a reinforcer; time out: appropriate; etc.), and counter-productive behaviors (verbal, punitive, derrogatory responses; inappropriate target behavior; physical punitive responses; etc).

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Posttest gain scores for both groups showed that there was no significant main effect for treatment. Rather than using simulated situations to test the relative efficiency of inservice training methods, McBride's design attempted to measure the real outcome of inservice training: the attendant's application of her learning on the ward. The failure to obtain significant differences can be interpreted to mean the attendants' environment needs to be re-structured so application of knowledge becomes feasible. Not only were the attendants overloaded with resident care and housekeeping duties, but, more importantly, when they did have some time, little or no reinforcement was provided by program administrators for application of inservice learning.

The Nonstimulating Environment of the Institution

Much has been written regarding the nonstimulating effect of the institutional environment upon young and older mentally retarded residents (McCarthy, 1969; Tarjan, 1966). Centerwall and Centerwall, (1960) compared a group of Mongoloid children reared in group placement foster homes (group P) to a similar group matched for age with the first but raised in their own homes (group H). Both groups remained in these two different environments for at least the first 2 1/2 years of life and all the children were eventually transferred to state institutions.

The results of the comparisons revealed that even after the first 2 1/2 years of being reared in different settings, a number of significant differences between the two groups were measurable at 2 1/2 years and at later ages. Children raised at home not only grew faster and weighed more when measured (age at measurement ranged from 4 years

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10 months to 12 years), but also walked at an earlier age. A most important finding, again favoring the group raised at home the first 2 1/2 years of life, occurred with a significant difference in IQ and SQ (social quotient) when children were admitted to the institution and was still measurable at an average age of 7.

Yarrow (1961) reviewed the literature on maternal deprivation written over the 1940s and 1950s including that in which institutionalization had been a major background condition. He ordered the institutional environments into several theoretically meaningful categories for the purposes of isolating specific research variables:

1. the physical environment--the quality and amount of sensory stimulation:

Confinement to cribs or mats for long periods of time, drab rooms, and small amounts of visual or auditory stimulation are evidence of conditions of deprived sensory stimulation occurring in many institutions.

2. the emotional environment--affective stimulation:

The neutral or bland emotional atmosphere of an institution where there is little intensity or variability of feelings often results in children not being exposed to strong negative or strong positive affective stimulation.

3. the social environment--social stimulation:

The low adult-child ratio in institutions studied averaged about one adult to ten children and resulted in little mothering; and, due to shift changes, the mothering that did occur was on an inconsistent basis giving children little opportunity to relate to

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a single person. The main times for contact with an adult come during eating, bathing, and diapering times. However, the quality of this small contact is often poor due to an overworked staff as noted by Farber (Cortazzo, et al., 1971).

> We passed through the nursery. Attendants were changing diapers. We watched one of the attendants. Mechanically, she pulled the child forward by holding on to both legs, flipped him over, put on fresh overalls, flipped him on his back, pulled him forward, and went on to the next without a smile, pat, or even a touch. The children's eyes seemed dead. Had nothing ever stirred them to life? But, no one seemed to have time to find out. Perhaps it was because there were so many to be cared for by so few. (p. 149).

This research on maternal deprivation is flawed by methodological inadequacies: bias in selection, inadequate description of institutions, and early maternal care, etc. Despite these inadequacies there is a consistent core of conclusions regarding the intellectual, social, and verbal development of persons with institutional backgrounds. First, there generally is a social retardation in the area of interpersonal relationships. This deficit results in social apathy--an indifference to social attachments and a lack of social initiative and sensitivity. Less often the research pointed out the phenomenon of "affect hunger" which is manifested by an insatiable seeking of affection.

Second, most studies found a general intellectual retardation which seems to be significantly related to the amount of individualized stimulation provided. There does seem to be unaminous evidence of deficits in the intellectual functions of abstract thinking, time and space concepts and language.

Retardation in the development of language skills was repeatedly found in infants and young children (Brodbeck and Irwin, 1946;

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Dupan and Roth, 1955; Fischer, 1952, 1953; Freud and Burlingham, 1944; Gesell and Amatruda, 1941; Rheingold and Bayley, 1959; Skeels, et al., 1938) and in children and adults (Bender, 1945; Goldfarb, 1945; Haggerty, 1959; Lowery, 1940). This retardation seems to result from inadequate language stimulation from the adults and peers in the institutionalized person's life. Generally there is little reinforcement for the infant's and child's vocalizations and, as a consequence, the opportunity for the child to develop the signal or expressive function of language is greatly lessened. Although imitative behavior has not been definitely shown to be a necessary prerequisite to language, its occurrence does encourage practice of sounds and words; the research reviewed by Yarrow (1961) showed that imitative abilities often failed to occur at the appropriate developmental period in the institutionalized child's life.

More recent research and reviews of literature support Yarrow's conclusions regarding the deficits in the development of language in institutionalized retardates (Blount, 1968; Denver, 1971; Keane, 1972; Spradlin, 1963b; Zisk and Bialer, 1967).

Language as Verbal Behavior

Siegel (1972) outlines three approaches to verbal retardation: (1) learning theory, (2) interpersonal approaches, and (3) linguistics or psycholinguistics. The present study operates within confines of the first approach: language is regarded as verbal behavior which is subject to the same principles as any other behavior. Language, used to refer to the speech and gestures of a speaker as well as the responses

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made by a listener (Spradlin, 1963a), is acquired in the context of a responsive environment. Learned behavior, which includes verbal behavior, as proposed by Skinner (1953, 1957) is described in terms of an antecedent stimulus (S) which sets the occasion for the response (R) to occur. The response in turn evokes other stimulus consequences (S^R). This arrangement is expressed:

S----------R----------S^R

Siegel describes the early stages of language acquisition in the context of the child's responsive environment. During the first stage the infant emits non-crying vocalizations which occur in the absence of any observable stimulation.

> We do not have precise descriptions of the child's vocal repertoire in these earliest months, but there are strong suggestions that the child comes into the world with, or soon acquires, an extensive vocal repertoire which subsequently contracts. In this first stage, the child's vocalizations do not appear to be systematically affected either by antecedent or subsequent stimuli. No systematic links can be drawn between vocal acts and the stimuli in the environment (p. 129).

Schematically this stage is represented by Siegel in Figure 1.

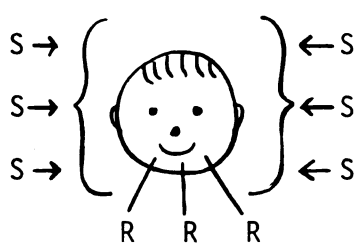

Figure 1. The Infant's Vocalizations are not Systematically Related to Specifiable Internal or External Stimuli (p. 129).

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From about three months on in the normal infant, social reinforcement becomes linked with vocal behavior and the infant's vocal patterns may be modified by the contingent social reinforcement provided in his environment; but, during this stage, infants do not seem to be under the control of the antecedent stimuli. However, research has shown that selective or differential reinforcement is possible at this stage. It is this selective reinforcement that results in the shaping of a child's verbal repertoire according to the phonemic system of his environment. This stage is schematically represented by Siegel in Figure 2.

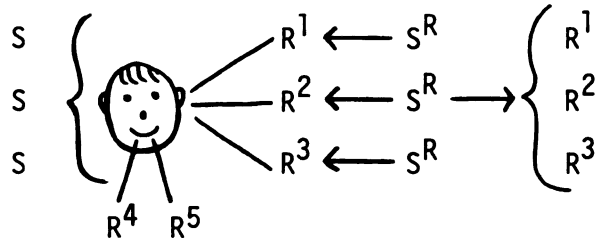

Figure 2. The Infant's Vocalizations are Differentially Reinforced (p. 130).

Finally the infant's vocal repertoire comes under the control of both antecedent and consequent stimuli (i.e., discriminative stimulus, S^D.)(Figure 3.)

> The antecedent stimuli assume increasing importance while reinforcement consequences become obscured in complicated patterns of conditioned reinforcement, stimulus-response chains, and self-reinforcement . . . . It is at this point that the child's responses may be designated as 'meaningful.' That is, they occur in the presence of appropriate setting stimuli or cues (p. 130).

Siegel then identifies three sources of variation which alone or in combination may retard language development: (1) variation within

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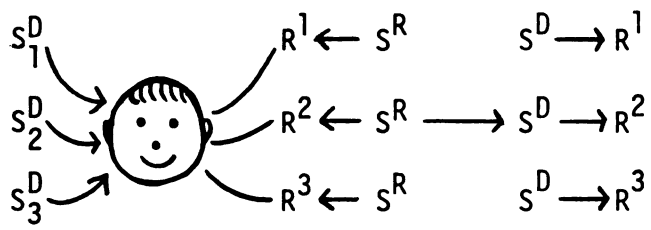

Figure 3. The Infant's Vocal Repertoire Comes Under the Control of Both Antecedent and Consequent Stimuli (p. 130).

the child as an organism, (2) variation within the initial setting or stimulation conditions for the child, and (3) variation in the reinforcement variables attendant on his behavior. The source of variation occurring within the child which may result in language retardation includes such disabilities or major pathologies as profound hearing loss or severe paralysis of the muscles in the speech mechanisms. "Though these are obviously 'organic' conditions," Siegel notes that, "it is helpful to think of them as conditions which affect the child's capabilities for interacting with his environment rather than as static attributes of the organism (p. 131.)" Deaf children with the help of hearing aides or with exposure to gestural systems of language, can still learn language by the same system of behavioral principles. Likewise, a person, unable to develop speech due to muscle paralysis, can learn a variant form of expressive language, perhaps manual signing.

Quality and quantity of verbal stimulation in a child's environment may be a source of retardation in that child's language development.

> To a great extent, speech appears to be modeled after the significant adults in the child's environment. It is not unusual to find that a child with a severe articulation disorder has a parent with a similar problem. If the opportunities to model speech are scarce,

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> or if the model is itself defective, disordered speech may develop. Or it may be that the kind of stimulation provided by the environment is somehow not properly matched to the child's behavioral propensities (p. 132).

Reinforcement is the primary means of strengthening and shaping appropriate language skills. Siegel notes that since there is little experimental evidence to specify the factors leading to delayed language, one often resorts to anecdotal evidence. Often in interviews with parents of nonverbal speech-retarded children the child is reported to have been quiet and without any "need for speech" during his early years. Siegel says that "in motivational terms this suggests that the child produced little verbal behavior, and that verbalization was not differentially reinforced over other methods for manipulating the environment (p. 131)." The mentally retarded child is delayed in his speech development but appears to follow the same sequence of development as normals (Blount, 1968). However, if the adults in the retarded child's environment are unaware of this predictably slow but orderly development they may "give up" on the child's speech and fail to notice and therefore to differentially reinforce the early language behaviors that do occur.

Another aspect of improper reinforcement which acts to retard language occurs when one portion of a child's environment reinforces verbal behaviors that are incompatible with the verbal behaviors being reinforced in another portion of that same child's environment. For example, an institutionalized child may be reinforced on the ward for silence or for echoic verbal responses while during language training sessions with a speech therapist he may be reinforced for gross vocal

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responses or for nonimitative expressive responses to questions. Depending upon the reinforcers and the length of the child's exposure to either environment, language retardation is apt to result.

Language training according to learning theory utilizes the principles of operant conditioning or behavior modification in that, according to Siegel:

> . . . it consists of the systematic application of reinforcement for responses that increasingly approximate some norm, and in the presence of appropriate cues. If the child has little or no verbal repertoire, the task is to develop the necessary prerequisite behaviors that will move the child toward at least minimal verbal expression. Initially, this will involve a concentrated effort to bring about any sort of reasonable vocal behavior through direct reinforcement, shaping, and perhaps the nurturing of an imitative repertoire along the lines described by Baer, Peterson, and Sherman (1967).
>
> If a child has the necessary responses, but emits them in inappropriate contexts, the speech program may have to concentrate on the antecedent control. A great deal of speech therapy is fundamentally concerned with the stimulus shift--bringing a response pattern into the context of appropriate stimulus conditions (p. 132-3).

Language Acquisition Training Based on Operant Conditioning Procedures for Lower Functioning Retardates

Research in the application of operant conditioning or behavior modification procedures with institutionalized and noninstitutionalized, moderately, severely, and profoundly mentally retarded persons are numerous and often demonstrate successful results (Gardner and Watson, 1969; Watson, 1967). Recent examples of these studies describe experimental modification of behaviors in areas of self help (Azrin and Foxx, 1971; O'Brien and Azrin, 1972; O'Brien, Bugle and Azrin, 1972), self abusiveness (Corte, Wold, and Locke, 1971; Smolev, 1971), language

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(Lawrence, 1971; MacCubrey, 1971; Kent, 1972) as well as in comprehensive programs which apply behavioral principles throughout the retarded child's entire day (Browning and Stover, 1971; Kazdin and Bootzin, 1972; Lent, 1967; Pizzat, 1973; Thompson and Grabowski, 1972).

Most of the behaviorally based language training programs to be reviewed next, including the one used in this study, follow the operating principle described by Yoder and Miller (1972):

> . . . the content for language training for retarded children should be taken from the data available on language development in normal children, and this content should be taught in the same sequence that it is acquired by the normal child (p. 11).

The linguistic studies that trace the developmental acquisition of language in the normal child (Bellugi, 1967, 1972; Bloom, 1970, 1972; etc.) must be consulted to provide the content and the sequence of instruction; while the behavioristic principles of operant conditioning are used to specify the instructional procedures which most efficiently teach that content (Gray and Ryan, 1973).

Research on Imitative Training as an Important Aspect of Operant Training in Retardates

Risley, Hart and Doke (1972) summarized operant language modification research and found an overwhelming emphasis placed on the importance of imitation in these studies. The reasoning for the importance of imitative training is explained as follows:

> Most behavior modification efforts are premised upon the effectiveness of the therapist's 'modelling' of the desired behavior in producing similar behavior from children. When such demonstrations are not effective--that is, when the child does not imitate--there

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> can be no hope for rapidly producing significant acquisition of new behavior. The alternative, shaping each new behavior by differentially reinforcing successively closer approximations of the desired behavior, while often necessary, requires a therapist (of considerable skill). Even then the shaping process is frequently slow and arduous. Consequently, the development of procedures to establish or to improve imitative responding has been a necessary part of operant behavior modification research (p. 107).

Hartung (1970), in his review of the research on verbal conditioning of nonspeaking children through imitation training, notes the sequence of skills often necessary to develop meaningful speech in children with no rudimentary speech and little or no attending skills:

1. the control and limitation of disruptive behavior;
2. the conditioning of attention and eye contact;
3. the development of motor imitation;
4. the transition from motor imitation to gross vocal imitation;
5. systematic shaping of vocalizations into vowels, consonant-vowel combinations, and/or words; and
6. the transition from imitation to naming.

Other research reviewed by Hartung and by Risley et al. (1972) revealed an alternate technique to develop imitative speech in children with some rudimentary speech: establishing imitative control over vocal responses already occurring in the child's repertoire. In this training sequence the first two steps above are retained and followed by

3. increasing the frequency of vocalizations,
4. introducing the experimenter's vocalizations as S^Ds for the child's vocalizations, and
5. and 6. same as in first sequence of training steps.

Baer and Sherman have done a large amount of work with motor imitation development in retarded persons. In an early study, (Sherman, 1965), an alternative procedure was developed to train motor imitative responses as a prerequisite to training vocal imitation in a subject

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possessing so few vocalizations that their differential reinforcement was difficult. Sherman then began to reinforce imitations of gross motor behaviors (raising an arm, etc.). Once motor imitation of novel gross motor behaviors occurred reliably, the imitative behaviors presented were closer approximations to vocalizations: open mouth, coughing, blowing out a match, blowing (without a match), unvoiced sounds, and finally a voiced sound. Once this initial repertoire of imitative sounds was produced and consistently reinforced, the retarded subject began imitating other sounds; later sounds were chained into words and other new, whole words then imitated. At other times Baer, Peterson, and Sherman (1967) used imitative chains of motor responses ending with a vocalization to encourage subjects to make the sometimes difficult transition from motor imitation to vocal imitation.

Baer, et al., (1967), Lovaas, Freitas, Nelson, and Whalen (1967), and Metz (1965) have trained children in motor imitation skills who have had no discernible imitation as a basis for the establishment of an elaborate imitative repertoire. Shaping procedures were used that involved complete physical prompts or "putting the child through" the desired action by physically guiding him and then rewarding the action thus prompted. Such complete prompts would gradually be faded out requiring the child to make successively closer approximations in his own imitation of the trainer's action. Baer, et al. used this procedure as part of the training to establish generalized imitation. Generalized imitation is said to occur when a person imitates novel behaviors which were never reinforced. These behaviors would continue to be imitated at a high strength as long as some of the other imitative responses in a training session were reinforced.

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McReynolds (1970) found that food and social reinforcement given on a continuous schedule during the acquisition of vocal imitative responses (vowel sounds and consonant-vowel combinations) in mentally retarded children increased the speed of initial acquisition. Social approval could then effectively maintain these imitative vocal responses.

As an effort to sequence the vocal imitation phase in the Language Acquisition Program, the LAP, (Kent, Klein, Falk, and Guenther, 1972) Guenther and Klein (1969) asked 33 institutionalized retardates under IQ 30 and between the ages of 11 and 17 to imitate a random list of mono and bi-syllabic nonsense syllable words using all the initial consonants tested in the early speech research (Poole, 1934). Words were taken from the list of 200 most likely spoken nouns (Kent, et al., 1968). Each response was reinforced with food; two changes per word were given if there was no initial response. They concluded that, in the institutional population tested:

1. the retardates were no more likely to respond imitatively to nonsense syllable stimuli than to word stimuli, nor were they more likely to correctly imitate the initial consonant in consonant-vowel nonsense syllables than in words. Therefore, they concluded, that in the teaching of vocal imitation to nonverbal retarded children, there appeared to be no rationale for the use of nonsense syllables. Also the words taught in the vocal imitative phase were those the child later was taught to produce functionally in the LAP.

2. Syllabification was more often correctly imitated in mono-syllabic words than in bi-syllabic words. Therefore, imitation of mono-syllabic words was sequenced to be taught before imitation bi-syllabic or word combinations.

3. There appeared to be a positive correlation among the three rank orders of correctly imitated consonants in nonsense syllables, in mono-syllabic and in bi-syllabic words.

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> And, upon inspection, these rank orders corresponded to those reported in the literature on normal developmental sequence of conconant sounds (Poole, 1934; Templin, 1957).

Therefore words trained in the LAP were selected whose initial consonants were among the first ten rank ordered consonant phonemes (b,h,w,m,p,n,k,j,g, and sh). Blanchard (1964) who studied the articulation growth patterns of 350 retarded residents at Pacific State Hospital supports Guenther and Klein's findings in that she found the sequence of development of consonant sounds in retardates between 8 to 15 years comparable to the sequence of development in normal children.

Research on Control of Disruptive Behaviors During Language Training

A number of techniques to decrease disruptive behaviors occurring during language training of retarded children have been researched. Common procedures used are extinction (withholding positive reinforcers following inappropriate responses) and time out from positive reinforcement (TO) (Lawrence, 1971; McReynolds, 1969; Risley and Wolf, 1968; Sloane, Johnson, and Harris, 1968). Disruptive behaviors (inattention, pushing stimulus objects away, tantrums, etc.) were usually eliminated by these researchers when all possible reinforcers for these behaviors were removed contingent on their occurrence. TOs ranged from removal of the child to a TO room for a short period of time to a mild TO: e.g., the trainer looks away from the child contingent on disruptive behavior.

Risley and Wolf (1968) found that TOs could be used to decrease disruptive behaviors once a child had spent some of the language

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training session sitting in a chair and had been reinforced enough to notice the absence of reinforcement during a TO. TO as described by Risley and Wolf is essentially a systematic mild punishment procedure implemented contingent on disruptive behaviors. When used in conjunction with the reinforcement of appropriate behaviors that are incompatible with the disruptive behaviors (attending, using objects to imitate, etc.) the disruptive behaviors usually are eliminated.

Lawrence (1971), in the training of 3 older, institutionalized profoundly retarded adults, did not find TO procedures effective in decreasing the disruptive behaviors they displayed (pushing away of items, head hitting, putting a foot on the table, table pounding, etc.). In her opinion TOs were too similar to the control procedures used in the resident's prevailing institutional environment. She found that they not only were ineffective but tended to have a negative influence on all behavior following the TO procedure. Therefore Lawrence changed her procedures and gave commands, presented new stimuli, or presented a variety of stimuli contingent on disruptive behaviors. For example, when the disruptive behavior of putting a foot on the table occurred she would give the command, "Put your foot down," which was reinforced contingently with the removal of the foot from the table. When items were pushed away by the resident Lawrence introduced a new item. Autistic-like behaviors of repetitive postural movements (block shaking, hand waving, etc.) were interrupted by touching the arm of the resident and then presenting a new task. It seems that the substitution of these procedures for TOs contingent on disruptive behaviors is behaviorally unsound. If consistently applied, the residents would learn to engage

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in disruptive behaviors when the task was too difficult or disliked by them, which in the long run would increase the frequency of the disruptive behavior.

McReynolds (1969) applied TO from positive reinforcement, contingent TOs were also implemented to function as negative reinforcers to increase the emission of the correct response as well as punishers to decrease the incorrect response. During these instances a TO was given contingent upon the continued emission of a formerly correct but presently incorrect response in imitation of the experimenter's model. (For example, TOs were given for the response "want pop," when the child already had demonstrated that the response "I want pop," was in his repertoire, i.e., "I want pop," had occurred at a 30-40 percent frequency in training). TOs were terminated contingent on the emission of the correct response (i.e., "I want pop"). In general these TOs not only rapidly decreased the incorrect responses that they contingently punished but they also increased directly the frequency of the correct response. McReynolds replicated the effectiveness of TO to decrease inappropriate responses and demonstrated the technique of using TO to increase correct responses.

The main disadvantage of TO procedures is that they require time away from the ongoing training program. Sailor, Guess, Rutherford, and Baer (1968) suggest a novel approach to controlling temper tantrums during experimental verbal training of retardates that eliminates this lost training time. Vocal imitation training was given to an institutionalized severely retarded girl who displayed frequent tantrums throughout the day. The words to be imitated during training were

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graded by the experimenters according to difficulty: number of words, one through four word responses, and number of syllables in each response. (Prior to the introduction of the tantrum control procedures the subject was successfully imitating comparable words at all levels of difficulty.) When disruptive tantrums occurred they were ignored, but following the tantrum, two opposite conditions were alternately applied contingent on the tantrums:

> Condition I and III: experimenter changed stimuli from high-difficulty to low-difficulty content for two trials immediately following the tantrum.
>
> Condition II and IV: experimenter changed stimuli from low-difficulty to high-difficulty content for two trials immediately following the tantrum.

Conditions II and IV both resulted in a decreased rate of tantrums thereby allowing more words to be introduced and imitated; however, these words, though new to the subject, were of less difficulty to her. Conditions I and III resulted in an increased rate of tantrums and far less vocalizations per session due to the longer amount of time spent in tantrums; however, the words imitated by the subject were of a greater difficulty level. The data seems to show that the subject's tantrums during conditions I and III served an operant function of reducing the difficulty of the stimulus units presented to her, and were therefore maintained at a high level of occurrence. During conditions II and IV, her tantrums seemed to serve only to increase that level of difficulty and therefore were greatly reduced. The experimenters argue that:

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> . . . the contingency between tantrums and consequent stimulus difficulty was the factor responsible for the control of tantrum rate achieved in this study, rather than prevailing conditions of stimulus difficulty or reinforcement density (p. 243).

These findings suggest an alternate procedure to TO for handling disruptive behaviors in retardates during language training; however, it seems that these results need to be replicated and refined further.

Research on Specific Aspects of Language Training

A large number of studies have been done to investigate specific aspects of training retardates in early language skills from techniques of generalizing verbal behaviors to another environment (Jeffery, 1972) to receptive training of adjective inflections (Baer and Guess, 1971). These experimental studies provide operant techniques which are then incorporated into experimental and nonexperimental applications of language training programs for mentally retarded persons.

Jeffrey (1972) investigated techniques to program the generalization of verbal responses from training sessions to the classroom--an often overlooked stage of language training programs. In training sessions a nonvocal, low trainable girl learned to imitate phonemes and to tact and mand pictures and objects at a high rate. To increase the probability that these behaviors would generalize to the classroom Jeffery

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2. implemented classroom practice through a self managed language training machine--subject was taught to put picture recording cards in a Language Master machine, label the picture recording her response, listen to her response and the prerecorded correct response, judge the correctness of her response, and sort cards accordingly into "good" and "not so good" piles,
3. trained peer trainers to use praise and to work daily with the subject on reviewing picture word cards, and
4. saw that the teacher was made aware of the subject's newly learned response which she then prompted and praised in the classroom.

The results revealed increases in four areas:

1. an increase from 41 percent to 95 percent correctly imitated phonemes, which was still maintained at this level when measured one month after training had terminated;
2. an increase in the subject's verbal response in the classroom during treatment (tripled baseline rate) which was maintained through the two follow-up measurement periods (1 and 3 months after termination of training);
3. an increase in the teacher's and classroom students' auditory discriminative stimuli directed at the subject (i.e., any verbal sounds directed specifically at the subject or class in general); and

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4. an increase in the teacher's or subjects' verbal consequences directed at the subject's verbal or nonverbal responses (any verbal sounds directed specifically at the subject or class which followed the subject's verbal or nonverbal responses within 5 seconds).

Jeffery's program was successful in substantially increasing and maintaining the rate of verbal responses not only made in training but also generalized to the classroom; the generalization program increased the auditory stimuli directed toward the subject by the teacher and class and the verbal consequences they provided for the subject's verbalizations.

Risley and Wolf (1967), in an often cited study, decreased echolalic speech in low functioning, nonverbal, institutionalized children and increased the use of functional speech. Behavior modification techniques used included

1. the elimination of disruptive behavior through extinction and TO procedures in conjunction with differential reinforcement of appropriate responses that are incompatible with the inappropriate responses,
2. establishment of control over imitation,
3. transition from imitation to naming,
4. expansion of the naming vocabulary, and
5. establishment of phrases and sentences.

Echolalic children sporadically and under their own control imitate words and phrases. This imitative ability, to be useful in

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language training, must be brought under the trainer's control. This is done by presenting a word repeatedly over a 5-second period and reinforcing the child whenever he says the same word following the model. Often the trainer may use a word frequently spoken by the child as a means of increasing the probability of an imitation; another technique involves increasing the pitch, intonation level, and loudness of the model. Both these techniques are deleted as soon as the child is reliably imitating the word. Another phenomena of training echolalic children, noted by Risley and Wolf, was the increase of other nonimitative speech with the establishment of imitation through differential reinforcement. This speech was decreased by waiting until the child was silent before introducing the imitative model so as not to reinforce self imitative and nonimitative speech with the next stimulus presentation. Once frequent imitation occurred (5 to 6 times per minute) extraneous behaviors of arm waving, turning in chair, etc. were extinguished and the presentation of reinforcement and imitative models was made contingent upon attending behavior.

The transition from imitation to naming involves changing the trainer's stimulus control from a word model to be imitated to a stimulus object and a question ("What is this?"), in the presence of which, a particular verbal response is made. Basically this stimulus control is transferred by a process of fading in new stimuli and fading out verbal imitative prompts. This process is represented by the following steps:

A. Vocal imitation:

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B. Transition from imitation to naming:

S^D_2 "What is this, say, 'train'."----------R^2 "Train."

S^D_3 "What is this, say, 'trrr.'" ----------R^3 "Train."

S^D_4 "What is this, 'tr'." ----------R^4 "Train."

C. Naming:

S^D_5 "What is this?" ----------R^5 "Train."

Much of the recent language acquisition research with retarded children has used these operant behavior modification techniques reported by Risley and Wolf (1967), with adaptations made to fit children without any rudimentary speech.

Barton (1970) modified the bizarre and inappropriate speech of a severely retarded institutionalized boy. Though the child's speech consisted of a large clearly articulated vocabulary, he frequently perseverated responses or answered questions with random or unconnected responses, with advertising jingles, or with other inappropriate responses. Behavior targets included the child's responses to magazine pictures and the experimenter's questions:

1. "Who, what, where is (that, doing _____)?"
2. "What, where (is, are) (he, she, it, they) (doing, having, playing, etc.) (here, there, on, in the_____)?" 9p. 300).

Only one question was asked per picture while 50 pictures were presented each training session. Appropriate responses were reinforced with praise and candy while all inappropriate responses were given a TO: closed and covered the magazine and experimenter turned away from the

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child for 10 seconds. The child's negative responses, "I don't know," were ignored.

The results showed that "simply by reinforcing appropriate or inappropriate responses, their numbers can be increased, almost to the exclusion of the unreinforced class (p. 304). Attempts were not successful to get the response class of appropriate answers to questions about pictures to generalize to general conversational questions about things and people not in pictures, Barton suggested that food reinforcers should have been faded out and social reinforcers put on an intermittent schedule prior to generalization testing where no reinforcement was given for appropriate responses. Also the five generalization tests, given throughout the training phase and following the training phase, did not have the variety of stimuli present during training but used the same 66 questions five times. This, along with the lack of reinforcement, may have made the generalization test so unlike training conditions that the child's newly learned appropriate responses would not generalize. Research is needed to more fully develop Barton's techniques of generalization training.

Stremel (1972) trained three trainable and severely retarded children with limited expressive noun vocabularies, in an operant language training program, to produce the basic grammatical relations, i.e., subject-verb-object responses. Three intermediate training goals were used based on Bloom's developmental data (1970).

1. action verbs and verb-object combinations
   a. receptive level: performing commands
   b. expressive level: answering questions ("What are you doing?")

c. expanded expressive level: giving verb-object responses in order to receive things or events ("Go bathroom," "Want drink," etc.).

2. Subject-verb combinations
   a. receptive level: pointing to pictures representing subject-verb combinations ("Point to 'boy run!'").
   b. expanded expressive level: answering questions about pictures with subject-verb responses (Q: "What doing?" R: "Boy run").

3. Subject-verb-object combinations
   a. receptive level: pointing to pictures representing subject-verb-object combinations ("Point to 'boy sit chair'").
   b. expanded expressive: answering questions about pictures with subject-verb-object combinations ("What boy doing?" R: "Boy sit chair").

The trainer always gave the child expanded feedback thereby providing advance exposure to the next response class to be trained. Such an example would be: trainer points to a picture and asks, "What doing?" Child responds: "Boy run." Trainer gives expanded feedback: "Boy run school." Tokens and pictures were used in a novel way to prompt expansion responses: V-O, S-V, and S-V-O.

Stremel's expansion of the child's responses made use of telegraphic speech rather than conversational or adult syntax speech. For example, adult syntax speech would state: "The boy is running to school," while the modified form of telegraphic speech would state: "Boy run school." Brown and Bellugi's research (1964) showed that the modified form of telegraphic speech characterized a child's first sentences. Miller and Yoder (1972) support Stremel's use of modified telegraphic speech in their recommendations that adults working with language retarded children should:

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1. reduce their syntax to telegraphic speech whenever possible while talking to the child;
2. expand and model utterances made by the child; and
3. talk to the child as much as possible about the things that are happening at the moment--'at a moment when he (the child) is most likely to be attending to the cues that can teach that meaning' (Brown and Bellugi, 1964) (p. 302, 1972).

Brown and Bellugi (1964) Miller and Yoder (1972) and Stremel (1972) state that this procedure prevents the need for the child to have to pick out from the adult syntax those forms or words which carry the conceptual meaning of the linguistic code, which the normal child capably does on his own. The language retarded child would then have the content words presented directly to him in phrases or two-word combinations. Kent et al., (1972) and the language program used in the present study, the MLAP, also used expanded feedback to the child during receptive and expressive phases. However, in both programs the feedback is given in adult syntax rather than in the modified telegraphic form, since it was believed that adult syntax feedback would be given with more natural expression and rhythm. More research is needed to determine which type of expanded feedback is best suited to the severely and profoundly retarded child.

Guess (1969) and Guess, Sailor, Rutherford, and Baer (1968) have done some interesting research in training severely retarded persons to understand and use plurals. Guess, et al., (1968) demonstrated positive outcomes to the following questions posed by Baer, Guess and Sherman (1972):

> Can vocal tacting behavior--specifically, labeling--be given a rule-bound grammatical organization, such that (the) child will use this rule to produce new instances of language which have not been directly trained, not previously modeled, yet exemplify the

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> rule? And the question continues: will the rule so produced have such organizing power that it will overturn or preempt any prior behavioral organization to which a label might have been subject? (p. 96).

A severely retarded girl was taught generative productive plural usage. After training, she was able to correctly label new single objects and object pairs in the single or plural without further direct training specific to those objects. After the contingencies were reversed (reinforcement of non-plural responses to object pairs, and vice versa), and after there was a corresponding reversal of the response by the child, the original correct usage of plurals was again recovered when the previous contingencies were re-implemented. During this time it was discovered that several plurals learned according to the reversed rule were then, without any direct training, corrected by the child according to the normal pluralization rule.

These results suggest, as with Baer, et al.'s (1967) research which demonstrated generalization of the "class" of imitative responding that it is feasible to train nonverbal severely retarded persons to develop a single productive language class, the plural morpheme, by imitation and differential reinforcement. According to Baer, et al. (1972) in additional studies:

> Our data demonstrate simplistically generative grammatical accomplishment in the case of adjective-noun phrases, noun suffixes, present tense/past tense usage, and the receptive transitional use of comparative and superlative forms of adjectives. Our subjects uniformly have been drawn from the ranks of institutionalized retardates who for many years previously have shown little or no linguistic skill or organization. Thus, Janet's study (Guess, et al., 1968) proves to be typical and prototypical. As a group, these studies then contribute to the context with which this argument opened: a rule-bound organization of language can be achieved in language-deficient children by techniques no more complicated

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> than reinforcement and imitation applied to a sequence of items which are no more than ordinary exemplars of the desired rule (p. 99).

In another study by Guess (1969) the performance of two retarded subjects indicated that their receptive comprehension was functionally independent of their expressive speech in the grammatical productive acquisition of the plural morpheme. This study suggests a position opposite to the traditional (i.e., that receptive comprehension is a prerequisite to expressive speech) in its implicated conclusions that receptive language and expressive speech could be two separate and functionally independent classes of behavior. However, more study needs to be done with larger groups and using research designs that allow expressive training prior to receptive training rather than using a reversal design.

Language Training Programs for Lower Functioning Retardates

Although a wide range of operant language training programs exist presently for retarded children only aspects of some recent ones will be reviewed (Bricker and Bricker, 1970; Gray, 1970; Gray and Ryan, 1973; Kent, 1972; McCarthy, 1969; McCubrey, 1971; Sailor, Guess, and Baer, 1973). An eighth program, the Language Acquisition Program, (Kent, Klein, Falk, and Guenther, 1972) upon which the present study's Modified Language Acquisition Program is heavily based, will be covered in more detail.

Different researched applications of Gray's (1970) and Gray and Ryan's (1973) comprehensive and rather complex language program

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have been successfully done with populations of young language delayed children (3 to 4 years delay), trainable and severely retarded children, deaf and hard of hearing students and bilingual children. In addition Gray and Ryan (1973) collected data on the effectiveness of paraprofessionals versus professionals trained in using the program, in terms of the percent of correct child responses and the total number of responses per child per session. The results indicated that there was no drop in the accuracy of the training when done by paraprofessionals but the professionals' responses per child were 28 percent higher than that reported for paraprofessionals. However, this difference tended to disappear when aides were working with the program as often as teachers--more than once per week.

Basically the program's delivery system was a behaviorally based one of "programmed conditioning" which incorporates branching as the process whereby the teacher used additional instructions and branching steps to help a child who was having difficulty on a particular programmed step. The content of the training is based on the sequence of normal language acquisition. Not only are content words taught (i.e., those with concrete referents) but also function words (articles, prepositions, auxillary verbs, etc.) which provide grammatical context for the content words.

The child is trained at appropriate levels in the program based on the results of the Programmed Conditioning for Language Test (PCLT). This test operates on the premise that when asked to repeat a sentence, a child will use only those constructions which he himself has in his language structure.

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> Thus, if you asked a child who did not have "is" or the article 'the' to repeat the sentence 'the ball is on the table' he would say 'ball on table.' Although this is not a formal, standardized test it has been found to be a valid and useful tool for our purposes. (Gray, 1970, p. 115.)

Gray and Ryan report that the PCLT has accurately placed children in the language curriculum over the past eight years of use with the exception of the echolalic and the bilingual child. Both of these types of children are so skilled in imitation that they may score high on the test when in reality their daily use of the language forms is quite limited. After the PCLT is given the first tested program failed is used as the starting point for training. Before training begins, a specific criterion test is given on the particular grammatical form to be taught. The criterion tests are re-administered to evaluate progress in training.

Modeling of the correct response is a procedure frequently used to prompt the child in making the correct response. Group training is recommended as a means to avoid overtraining to allow benefit from the modeling hypothesis (Bandura, 1969): children learn from observing other children. Tokens paired with social praise are commonly used in this program. Also a behavior management system which relies heavily on a token economy has been used with the program. Gray and Ryan's program seems to be geared to children with some imitative skills (child can imitate vocal prompts), attending (child can sit at training table), and receptive understanding skills (child understands "Are you ready to work?" "Sit at your desk," or "When you are ready to work, raise your hand," etc.). For these reasons, this particular program may serve as an excellent supplement to others (Bricker and Bricker,

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1970; Kent, 1972; Kent, et al., 1972; Sailor, Guess and Baer, 1973), which begin at the more elementary levels of training the prerequisite skills of attending and motor and vocal imitation.

The next three studies were done in institutional settings. The first two dealt with the language training of mongoloid subjects (Buddenhagen, 1971; MacCubrey, 1971) while the third used attendants to train severely and profoundly retarded infants and young children (McCarthy, et al., 1969).

In MacCubrey's study, eighteen trainable mongoloid subjects with CAs between 4-6 and 7-10 and MAs of two years were matched for MA and CA and divided into three groups. All were drawn from one of two institutions and possessed some ability to produce speech. Groups I and II lived in a separate research facility for the 7-week experimental period while Group III remained in their institution, without treatment, as institutional controls. During the seven-week experimental period Group I received verbal operant conditioning in daily group sessions and Group II received daily activities of a traditional preschool sort (for children of their MA) without conditioning and separate from Group I. Verbal operant conditioning sessions included the procedures of shaping and fading-in of nonverbal prompts to elicit functional speech used for object and picture naming, descriptions of action pictures in word combinations, and discrimination of colors and polar opposites.

Pre- and post-experimental evaluations were made with two language measures, an IQ measure (Stanford-Binet) and a social rating scale. Although significant positive changes were noted for Group I

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on the Stanford-Binet and the language measure, these results must be interpreted with caution due to methodological problems of design and statistical analyses used by MacCubrey (i.e., confounding of group, teacher and institution with treatment, insufficient matching substituted for random assignment, etc.).

Buddenhagen (1971) gave intensive individual training to four nonverbal institutionalized mongoloid children. The general strategies for training involved:

1. phonetic analysis or assessment of the S's entry behavior to determine which components of the S's extant repertoire could serve as a basis for a beginning and lead most rapidly to viable speech;
2. providing social and material reinforcement for successful responses; and
3. providing a context which made the S's responses appropriate in terms of meaning or content (p. 34).

All four children exhibited a variety of behavior problems (fighting, stereotypic behaviors, masterbating, etc.); these behaviors were generally treated by positively reinforcing appropriate behaviors which were incompatible with them, occasionally time-outs were used. CA ranged from 7 to 13 while all four subjects functioned in the severely retarded range.

Since the entry behavior of each child was quite different and all training was done individually, Buddenhagen describes the project as four separate experiments in verbal conditioning. Generally though, Buddenhagen tried to establish in the subjects a verbal repertoire that would have great utility in the cottages in which the subjects resided. Mands, such as "I wanna drink," "I want more," etc.,

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were considered to have greater probability of being maintained on the wards because they provided pleasant consequences for the resident when the requests were granted and were independent of specific antecedent verbal behavior by the attendants (i.e., "fine," or "O.K.," are valuable only when uttered in appropriate contexts of the antecedent verbal stimuli of "How are you?" or other similar questions). Each of the four reports incorporates the basic operant procedures already reviewed; however, they are valuable for their detailed accounts within an applied experimental setting. Buddenhagen's conclusions tend to reinforce prior research with nonverbal retardates:

1. A child's history of non-talking can readily be reversed if appropriate changes in the child's human environment are effected . . . (p. 160);

2. Mongolism need not decrease the child's potential for profiting from speech training;

3. Age per se does not seem to be related to the amount of success from operant speech training programs;

4. In order for shaping of vocal responses to occur attending skills must be present in the subject. Visual attending generally guarantees auditory attending and permits the observation of the visual aspects of vocalizing;

5. Aversive controls administered by the experimenter greatly reduce the reinforcement value of experimenter-produced praise, applause, and similar manifestations of approval (social reinforcement, p. 163);

6. Social reinforcement alone is generally insufficient to maintain the trained vocal performances of nonverbal children;

7. Use of vocal imitation to establish vocal repertoires in nonverbal children is an effective and efficient technique; and

8. Interverbal chaining or linking together of dissimilar syllables should be done prior to bringing the single syllable or replicated syllable response to a high strength.

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McCarthy, et al. (1968) used institutional attendants to train and informally assess progress of 55 severely and profoundly retarded infants in the developmental areas of language, social, gross and fine motor skills. Training procedures incorporated behavioral principles of positive reinforcement of successive approximations towards goal behaviors and prompting to initially encourage a desired response. Using the children they worked with daily, ward attendants were instructed by psychologists and special educators in the methods of informally testing and assessing the four developmental areas outlined by Gesell. Attendants were provided with training materials, kept daily notes on the progress of those they trained and were equipped with Treatment Card Decks which outlined

1. the developmental task,
2. a test of the ability to perform that task,
3. the normative age level at which successful performance of that task could be expected, and
4. a suggested means of teaching that test task.

In the language area the developmental tasks taught by the attendants ranged in normative age from two to 48 months. This area included tasks in a serial order such as: evidencing a response to another's voice, selected responsiveness to vocal output (e.g., one's own name), vocal imitation, following verbal directions, evidencing the meaningful use of words, naming objects, etc.

Results at the end of one year showed significant gain ($p<.05$) in the treatment group over the group receiving regular institutional care. This gain was still significant in the remaining 30 subjects at

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the end of three years. Generally the most consistent gains came with training in the language development area. These results are important for two reasons: paraprofessionals were able to provide a treatment which, even when applied directly on the ward setting (during the third year only), resulted in significant developmental gains in low functioning infants; in addition, this extra training was done with the same staff-resident ratio as was present during the control periods.

Bricker and Bricker (1970) described an operant language program for the severely language-handicapped child which emphasized the importance of establishing hearing levels of children prior to training. Recent surveys estimate that approximately 20 percent of the institutionalized retarded population exhibit hearing losses for speech reception threshold of twenty decibels or more (Siegenthaler, 1970). Meaningful hearing tests given in the standard ways are generally difficult to administer to severely retarded speech deficient children. Therefore, operant audiometry procedures are implemented by training the child to perform the skills sequentially listed below:

1. behavior control;
2. establishment of a button pressing response to sound/light stimuli;
3. establishment of behaviors needed to cooperatively wear head phones;
4. reestablishment of the button press response to sound/light stimuli with the sound coming from the headphones;
5. fading out the light stimuli (establishing tone control at 100 Hz. or greater if responding becomes unreliable);

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6. generalization of tone control across frequencies (250 through 6000 Hz);
7. generalization of tone control across intensities (by changes of 5 to 10 dBs); and
8. standard pure-tone audiometric assessment.

This operant training allows a standard audiometric test to be given to a child incapable of making a verbal response but capable of a button pushing response, contingent on sound stimuli from earphones.

A more recent language program by Bricker (1972), still in the process of completion, has 24 subprograms each with complex step-by-step procedures. The program begins with audiometric evaluation, and training of attending and imitative skills and extends to meaningful sentence production.

Sailor, Guess, and Baer (1973) have developed an impressive and comprehensive language training program for retarded and/or speech deficient children which has four main targets of emphasis unmet as yet by other language programs, except perhaps Bricker's (1972) and Kent's (1972). These are

1. A comparison of various operant techniques of training a single pre-language or early language skill (i.e., vocal imitation has three main training sequences which have all been successfully demonstrated);
2. Research as to whether any of the children's preexisting vocal or verbal characteristics predict their differential responsiveness to these techniques,
3. A behavioral language program which has detailed sequences for taking the nonverbal, nonimitative child to a thoroughly useful level of language competence, and
4. A language program which contains elements designed to enhance the child's transfer or generalization of language behaviors to nontraining situations (Sailor, 1972).

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The program is organized into four dimensions of language: reference (labeling), control (manding or requesting), self-extended control (manding further instruction in the case of specific unknown referents by asking "What's that?" or "What are you doing?"), and integration (includes the act of combining the language skills taught in reference, control, and self-extended control). Content taught in each of these four dimensions extends from persons and things and actions with persons and things, into extension of a basic verbal repertoire with content in the verbal skills of understanding and expressing possession, color, size, and relation.

Kent's latest revision of the Language Acquisition Program (LAP) (1972) is based on extensive research and appears to have targets similar to Sailor, et al.'s (1972). The revised LAP has added advanced receptive and expressive levels of training which include aspects of counting and color and shape sorting and naming. In addition, Kent has introduced a noncriterion training procedure where trainees are given advanced exposure to new tasks in later parts of the program on a noncriterion basis. This has been found to facilitate later training to a criterion level of performance.

The original LAP (Kent, et al., 1972) was developed at Fort Custer State Home and Training School in Michigan. The LAP also includes a preverbal and verbal section. The preverbal section emphasized the acquisition of attending behavior, motor imitation, and vocal imitation, while the verbal section trains the receptive linguistic repertoire and a prelinguistic expressive repertoire. The program is further organized into phases and each phase into parts. Initial

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inventories are given to the child by the experimenter or the attendant prior to training each part. The child is then trained on that part until he meets criterion on the final inventory.

The attending phase is prerequisite to training in all other phases. It consists of teaching the child to remain seated, to look at objects on command, and to establish eye contact with the trainer.

After completion of the attending phase, motor imitation training begins. During this phase the child learns to imitate specific manipulations of objects and movements of body parts.

The child may then proceed to the vocal imitation phase, or simultaneously receive this training plus basic receptive training. This is because no vocal responses are needed in the receptive phases. Vocal imitation tasks range from merely vocalizing when the trainer vocalizes to vowel, word, and phrase imitation. There is no final criterion for this phase since the trainer continues to expand and refine the vocal skills of the child through vocal imitation training while also giving training in the verbal section of the program.

The verbal section consists of four phases: basic receptive, receptive expansion, basic expressive, and expressive expansion. There are matching parts in each phase which represent what are assumed to be hierarchies of linguistic or prelinguistic complexity. The child is trained in progressively more complex ways to respond to familiar objects, to verbal stimuli which refer to objects not immediately present, to certain body parts, to room parts, and to action words.

In the basic receptive phase, the child is trained to respond to a number of simple verbal commands such as: "Touch the shoe," "Show

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me the table," "Show me your eye," and the child also learns to respond appropriately to action words such as "Jump," "Sit."

During the receptive expansion phase, the key words learned by the child in the basic receptive phase are reused in verbal directions which involve two key words rather than one. For example, the child would be trained to respond to: "Put the ball on the table," and "Touch the baby's nose."

During the basic expressive phase, for which some vocal imitative abilities are required, the child's response changes from a motor response of touching, pointing, or doing, to a vocal word response. The child learns to name the same objects, room parts, body parts, and actions receptively learned in the basic receptive phase. The child is taught to respond to questions such as, "What is this?" as the trainer points to an object, or the question "What am I doing?" as the trainer performs an action.

In the expressive expansion phase, the child is trained to respond verbally to more complex questions using the same key words and relationships as in previous phases. For example, he learns to respond appropriately to questions such as: "Whose hair is this?" as the trainer points to the child's or a doll's hair; and, after the trainer has placed a particular object in a particular place, the question "Where is the shoe?" is asked of the child.

Throughout training, the techniques of shaping, physical and imitative prompting, and fading are used by the trainer to evoke from the child the criterion response levels needed for each part and phase of the program. Shaping procedures for new responses do not exceed 40

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Appropriate concrete reinforcers for each child are determined prior to initial testing. Generally, once a child has learned attending skills, he receives token training and is placed on a token reinforcement system. The particular token system used in the LAP, as in the MLAP, is one which does not assign a particular value to each token but one in which tokens are freely given with social reinforcement to reinforce appropriate responses from the child and exchanged at the end of each training session for a single choice of food, drink or toy play (music box, talking pull toy, etc.).

As with the other programs reviewed, both the LAP (Kent, et al., 1972) and the revised LAP (Kent, 1972) use behavioral principles to teach a small-stepped sequence of skills taken from the data available on language development in the normal child.

Using Peers as Helpers, Behavioral Engineers, and Tutors in Classrooms and Institutions

Utilization of Normal Peers as Change Agents for Special Education Students

The "helper" therapy principle of using peers to assist other peers in improving academic skills or modifying deviant behaviors is an old practice which is still applied informally and in more scientific ways in public school settings (Gartner, Kohler, and Reissman, 1971;

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Reissman, 1965). There are numerous recent examples of the successful use of regular class students as behavioral engineers and tutors for younger children with behavioral and/or academic problems (Surratt, Ulrick, and Hawkins, 1969; Willis, Crowder, and Morris, 1972) as well as for students within the same classroom (Conlon, Hall, and Hanley, 1972; Davis, 1972; Harris, Sherman, Henderson, and Harris, 1972; Patterson, Shaw, and Ebner, 1969). In addition, a large number of studies report the effectiveness of regular classroom students assisting as tutors or behavioral engineers with students in special education classrooms for the mentally retarded, the emotionally disturbed, and the physically handicapped (Csapo, 1971; Doorlag, 1970).

Doorlag (1970) systematically examined all programs in Michigan using regular class students as assistants to educational programs for the retarded, the disturbed and the physically handicapped. His extensive findings are joined below with the conclusions and findings of the other studies reviewed.

1. Teachers who have worked with regular students as classroom assistants were highly supportive of the student assistant idea.
2. The student assistants were utilized primarily in the instructional portions of the classroom program rather than in the clerical and supervisory aspects.
3. Student assistants were judged to be capable of performing instructional tasks in the classroom.
4. Teachers generally believed that the use of student assistants improved the educational program for handicapped, academically delayed, and disruptive students.
5. The students utilized as behavioral engineers or tutors were believed as well as shown to have made personal and/or academic improvements themselves.
6. Students used as behavioral engineers or behavioral change agents were reported not to have acquired through contagion the inappropriate behaviors of the students they modified.

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7. Student assistants used as behavior change agents can produce behavioral changes in disruptive regular class students and in emotionally disturbed students in special education classes.
8. Student assistants used as tutors with academically delayed students were judged or shown to have a positive effect upon the academic performance and attitudes of students tutored.
9. The administrative problems encountered in conducting student assistant or student behavioral engineer programs were not regarded as significant or extensive enough to discourage the development of problems to the teacher of the assistants themselves.
10. The student assistant programs were judged to be effective in all special educational classrooms examined regardless of the handicap the students had, their academic level, or the academic level of the student assistants used.
11. Service as a student assistant was reported to facilitate the recruitment of potential teachers into the special education field.

Utilization of Retarded Persons as Helpers, Substitute "Mothers" Trainers, and Behavioral Engineers of Other Retardates in Classrooms and Institutions

Retarded persons have also been used in a variety of "helper" roles in institutional settings and in special education classrooms. The usual role in institutions has been as assistants to attendants in resident care and housekeeping tasks (Cleland and Swartz, 1970; Ayllon and Azrin, 1968). Less often the retarded have served other retardates in the instructional roles of "substitute" mothers (Houglan, 1963; McKinney and Keele, 1963), behavioral engineers (Kazdin, 1971; Gelfand, Gelfand, and Dobson, 1967; Whalen and Henker, 1969, 1970), or as trainers of self care skills (Dilley, 1969), language skills (Jeffery, 1972; Whalen and Henker, 1969, 1970), and reading and writing skills (Brown, Fenrick, Klemme, 1971).

A recent survey (Cleland, Swartz, Drew, and Talkington, 1972) of attendant attitudes towards working retarded residents (student

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helpers, SH) in an institution revealed some response trends. These SHs worked in resident care and housekeeping tasks only. A significantly larger proportion of the 46 attendant responses indicated that attendants on both the SH's home ward and their work ward

1. regarded SHs as less aware of the needs of the children than they were,
2. reported that SHs were less apt to discuss with them the nonambulatory residents they worked with,
3. reported that conversational topics the SHs discussed were:
   a. least often: "wanting to do a better job of caring,"
   b. more often: "wanting a different job," "difficulty in helping patients," or "messiness of patients,"
   c. most often: "when do I get paid?", and
4. indicated that SHs, if it were possible, would not be used by them as babysitters.

Generally, the survey indicated high agreement on questions about SHs from attendants on home ward and work ward. But whenever a response dissonance did occur on individual SHs, the work ward attendant was the person most often sought out by the SH.

> These results suggest that a more responsive relationship, or one of differential reinforcement, exists between SHs and their work-dorm attendants than their home-dorm attendants. Conceivably this is a function of the SH feeling more important, and meaningfully participating, on the work-dorm than on the home-dorm setting (p. 34).

An additional factor influencing this relationship was that the SHs were paid only by the attendants on the work ward and never by the home-ward attendants. The authors suggest from the results that although a comradeship may develop between the attendant and the SH,

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there is always the interferring factor of job competition:

> For example, pessimistic attitudes may arise because of attendant and SH job similarity; hence, if attendant attitudes toward retardates are to be changed, removal of the SHs from a quasi-attendant (and perhaps competitive) role into different jobs is a move that could excise a persistent barrier to communication between professional and attendant staff (p. 34).

This survey points out the difficulties of placing retarded residents into the unstructured helper positions of resident care and housekeeping duties, i.e., resident-attendant competition and a high level of negative job attitudes held by residents. Other work roles that have been reported in the literature do not seem to evoke competitive or negative feelings but rather more therapeutic benefits for the retarded person. Perhaps this is because each study or project had clearer job descriptions, prework training sessions, initial job supervision fading into support--supervision, and reinforcement for success.

In McKinney and Keele's study, educable and trainable adult women were given general instructions to "mother" two severely retarded boys four hours per day for one month. "Mothering" consisted of increasing physical attention given to the boys by assisting in their routine care, playing with them, teaching new skills and words, and initiating physical contact. After 200 hours of such treatment, the children demonstrated significant increases over a control group in factors of purposeful and verbal behavior and significant decreases in factors of social behavior and random activity.

Another similar but nonexperimental project reported by Houglan (1963), instructed high-functioning retarded women and men to be patient aides in an institution for the retarded. Houglan's project gave

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specific assistance in caring for the young and bedridden residents as well as in bedmaking and dishwashing. The retarded aides received classroom instruction in their tasks and earned coffee breaks and some status because of their new roles. In addition, some resident aides were used to teach new groups of aides the skills of bedmaking, etc. Attendants were carefully selected to supervise and train the residents. Problems of job competitiveness with other attendants occurred initially but it seemed that the specific definition of patient training aide duties as well as the pretraining and follow-up supervision each received acted to subside complaints and promote the acceptance of the aides.

In another nonexperimental project, Dilley (1969) taught retarded female residents to be "big sisters" to profoundly retarded women and to provide instruction in toileting, dressing, and eating skills. The results indicated to the author that mildly and moderately retarded residents can successfully train lower functioning residents in self care skills. Dilley reported that the "big sisters" benefitted also: behavior problems decreased and appropriate social behaviors and outward aspects of self concept increased.

Serving as behavior therapists, modifiers, or engineers is another role that has been filled by retardates. In a ward observation study (Gelfand, et al., 1967) in a hospital for retarded and psychotic patients, it was found that the patients themselves, over nurses and attendants, were the best unprogrammed behavioral engineers towards patients. That is, patients on their own ignored more often the inappropriate psychotic behaviors of other patients, i.e., 79 percent of the time in comparison to 64 percent for attendants and 39 percent for

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nurses; and, the patients also did well in reinforcing prosocial patient behaviors (56 percent of the time) though nurses reinforced more often (68 percent) and attendants less often (44 percent).

Kazdin (1971) went a step further and programmed retarded adults to serve as behavioral engineers in an institutional sheltered workshop setting. A token reinforcement system was utilized in which each client was assigned a particular color. Two clients with low verbal repertoires were given the color-coded tokens daily and instructed to reinforce each other for talking to clients during the day. In addition, other clients gave them tokens for engaging in conversation. Talking with others increased with this contingency in operation. Another client, with self-controlled poor posture of the head and neck, was given tokens daily to reinforce his peers whenever they praised him for good posture. A fourth client who talked only to himself was given tokens by other clients for talking and gave tokens to those he talked with. Kazdin found that using peers as behavioral engineers rather than only staff seemed to offer the following advantages:

1. Reinforcement could be given more often;
2. When reinforcers were given only by staff, the staff came to serve as the only discriminative stimuli for the increase or decrease of the target behavior, while peer-administered contingencies tended to generalize the target behaviors throughout the workshop and across the workday;
3. Using clients as behavioral engineers appears to be rehabilitative and therapeutic to clients themselves in that they gain a greater awareness of desirable behaviors;
4. By giving clients a greater role in the social milieu of the institution the authors felt that some of the negative effects of institutionalization might be undone; and
5. The staff had more time to effectively supervise.

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In classrooms for the trainable mentally retarded, students have been effectively used as trainers of their peers. Jeffery (1972) trained two students in two 20-minute sessions to review picture cards with low-verbal students. They were taught to praise the student for correct responses while repeating with prompts the cards on which incorrect responses were made. In Brown, et al.'s (1971) study a teacher and teacher aide in a trainable classroom taught students using the following sequence of instruction to be reading and writing trainers.

1. Two students were taught to read two different lists of words.
2. These students were instructed in a specific procedure to train others in reading the words each had learned.
3. The two readers formed a team to train other classmates in reading the words they had learned.
4. Four students worked in pairs to conduct group word review sessions;
5. Practice in writing words students could read was done in pairs with peers giving each other feedback on quality of handwriting.

Training procedures used by students included specific verbal presentation commands, reinforcing feedback for correct responses, imitative prompting of incorrect responses, recording of all responses onto data sheets, totalling of correct responses at end of sessions, and entering totals on progress charts. These training procedures were slowly modeled by the teacher aide. Then, as the trainers tried implementing the procedures, the aide's verbal guidance was slowly faded out, being completely eliminated by the end of the fifth, seventh, or sixteenth session depending on the type of training. Both group and individual training was done by the retarded trainers. Training results revealed student learning gains at every level of instruction as well as a noticeable increase in the level of motivation for learning in the classroom.

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A series of studies by Whalen and Henker (1969, 1970) have sophisticated this use of retarded trainers by teaching them to use operant and imitative techniques as the method to train nonverbal, low-functioning children in attending, in motor and vocal imitation, and in following simple vocal directions. The five trainers, all females with a mean CA of 19 and mean IQ of 55, were trained over a 4 1/2 month period. They were taught to decrease disruptive behaviors, to train attending skills, motor imitation, vocal imitation, receptive understanding of simple commands, to use techniques of prompting and fading of prompts, and to give tactual, verbal and tangible praise contingent on appropriate responding. Rather than use a standard task sequencing strategy, trainers were taught to attend to and incorporate the student's spontaneous behaviors. Therefore, tasks were changed when the child initiated other appropriate responses.

The ten ambulatory trainees or students had a mean CA of 7 years and a mean IQ of 30. Final selection included only those who had been heard to make sounds and who were able to imitate one response after a 15 minute training session with the experimenter.

The design used a matching procedure whereby two trainees of the same sex and almost equal CA and IQ were randomly paired with each of four trainers and one trainer was nonrandomly paired with two trainees. Next, one trainee in each pair was randomly assigned to a training-play condition and the other to the play-training condition. During the training condition all the reinforcement and modeling procedures learned by the trainer were used with the child. However, during the play condition, which acted as a control period, trainers were

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instructed to play with, not teach their child and to give food on a noncontingent basis. During Phase I the training-play condition lasted 60 sessions. This was followed by Phase II which consisted of 60 sessions of the play-training condition where each child's treatment was reversed by his trainer.

Whalen and Henker used various methods to teach the retarded trainers. Much verbal instruction, some peer modeling and occasional demonstrations were used by experimental staff. Often as a trainer from a former pilot study worked with the new trainer, the experimenter watched and provided a running explanation. Depending on the skills of the trainer the experimenter withdrew physically between the third and the eighteenth session to an observation room where viewing was done through a one-way mirror and needed instructions and trainer praise were given over an intercom. When new procedures were necessary, the experimenter reentered the training room, gave the instructions for a few trials, and returned to the observation room. Play sessions were also observed from this room and trainers were reinforced over the intercom for playing rather than teaching the child.

Trainers were encouraged to observe other trainers at work as a means of additional instruction through modeling. Task order was loosely controlled by the stimulus materials provided for each session. One trainer, who could read, used a foot pedal-controlled slide projector with slides of commands to be given to guide the order of task presentation. In addition to staff praise, trainers were paid for their jobs and allowed to have coffee breaks with experimental staff.

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During the second phase of 60 sessions the conditions were reversed for trainees with trainers teaching the child formerly in the play condition and playing with the child formerly in a teaching condition. In this phase staff demonstration and feedback were drastically reduced so as to test trainers' ability to generalize their skills to their other child.

Each child was measured on a Social Behavior Test consisting of the specific training items and generalization items. It was found that children who participated in the training group improved significantly more on the Social Behavior Test than did those who participated in the play control group. However, even the Phase I play condition significantly increased responsiveness as measured on the test for the five trainees in that condition. A 6-month retest revealed an average 24 percent loss in acquired repertoire at posttesting.

Whalen and Henker drew a variety of conclusions from the study regarding retarded trainer effectiveness:

1. When not consistently supervised they are inefficient trainers;
2. All trainers had difficulties with the perceptual-motor coordination needed to manipulate training materials and provide prompts and reinforcement to the child, which often resulted in delayed reinforcement;
3. Trainers often verbalized too much, embedding the intended discriminative stimuli commands in the midst of their extra verbage;
4. Trainers tended to present difficult tasks too early and to discontinue other tasks before learning was stablized. This may be the reason that only 33 to 78 percent of all tasks presented were learned by the children; and
5. The best method of trainer instruction was the brief but repeated presession reviews.

Beyond their learning of specific training procedures, the authors observed improvements in the trainers' general adaptive behaviors.

Summary Relevant to the Purposes of the Study

The research reviewed seems to conclude with little dispute that:

1. the difficulties of utilizing attendants in resident-training programs in institutions center around:
   a. low attendant-resident ratios,
   b. little or no provision of relevant specialized training for attendant staff, and
   c. a general absence of administrative reinforcement provided to attendants for resident training behaviors;
2. if resident training programs are to have lasting effectiveness they must include attendants as instructors;
3. to equip attendants with the skills to instruct retarded residents, an inservice training program is needed which not only begins at the attendant's level of knowledge, but also involves active responding by the attendant, shaping procedures employed throughout training, opportunities to generalize learnings to actual training situations, and a follow-up program of supportive reinforcement and shaping procedures;
4. institutional settings for the retarded generally retard even further the cognitive and social growth of its residents; delays in language development are an aspect of this retardation;

5. language may be regarded as verbal behavior which is subject to the same principles as any other behavior;
6. the mentally retarded child is delayed in his speech development but appears to follow the same sequence of development as the normal child;
7. imitative training is an important aspect of operant language training in retardates;
8. commonly used, effective procedures to control disruptive behaviors of retardates occurring during language training are extinction and time out from positive reinforcement;
9. the majority of recent language training research with the mentally retarded incorporates the sequence of normal language acquisition as its content within a framework of behavioral principles;
10. consistently supervised retardates can be effectively utilized with other retardates as substitute "mothers" behavioral engineers, and reading, writing and language acquisition trainers in classrooms and institutional settings; and
11. retardates in trainer roles appear to make gains in general adaptive behaviors and social interaction skills.

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CHAPTER II

METHODOLOGY

Purpose

This study is applied research, the purpose of which is to demonstrate and test the effectiveness of a strategy for utilizing retarded residents of a residential institution to train their retarded peers under the guidance of the attendant staff. Specifically, it seeks to determine whether significant gains in language functioning and in the ability to respond to a standard measure of intelligence can be produced by retarded trainers who are trained to administer a developmentally ordered language program incorporating principles of reinforcement and modeling.

Design

Overview of Design

In its experimental aspect this study involves a simple pretest, posttest design, utilizing an experimental group (Group E) and a control group (Group C). In addition, and in keeping with the developmental purposes of this study, data were gathered to portray the successfulness of training not, as above, in terms of gain scores, but in terms of the skills manifested by trainers during the training interactions.

The training strategy can be understood by inspection of the basic training unit portrayed in Figure 4. This figure shows the relationships between the three categories of subjects. The students are those retarded children and young adults who were being trained.

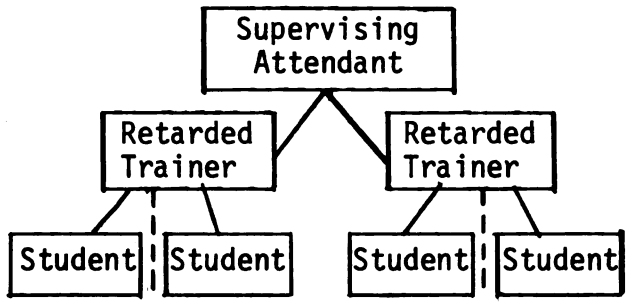

Figure 4. Basic Training Unit of the Study. Dotted Lines Indicate that each Trainer Worked with One Student at a Time.

Their pre- and posttest scores generated the gain scores used in testing the major hypotheses of the study. The trainers are those retarded adults who carried out the training. Each trainer trained two students one at a time; this threesome is referred to as a triad. Each supervising attendant directed two triads, as illustrated in Figure 4. Although additional triads could be added, this basic training unit portrays the arrangement that would exist if this model were applied in the future in institutional settings and other settings. In this study the experimenter and her assistants engaged in the training of attendants and trainers so that by the final phase of the study the members of a basic training unit would work together effectively and fairly independent of experimental staff. Group E and C were each made up of three of these basic training units. Thus, each group included three attendants, six trainers, and twelve students.

The experiment consisted of three phases. Phase I, lasting two weeks, was an initial training period, which varied for Groups E and C in ways described in a later section of this chapter. Phase II, lasting three weeks, involved the training of attendants in the supervision of one triad at a time, while Phase III, lasting three weeks, involved each attendant supervising her two triads, with maintenance levels of experimenter supervision and instruction. Students were, thus, exposed to training for a total of eight weeks, with the quality of training presumably increasing over this time span.

Group E trainers and attendants were trained to teach toward specific language goals by applying operant conditioning principles as embedded in the Modified Language Acquisition Program (MLAP). Group C trainers and attendants were also given language training goals for their students, but without training in the use of this program or these principles. Insofar as possible, all other training variables were made equivalent for the two groups. Thus, the independent variable is the application of a developmentally ordered language training program which incorporates the principles of reinforcement and modeling.

The main dependent variables were measures of language ability (The Modified Language Acquisition Program Final Tests, MLAPFT) and intelligence (Cattell Infant Intelligence Scale) to be described fully in a later section. The gain scores of the two students in a triad were combined in the analysis, since they were considered not to be independent, but to be, in part, a function of the skill of the trainer in the triad.

A less formal dependent variable, the Behavioral Observational Record, BOR, was utilized to gather data regarding the instructional interactions between trainers and students and between attendants and students in both groups.

Research Questions

Main questions.--It was the general hypothesis of this study that the intensive training of Group E at the attendant and trainer levels in the use of reinforcement and modeling techniques and the Modified Language Acquisition Program would yield greater growth in language acquisition by the Group E students than by the Group C students who were paired with untrained retarded trainers and supervising attendants. Although trainers in Group C were generally encouraged to provide their students with reinforcement on a noncontingent basis, verbal and tactual stimulation, training based on their own or their attendant's ideas, and play interaction, it was believed that their training efforts were less efficient and purposeful than were those of Group E, thereby resulting in a smaller amount of student growth in language acquisition.

Thus, the first main research question asked by this study is: Will the students in Group E gain more prelanguage and early language skills than the students in Group C?

It was further believed the Group E students, as a result of their language acquisition training would improve in their abilities to attend to training and testing materials, to sit at a table, and to respond following presentation of vocal and visual stimuli by a trainer

or tester. All of these skills could be expected to contribute to the students' ability to respond appropriately to intellectual tests. In addition, the commonality of some of the language training tasks with some of the tasks in infant intelligence tests led to the belief that Group E students would demonstrate greater mean scores on the Cattell Infant Intelligence Scale, due to their language training, than would students in Group C. Thus, the second main research question asked by this study is:

Will the students in Group E show greater gains in mental age than the students in Group C?

Related questions.--In order to more directly determine the efficacy of the training given by Group E trainers and attendants, observation data were gathered using an observational coding procedure (Behavioral Observation Record, BOR). By answering the following questions, an attempt was made to describe the observable differences between the trainers and between the supervising attendants in the two groups.

First, by examining the data gathered during observations of the instructional interactions of trainers and students taken in actual training sessions, the following questions were answered:

1. Would Group E trainers have a greater average frequency or percentage of the following categories of training, behavior than trainers in Group C?
   a. number of complete trials presented (i.e., consisting of stimulus presentation, student response, and reinforcing consequence),

b. number of trials when the student was attending prior to the stimulus presentation,

c. number of responses (correct, approximate and incorrect),

d. percentage of trials when correct and approximate responses were reinforced (regardless of whether the responses were prompted or not),

e. percentage of times tangible reinforcers (food, tokens, toys, etc.) were paired with praise, and

f. percentage of trials on which a student not responding or responding incorrectly on a preceding trial, was prompted on the following trial or where that trial was repeated without a prompt and the resultant response improved to an approximate or a correct response.

2. Would Group E trainers have higher average judgment ratings than Group C trainers in the following areas?

   a. consistency and appropriate repetition of stimulus presentations,

   b. appropriate fading of prompts, and

   c. appropriateness of task to student.

Two additional questions were asked about the attendant's and the experimental staff's role with the trainer during the actual training sessions. Data to answer these questions were taken from the BOR observations done over the three phases during actual training sessions.

3. On the average, did Group E attendants and experimental staff reinforce trainers more often than Group C attendants and experimental staff?

4. On the average, did Group E attendants and experimental staff interrupt training with instructional comments directed towards the trainer more often than Group C attendants and experimental staff?

Regarding the data collected before and after the study during the experimenter-structured training sessions with attendants and with trainers, all the above questions under #1 and #2 were also asked about the attendant observations and about the trainer observations. Additional questions were asked regarding the trainers' ability to generalize their skills to new students not worked with before.

5. In the skill categories listed in questions 1 and 2, did the average frequency percentage and rating scores of the trainers during the post-study observation in Groups E and C decrease from their scores during training observations?
6. Did these average frequency percentage and rating scores of the trainers in Group E decrease less than those of trainers in Group C?

Finally, the data collected during the pre-study experimenter-structured sessions were consulted to answer two final questions:

7. Were the training skills observed to be approximately equal in both groups of trainers during the pre-study observations?
8. Were the training skills observed to be approximately equal in both groups of attendants during the pre-study observations?

Modifications in Design from Related Research

With a number of exceptions and changes, this present study parallels the Whalen and Henker research (1969, 1970). These exceptions were made for the purpose of developing an ongoing retarded trainer, language modification program which could be maintained mainly by institutional staff following the study. The first change toward this purpose was to appoint attendants as the behavioral supervisors of the trainer-student pairs rather than use temporary experimental staff alone. (This change in a nonexperimental continuation of the retarded trainer program would also facilitate generalization of training and reinforcement procedures to the same residents during nontraining times and to other residents not participating in the program.) Therefore, the basic training unit (Figure 4) also differed from that used in Whalen and Henker's research. It should be noted that under experimental conditions attendants, trainers and students from the same ward were not placed together in the same training unit so as to avoid the occurrence of extra unaccounted training.

Although similar to the method used by Whalen and Henker, the Burke-Rowland inservice training method was used to individually instruct Group E trainers in imitative and operant techniques of training language skills, to teach trainers new skills and continue shaping of old skills, and to control misbehaviors of students and trainers.

The fourth change from Whalen and Henker's work involved the use of a comprehensive, research-based language program. The program used was a modified version of the LAP (Kent, et al., 1972).

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The fifth main addition allowed the training sessions to be programmed by the use of pictural representations of each task that the trainer presented to the student. The language tasks were sequenced for the trainer by the attendant with the needed repetitions, omissions, and additions. This was one prior to training sessions and according to the student's performance in the preceding sessions. Although task programming with pictures could decrease the trainer's generalization of language training abilities to nonexperimental situations without these prompts, it was felt that the efficiency of the training sessions would be improved if appropriate task sequences were provided for the retarded trainer.

The final major change from the research of Whalen and Henker is in the design of the experiment. Rather than have a trainer work in both experimental and control conditions, two separate groups of trainers, one experimental and one control, were utilized. Also, because of McKinney and Keele's study (1963), it was believed to be unnecessary to include an institutional control group of students receiving no contact with trainers.

Subjects

Students

Twenty-four students were selected from the profoundly retarded population at Howell State Hospital. It was regarded as important to select students most able to benefit from short daily language training sessions directly operated by retarded trainers. Therefore, care was taken not to include residents with extreme visual, hearing or motor

handicaps or those with gross behavior problems. A large group of residents was observed to eliminate those with gross handicapping conditions. Approximately 100 residents were seen individually and students were eliminated who did not meet the following criteria:

1. able to sit for at least 30 seconds without any incompatible motor responses (stereotypic movements such as rocking, hand waving, etc.) and without restraint or reinforcement;
2. having little or no receptive and/or expressive language as measured on the MLAPFT;
3. having enough control of arm movements to manipulate and touch small objects; and
4. having no severe behavior problems, i.e., those that could not be directly controlled by the trainer with the guidance and supervision of experimenters and attendants (generally included aggressive behaviors towards others).

In addition, all parents or guardians of those selected were informed by letter of the study and its purposes. It was requested by the experimenter that any visits away from the institution during the testing and training periods be limited to weekends in order for their child to be included as a participant in the study. A copy of this letter is included in Appendix A. All parents and guardians cooperated with the requirements, and some highly supported the study's goals.

In Group E, two changes were necessary in the student sample; no student changes were needed in Group C. One student was removed to another institution during the third week of the study for an unforeseen cataract removal operation. Since the length of time needed for

recovery from this operation was predicted to be five weeks, another student was selected during the fourth week of the study as a replacement. In the second situation the student originally selected had a medication dosage change during the first week of the study. This medication change resulted in disturbed attention so that he no longer met the attending criteria. Both student replacements are included in the reported sample means in Table 3 on which the F values were calculated; the students removed from the study during the early weeks are not included in these means.

The twenty-four students selected for the study all functioned in the profoundly retarded range: that is, their IQ scores were less than 20 as measured on the Cattell Infant Intelligence Scale. Eighteen students were male and six were female. Other characteristics of the students--chronological age, mental age, IQ, length of institutionalization, and pretest scores on the MLAPFT,--varied widely: CA: 7 years 0 months to 25 years four months; MA: 0.57 years to 2.48 years; IQ scores: 4 to 17 points; length of institutionalization: 1.41 years to 22.06 years; MLAPFT pretest scores: 51.28 to 103.26.

In Table 3 are presented group means, averaged across pairs of students trained by the same trainer, for CA, MA, IQ, length of institutionalization, and MLAPFT pretest scores of the students and F-test results for differences on these variables between Groups E and C. Generally the students were nonverbal, though a few had comparatively high levels of receptive understanding with no expressive ability beyond sounds and gestures while a few had some receptive as well as some vocal expressive abilities. In addition, all students had some level

of awareness concerning hunger and mealtime and changes between activity and nonactivity. Most had preferences in eating, persons and activities; some carried out small tasks on the ward (assisting in setting tables, etc.) and most at times were able to respond appropriately with anger or smiles. Over the eight week training period the majority of the students learned to recognize their trainer and would eagerly approach him to go to the training room.

Table 3. Means on Control Variables for the Pairs of Students in the Experimental and Control Groups.

Variables	Experimental Group (n=6)	Control Group (n=6)	F
CA	17.78 yrs.	16.65 yrs.	.30
MA	1.61 yrs.	1.46 yrs.	.26
IQ	11.17	10.17	.37
Length of Institutionalization	13.24 yrs.	10.89 yrs.	1.01
Prescores on the MLAPFT	67.63	64.63	.10

Trainers

The twelve trainers participating in the study were adult residents at Howell State Hospital. Each trainer was briefly interviewed to determine level of speech, general ability and desire to work as a trainer. Due to pending community placement of many of the higher functioning residents, the pool to select trainers from was limited; therefore, the original selection criteria were lessened somewhat and included

1. having some understandable and meaningful speech,
2. having enough vision and mental ability to read picture training cards, to select and to arrange training objects,
3. having enough hearing and mental ability to follow verbal directions given from behind the trainer's back, and
4. having enough control of arm movements to manipulate training materials and physically prompt students when necessary.

In addition, all parents or guardians of those selected as trainers were informed by letter of the study and its purposes. A copy of this letter is included in Appendix B. Parents and guardians were requested that all visits away from the institution be limited to weekends so as not to interfere with testing and training schedules, and with the understanding that those who could not be limited to weekend visits would have to be excluded as participants in the study. All parents and guardians cooperated and some gave strong support to the study.

Replacement of trainers during the study was necessary in only one instance. This occurred in Group C. Unexpectedly during the first week of the study one of the trainers became critically sick and died. Another resident serving as the substitute for any replacement situations was then immediately included in the study. However it soon became clear, to the experimenter and assistants, that the replacement was inappropriate; the new trainer had many emotional difficulties and after two training sessions with his students and much support from the experimental assistants he decided that he did not want to continue in the job. At this time another trainer was identified, tried out,

and included as the final replacement for the position. This latter trainer began at the end of the second week of the study and continued until the study's end as one of the better, more creative trainers in the control group. The single trainer replacement was included in the reported sample means which the F-values were calculated (Table 4); the two trainers removed from the study in the first few weeks are not included in these means.

The twelve trainers participating in the study functioned across a wide range of mental ability as measured on the Stanford-Binet Intelligence Scale. One of the trainers had an IQ of 19, thereby functioning in the profoundly retarded range. Five trainers functioned in the severely retarded range with IQs between 21 and 35. Four functioned in the trainable range with IQs between 36 and 50, one with an IQ of 78 functioned in the borderline range, and one functioned in the normal range with an IQ of 90. This latter trainer was measured on the Peabody Picture Vocabulary Test since her emotional problems and shyness necessitated a nonverbal test. Also other characteristics of the trainers varied widely: chronological age: 19 years 3 months, to 45 years 5 months; mental age: 3 years 7 months, to 14 years 5 months; and years of institutionalization: 1.81 years to 23.83 years. Eight trainers were women and four were men.

Table 4 summarized the average CA, MA, IQ and length of institutionalization of the trainers and the F test results for differences on these variables between Group E and C. The mean length of institutionalization was significantly different between the two groups in favor of Group C with its trainers being institutionalized, on the

average, eight years less than the trainers in Group E. This difference may have perhaps given an advantage to Group C but its actual importance in terms of student benefit is difficult to predict.

Table 4. Means on Control Variables for the Trainers in Experimental and Control Groups.

Variables	Experimental Group (n=6)	Control Group (n=6)	F
CA	28.46 yrs.	28.51 yrs.	.00
MA	6.54 yrs.	8.07 yrs.	.54
IQ	38.17	47.33	.51
Length of institutionalization	17.95 yrs.	9.34 yrs.	6.55*

*Significant at the .05 level.

The trainers displayed a wide variety of personalities, talents for training, and motor and speech handicaps. A few trainers initially lacked confidence in their ability to work with their students; one such trainer was often heard during the early weeks of the study saying, "I'm scared, I don't know what to do." Other trainers demonstrated opposite feelings: they were more confident and sure of their teaching abilities and purpose. One of these trainers, more verbal than most, stated that the trainer-student program was very worthwhile since it made him feel good to help those less fortunate than himself. The average trainer looked forward to his daily "job," expressed disappointment when any sessions were cancelled due to illness of students or supervising attendants, and quickly learned to control and work with both of his students.

Of the twelve trainers, three were confined to wheelchairs and one used a walker. Only one used a walker. Only one of these trainers had slow arm movement in both arms. Despite the physical limitations these trainers still partially assisted in walking the students to and from training sessions and in equipment clean-up. The four physically handicapped trainers were evenly distributed between the two groups. Poor articulation with or without slow speech was a problem for five of the trainers; three of these trainers were in Group E while two were in Group C.

In addition to their training job, some trainers fed residents on their own wards or on other wards, two had short-term placements in the institution laundry, and many performed on-the-ward tasks such as table setting, cup washing, etc. However, only the training job was a paid job; a token payment program was just beginning and generally had not been extended to cover these additional "jobs." Most of the trainers took great interest in being paid, and in saving and spending their earnings of 5 cents for every single 20-minute training session.

Attendants

In order to select attendants to participate in the study most day shift (7:00 a.m.-3:30 p.m.) and fourth shift attendants (12:30 p.m.-9:00 p.m.) employed at Howell State Hospital were given short explanations of the study six weeks prior to its beginning. The six attendants selected for the study were randomly chosen by ward, one from each ward, from a group of 14 volunteers. General requirements for participation included

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1. status as a full time employee at Howell State Hospital on the day or fourth shift with at least six months on the job,
2. an interest in the project and a willingness to spend up to two hours per day supervising trainers,
3. willingness to be randomly assigned to treatment group, and
4. no interfering vacation time during the study (the study lasted eight weeks during the summer months).

One attendant was selected from each of six wards so as not to short-staff any single ward. On wards with more volunteers than one, the choice was made randomly by drawing lots.

For varying reasons two of the three attendants in Group C requested that they be replaced by other attendants and this was done. The first replacement was during the second week of the study and the second occurred during the beginning of the fourth week of the study. Both expressed similar reasons for their request; the main reason stated was that the time spent on the study was interfering with the completion of their ward duties despite the full support of their supervising staff and the administrative staff for the study. Both attendants worked the day shift, which generally included additional morning care duties on the bed patient wards. Later, each attendant reported feeling some pressure from their fellow workers on these busy wards as to the additional work created by their absence from the ward. Replacement attendants were therefore taken from the fourth shift where duties generally included an emphasis on resident training. One of the two replacements was also selected from a less busy ward.

It was felt by the experimenter that in addition to the reasons expressed by the attendants for requesting replacement, there were unexpressed reasons for those in Group C relating to the purposeful lack of structure provided to guide language training procedure in Group C. As stated earlier, Group C was made identical to Group E in all areas except training procedure; therefore Group C had identical training equipment, trainer-student organization and scheduling, and general operational rules as well as language training goals for each student. The supervising attendants in Group C therefore had the additional job of creatively guiding their trainers in the direction of achieving the language training goals with their students. This job may have been frustrating for some even though the experimenter and the assistants provided initial continuous reinforcement for all their ideas and continued to provide intermittent support. For the attendants in both groups the novel experience of working with resident trainers seemed to provide some motivation and enthusiasm.

All attendants participating in the study, excluding the two replacements, were women ranging in chronological age from 20.00 to 39.92 years, with a mean of 29.40 years. The amount of employment at Howell State Hospital or other institutions as an attendant ranged from 6 months to 7 years 0 months with a mean of 3 years. Although F-values were computed on attendant age and length of employment, these variables were not regarded as relevant indicators of supervising attendant success. These values are reported in Table 5. More important in both groups was the attendant's enthusiasm for the student's growth in prelanguage and early language skills. In Group E the attendant's ability

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to understand and carry out the training and testing procedures and to maintain and increase the trainer's teaching performance was critical to the successful operation of the training units during the final third phase of the study where minimal assistance from the experimenter was provided. In Group C the attendant also needed to maintain the training ideas initiated by the trainers as well as provide additional ideas to vary the experiences given the students. These difficult-to-measure skills were present in varying degrees in the participating attendants.

Table 5. Means on Control Variables for the Attendants in the Experimental and Control Groups.

Variables	Experimental Group (n=3)	Control Group (n=3)	F*
CA	27.36 yrs.	31.22 yrs.	.28
Length of Employment	1.96 yrs.	3.14 yrs.	.28

*No F-values were significant at the .05 level.

Assignment of Subjects to Treatment Groups

Prior to random assignment of students and trainers to treatment groups, two students were matched with each trainer to make 12 trainer-student triads. Several variables were considered in forming these triads. It was important that trainers be able to physically control their students' behavior if necessary so as to be as independent as possible of their supervising attendants. Therefore, larger stronger

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students without physical handicaps and without much self-control were paired with the stronger trainers. Wheelchair trainers generally were paired with less active students or with those having good self-control. Because the advanced language acquisition procedures in the MLAP required the trainer to use more verbal directions and feedback, trainers with better understanding and communication abilities generally were paired with the more communicative students.

In most cases, trainers were not paired with students living on the same ward. This was done to avoid the occurrence of extra, uncontrolled training during nonexperimental times. In one instance in Group E, this practice was ignored as it was necessary to pair a strong mobile trainer with a highly unmanageable student. In two other instances situational factors made it necessary to form a triad from a student and trainer living on the same ward. Both instances were in Group C, and did not last for the entire study. In one case, it was necessary to replace a trainer and in the second case a student was transferred during the study to the adult ward on which the trainer lived. In all three instances, there were no observed or reported informal training sessions being held by trainers during nonexperimental times. After all 24 students were paired, two with each trainer, these 12 triads were randomly assigned to treatment groups.

The six attendants were randomly assigned to one of the two treatment groups. It was not regarded as essential to randomly assign attendants to triads. Instead, efforts were made to match attendants and triads in both groups to secure optimum and controlled performance. Therefore, prior to assignment the attendants were asked if they had

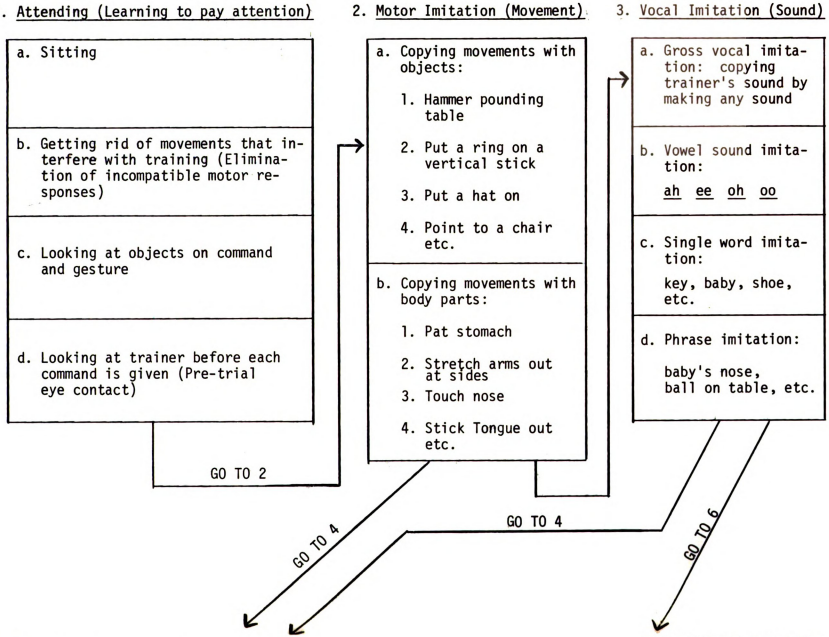
negative feelings about any of the students or trainers which would interfere with training or supervision. Following random assignment of trainer-student triads and attendants to treatment groups, attendants were paired with two triads to form the basic training units (see Figure 4) excluding, at that time, any pairings involving personal difficulties and placement of an attendant in the same training unit with student living on wards where that attendant worked. This latter consideration, as in the triads, was necessary to prevent the occurrence of extra training between attendants and students during nonexperimental times.

Treatment Procedures

The Modified Language Acquisition Program

The Modified Language Acquisition Program (MLAP) is heavily based, as mentioned and described earlier, on Kent, et al.'s (1972) Language Acquisition Program (LAP). As in the LAP the methods of instruction embedded within the MLAP consist of reinforcement and modeling procedures while the language content is sequenced according to the natural development in the normal child. This content and sequence are outlined in Figure 5.

There are seven phases in the MLAP: each phase is divided into two to five separate subskill training areas called parts. These phases and their parts extend across a wide range of preverbal and early verbal skills from attending behaviors to motor and vocal imitation to basic receptive and expressive verbal skills and finally into an expanded level of receptive and expressive verbal skills. The arrows


1. Attending (Learning to pay attention)
a. Sitting
b. Getting rid of movements that interfere with training (Elimination of incompatible motor responses)
c. Looking at objects on command and gesture
d. Looking at trainer before each command is given (Pre-trial eye contact)
GO TO 2
2. Motor Imitation (Movement)
a. Copying movements with objects:
1. Hammer pounding table
2. Put a ring on a vertical stick
3. Put a hat on
4. Point to a chair
etc.
b. Copying movements with body parts:
1. Pat stomach
2. Stretch arms out at sides
3. Touch nose
4. Stick Tongue out
etc.
GO TO 4
GO TO 4
3. Vocal Imitation (Sound)
a. Gross vocal imitation: copying trainer's sound by making any sound
b. Vowel sound imitation:
ah ee oh oo
c. Single word imitation:
key, baby, shoe, etc.
d. Phrase imitation:
baby's nose, ball on table, etc.
GO TO 6

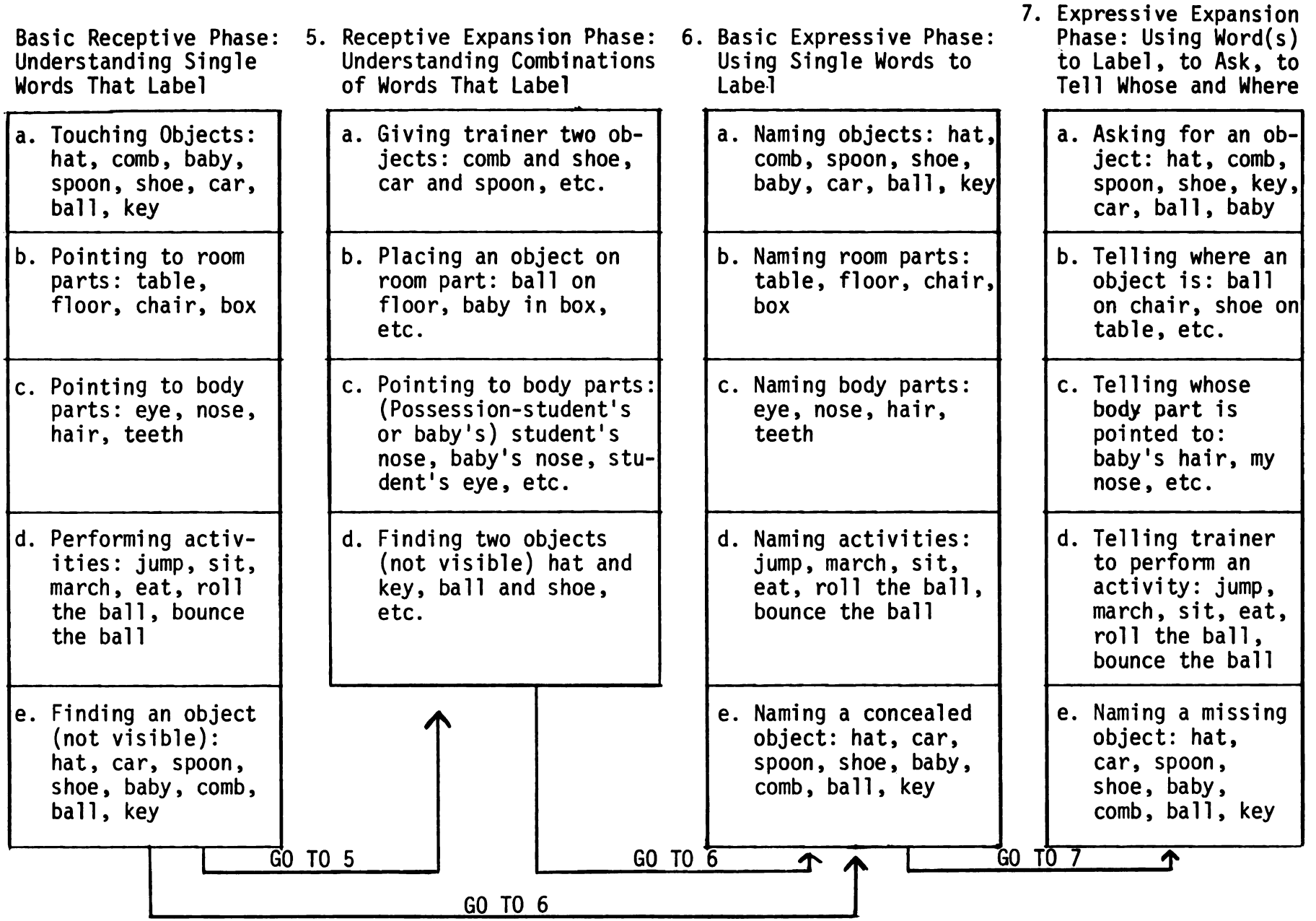


Figure 5. Modified Language Acquisition Program Outline.

in the diagram approximate the training sequence. For example, the attending phase is prerequisite to training in any other phase of the program.

Placement of a student into MLAP training sequence and that child's movement from part to part is determined both by his initial and final test results and by the chart in Appendix C which describes the prerequisite language skills for entry into each part of the program. The initial test for any part of the program is the same as the final test for that same part. Both tests have the same tasks which generally include two trials on each task presented in a random order. The two different labels, initial and final, are meant only to describe the times of testing a student. Initial testing is done before training on a part so as to determine an appropriate teaching order of tasks within that part: tasks on which a student made approximate responses are taught prior to incorrect response tasks, while those the student made no response to are usually the hardest for the student to learn and are taught last. Final testing is done before passing a student on a part and ending that particular training.

While training a student, two methods are used to adjust the instructional order of training tasks to fit student progress. One of these is intermediate testing which is different from initial and final testing only because a portion of a part in the MLAP is tested rather than the entire part. When a student seems to be responding correctly on the same tasks in a given part then the student would be tested on only those items. Each is presented twice in a random order. If the child is able to make correct responses on 90 percent of the items then

training on those items would be discontinued, except for intermittent review, and would concentrate on the remaining items in that part. The student would be given a final test when all items in a part seem to have been learned.

In addition to intermediate testing, training observations are useful in updating the training order to fit the student's progress. These observations are merely a written record of the student's performance during a training session. The particular task, the student's response, and whether or not a prompt was given by the trainer are the areas of information recorded by the observer. The attendant examines the training observation to determine if any tasks need intermediate testing--that is, if the student makes a consistent, correct response to a task without the trainer's prompting. An example of a training observation is included as Appendix D.

The testing procedures on all tests, initial, intermediate, and final, are the same. The command for each item is given when the child appears to be attending, and is not repeated; no prompting is given to the student, all responses are reinforced and no reinforcement is given following those tasks on which the child makes no response. This latter procedure prevents differential feedback to the student during testing. Criterion score for passing initial and final test is generally the same as for intermediate testing: 90 percent correct.

In order that training results be statistically analyzed and for the efficient employment of the language program by attendants and retarded trainers, a number of modifications in the LAP were necessary.

Broadly outlined, these changes occurred in the motor imitation phase, the training suggestions in the program manual, the description and use of the initial, intermediate, and final tests, the addition of the object, "spoon," to the last four phases of the program, and the specific teaching procedure involving pre-organization of training trials by the arrangement of picture task cards for the retarded trainer.

This latter modification was necessary for two reasons. First, during a pilot study, trainers without task cards tended to rely on the experimenter for changes in task presentation; that is, they would present one task then stop and ask what to do next, or present many tasks one time each, or change the task itself. Therefore, training cards were introduced to lessen the dependence of the trainer, to prevent inappropriate task changes and to program the needed repetition of tasks so that new skills could be shaped in the student. The command, materials and expected response for each training task were represented by a picture. Examples of three training cards are located in Appendix E. These pictures were prearranged for the trainer by the supervising attendant or experimenter in a picture-holding circular file. The instructional task order was determined by the student's initial and final test results as well as his training progress evidenced in intermediate tests and training observations. The trainer was taught to look at the first card, present the command and materials associated with the picture, and praise the expected response or an approximation of it. If necessary, he prompted the correct response in the student. Then the trainer turned over the picture card to reveal the next task for presentation.

The former LAP training procedure included the use of shaping procedures on a single new task for up to 40 consecutive trials in a session. When a new task was correctly responded to, two times consecutively without prompts, then it would be alternated with another new task. Also when a student made an incorrect response on a new item, the alternation procedure was immediately eliminated and training dropped back to an easier level. These more sophisticated training procedures, although resulting in the most efficient training, could not be incorporated with the retarded trainers used in this study. Therefore, the use of pre-programmed training cards solved one problem, but presented another--it excluded the immediate adjustment in task order for a student in relation to that student's responses, unless verbally directed by an observant trainer or supervisor.

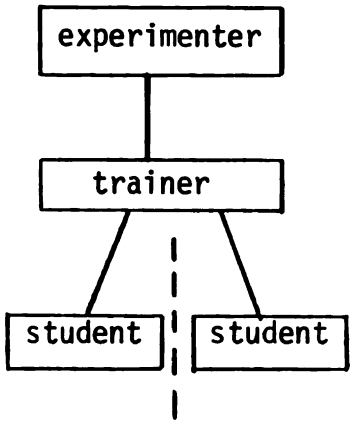
Phase Structure

The basic organization employed in both groups during the eight week study is outlined in Figure 6. Group E was trained and supervised by the experimenter while Group C was run jointly by two experimental assistants. Both assistants were well qualified for their job; each was a teacher, a graduate student in special education (mental retardation), familiar with Howell State Hospital, and had some experience in behavior modification, and in testing and training the severely and profoundly retarded.

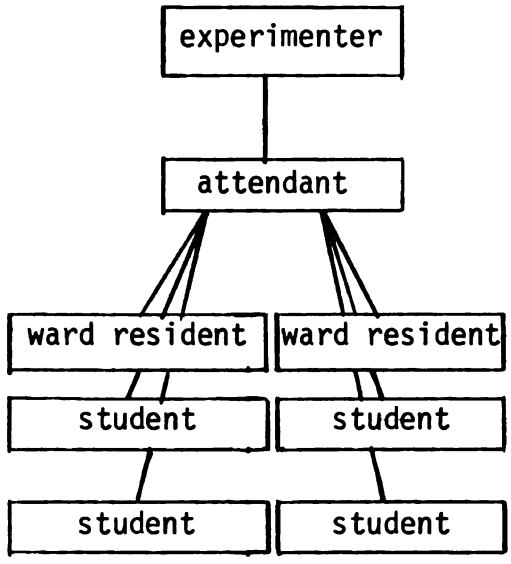
Phase I lasted the first two weeks (Mondays through Fridays); Phase II extended for the following three weeks (Mondays through Fridays); and Phase III, though originally intended to extend for 5 weeks,

PHASE I: 2 weeks

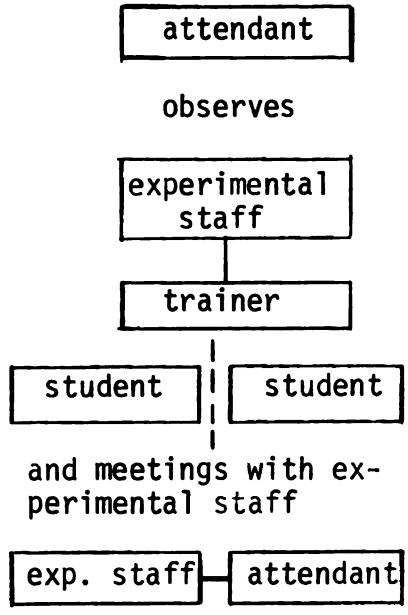
Phase Ia. Initial training of retarded trainers in both groups.



Phase Ib. Initial training of Group E attendants: familiarization with MLAP testing and training.

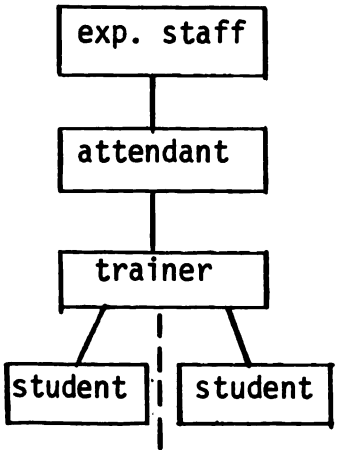


Phase Ic. Initial training of GroupC attendants: observation of trainers.



PHASE II: 3 weeks

Training attendants to supervise one trainer at a time.



PHASE III: 3 weeks

Training attendants to supervise two trainers at a time with minimal assistance from experimental staff.

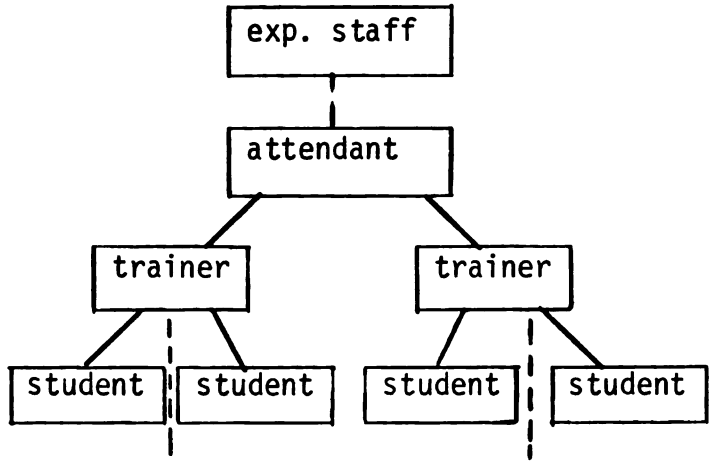


Figure 6. Training Organization and Procedure for Groups E and C During the 8-week Period of Training.

was decreased to an intensive three week period (seven days per week) due to the pending placement of 5 of the 12 trainers in the community.

General Controls Common to Both Groups

Outside of the experimenter, the assistants, the speech therapist, and the participants, no other institutional staff were informed of the group membership of any of the participants. Attendants were asked to refrain from revealing specific information about the study until after its completion. The basic differences between the training received by each group were generally outlined to the attendants. Since past studies (McKinney and Keele, 1962, etc.) regarded the interaction employed in the present study's Group C as a treatment of "mothering" or play, this group was never labeled or regarded as a control group during the study. In fact the attendants in both groups were challenged and repeatedly encouraged to employ their retarded trainers and their own ideas as much as possible so their students could achieve the identified language training goals made available in both groups. In addition, attendants were informed that at the study's end, the specific language training procedures used in Group E (called Group I in the study) would be made available to those in Group C (called Group II) through special training workshops.

The following procedural treatment variables for Groups E and C were controlled, i.e., made equal for both groups.

1. All-over phase organization and procedures (except for the attendant portion of Phase I),

2. Amount of time spent with attendants, trainers, and students by experimental staff, i.e., by experimenter in experimental group and by assistants in control group,
3. Training rooms,
4. Training equipment,
5. Student edible and toy reinforcers,
6. Trainer payment systems and portable stores for spending earnings,
7. Length of training sessions,
8. Average number of training sessions per student,
9. Basic organization of each training session,
10. Participant titles and amount of praise and exposure in institutional newsletter write-ups for attendants, trainers and students,
11. Enforcement of the policy that the majority of direct interactions with the students be provided by trainers,
12. Amount of videotaping for experimenter purposes,
13. Explanation to attendants and trainers of the language training goals (based on pretests) for each student in Phase I; and updating his or her initial language training goals, and
14. Testing and observation procedures.

The main differences in procedure for the two groups lay in the content taught trainers and supervising attendants and ultimately taught the students.

Phase Ia: Initial Instruction Procedures Common to Trainers in Both Groups

During Phase Ia each of the twelve trainers received individual attention one hour each day for 9 days by the experimenter (Group E) or the assistants (Group C). In both groups a trainer worked 20 minutes with each of his students. The remainder of the training hour was spent instructing the trainer to perform tasks secondary to working with his students. These included equipment pick-up and put-away, etc. Also when the student needed to be disciplined, the trainer was directed to give the discipline with guidance as needed from the experimental staff. This was done to encourage independence of the trainer in his ability to control the student from the beginning of their contact together. The careful prior matching of the student to the trainer in areas of speech, aggressiveness, and physical limitations avoided many problems later between the two. Trainers were encouraged to physically accompany their students to and from training sessions, whether this meant holding their hands, pushing their wheelchairs or having the student push the trainer's chair. And, to further encourage independence, the trainer was taught to assist in those tasks secondary to training the student: getting and putting away training equipment and student reinforcers, setting timer for 20 minutes at session's beginning, and, to the extent possible, meeting experimental staff in an assigned place at the correct time prior to each daily training session as well as returning to his own ward, and receiving his payment for work at the end of each training session.

Phase Ia: Initial Instructional Procedures for Group E Trainers

In Group E the Burke-Rowland inservice training method was employed to instruct trainers. Therefore as the trainer observed, the experimenter demonstrated a language instructional procedure on the student. This first demonstration proceeded slowly and was always geared to the trainer's comprehension level. Continuously checking to see if the trainer was watching, the experimenter gave the demonstration in the following step-by-step order.

1. Looked at the picture task card, verbalized the task and set up any materials needed for that task,
2. Presented the appropriate command for that task to the student when he was attending,
3. Waited for a response, prompting only if needed, and
4. Praised all correct and partially correct responses with words, smiles, a pat, and either a token of food (depending on the student) immediately after the response.

Next, the trainer was asked to imitate all the steps as demonstrated. As much assistance as needed was provided and any correct or partially correct attempts by the trainer were praised. Depending on the trainer's ability to reproduce the teaching procedure, one of the following steps was taken by the experimenter next:

1. If the trainer made no attempt to copy the demonstration with the student or gave a totally incorrect imitation, then same demonstration was repeated more slowly and in

smaller steps; e.g., look at training card, verbalize task, ready materials and then let the trainer imitate procedure thus far.

2. If the trainer made a partially correct attempt to copy the demonstrated training procedure with the student, then the same entire procedure was repeated, expecting and helping the trainer to give a better imitation of the training than in his first attempt.
3. If the trainer correctly copied most or all steps of the demonstrated training task, then the task card was turned and the next different task was demonstrated showing all the 4 steps (1 through 4 above) and allowing the trainers to imitate again.
4. If the trainer correctly copied the entire demonstration, then the next different task card was located and explained and perhaps demonstrated in isolation or with the student. With these trainers it was not necessary to repeat all steps of the demonstration, i.e., presentation to student, prompting and reinforcement could be omitted in the demonstration. However, the trainer was observed as he tried this second task with the student so as to check his second performance to see if further explanation was needed.

It was very important to provide much vocal assurance and praise to the trainer as he worked with the student in the initial training sessions. If the student appeared to be responding positively to the trainer, comments to emphasize this were given (e.g., "Look how

he is working and smiling for you; I think he likes his new teacher!"). From the very beginning of their instruction, Group E trainers were taught to follow the definite structure of reinforcement and modeling techniques and the MLAP sequence.

Phase Ia: Initial Instructional Procedures for Group C Trainers

During Phase Ia, Group C trainers were not intensively instructed in specific techniques of working with their students. Instead, they were encouraged to play and verbally interact with their students. Experimental assistants followed these Phase Ia guidelines with Group C trainers.

Make the trainer understand what kinds of things he should and could do with his students by

1. telling him that he is a teacher to the students assigned to him and that . . .
2. he should try hard to teach each student the language training goal (however this is mentioned only during first session),
3. he should play with the student and get him to play,
4. he should teach him new things,
5. he should talk to him,
6. he should use all the equipment provided,
7. he should keep him in the room for the whole 20 minutes,
8. he should give him physical contact (touching, pats, hugs),
9. he should give the student food or toys whenever the trainer wants them during the sessions,

10. he should not hurt the student, and
11. he should be encouraged to ignore the student and remove toys when the student begins disruptive behaviors (throwing, hitting, etc.).

Although tokens were provided, no token reinforcement system was implemented in Group C, nor were picture task training cards used by trainers. In addition, as mentioned earlier, Group C trainers were given the benefit of knowing their students' language training goals. During the first training session the specific training goals for each of his students as determined by the MLAP pretests were explained to the trainer by the assistant in clear and standardized ways. However, following the demonstration, the trainer's performance was not shaped. Instead, all his interactions with the student which approached the guidelines for Group C trainers were reinforced by the assistant.

A large percentage of Group C time was spent in perfecting the trainers' abilities to carry out the duties secondary to training and in encouraging and, at times when necessary to prevent student disruptive behaviors, suggesting and even showing play activities to be done with the students. Appendix F outlines the general procedures taken by the assistants with Group C trainers during this phase.

Phase Ib and c: Initial Training Procedures Common to Supervising Attendants in Both Groups

Phase Ib, illustrated in Figure 6, involves the initial training of Group E supervising attendants while Phase Ic concerns the initial training of Group C attendants. Both Phase Ib and Ic occurred

simultaneously with Phase Ia during the first two weeks. This is the only phase of attendant training where the organization differed between Group E and C. However, time spent with experimental staff was equal for both groups: one hour each day on duty, Mondays through Fridays--averaging to 4.5 hours per attendant.

Phase Ib: Initial Training of Group E Supervising Attendants

The attendants in Group E spent the entire Phase learning the assessment and training procedures and the organization of the MLAP. First one or two residents were selected from the attendant's ward to be jointly assessed and then trained by the experimenter and the attendant, next all four students assigned to that attendant training unit were assessed and their training programs determined and practiced. Generally one or two ward residents plus four students provided a wide variety of training levels and gave the attendant practice in most phases and parts of the MLAP.

Group E attendants were trained to meet an informally determined level of beginning skill in two areas: general abilities in language assessment and training procedures and use of operant and modeling methods. Both areas of skill were probed intermittently by the experimenter during the end of the first phase when testing and training the remaining two or three students. At these times, the experimenter withdrew all demonstrations and withheld vocal prompting so as to informally test the attendant for her comprehension and skill in the following general areas:

1. training versus testing procedures;

2. phase organization and sequence of the MLAP;
3. terminology of the MLAP;
4. administration and scoring of the initial tests;
5. determination of training levels;
6. use of training procedures in the MLAP;
7. reinforcement procedures (token, praise, and direct food methods);
8. shaping techniques (reinforcement of successive approximations, fading of prompts, etc.);
9. use of physical and imitative prompts;
10. familiarization with picture task training cards and MLAP manual; and
11. control of disruptive student behavior.

The remaining training time was structured to concentrate on any of the attendant's skills that appeared weaker than others.

Phase Ic: Initial Training of Group C Supervising Attendants

The three Group C attendants spent the two weeks of Phase I involved in various activities with the assistants for an average of 5 1/2 hours. The first hour-long meeting revolved around the details of the training sessions: reviewing Group C procedure rules (see Appendix G), and discussion of daily log sheets in attendant notebooks, assigned trainers and students, rooms for equipment storage and training, and the attendant's daily work schedule. Attendants were shown and encouraged to use daily log sheets during Phase II and III to

record the activities each trainer engaged students in and to discuss any observable progress. It was emphasized that these would aid experimental staff in describing the day-to-day activities of Group C.

Second, the attendants made observations of four 20-minute training sessions supervised by the experimental assistants, observing each trainer-student combination assigned to them. During these observations attendants were discouraged from interacting with the students or trainers but instead were asked to observe. At this time, the attendants were given the written training goals for each student. These goals based on the pre-MLAPFT results, were the same as was demonstrated to the trainers during the first training session. The goals listed immediate areas for training as well as areas for later work. Examples are listed in Appendix H. Conversation with the attendants regarding the student goals was limited to rephrasals of the written statements rather than elaborations upon training procedures or demonstrations by the assistants.

Third, another meeting, a half hour in length, was held by assistants with the attendants. During this meeting the discussion centered around possible activities they would encourage trainers to carry out with students, potential problems that might occur between trainers and students and solutions to those problems. In addition, it was emphasized that trainers should perform the majority of direct interaction with the students (including discipline); exceptions to this rule might include brief demonstrations by attendants as a means of suggesting new training ideas to trainers. Also attendants were reminded that trainers needed praise and continual support for their new role as teachers.

Finally another series of observations was scheduled during which the attendant was permitted to interact with trainers and students.

Phase II: Procedures Common to Both Groups

During Phase II the attendant in both groups learned to fill the position of instructor and supervisor of the retarded trainer taken during Phase I by the experimenter in Group E and the assistants in Group C. Phase II extended over the weekdays of three weeks. Because of the attendant's ward duties, the time allowed for their participation in the study was restricted. During Phase I and II each attendant was allowed one hour every day they were on duty, Mondays through Fridays.* Rather than train every day, trainers worked a single 20-minute session with each of their students every other day during this phase. The second trainer in each training unit was alternated with the first, giving each trainer an average of 7.5 hours of work during this phase. Attendants averaged 10 hours of work with the time equally divided between their two trainers.

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*In Phase III, two hours were allowed each attendant everyday she was on duty, including weekends. These hours the attendants participated were always scheduled during the least busy times of the ward where she worked. In addition, the trainers, many of whom had other jobs (5 fed residents, 1 washed cups, and 1 folded laundry) had to have their schedules coordinated with their supervising attendants in such a way as to allow coverage by experimental staff, equal time invested in training sessions by all participants, and availability of training rooms. The unpredictable occurrences of illness and medical appointments by any of the participants and isolated incidences of behavior problems in trainers and students, added to the many difficulties of scheduling training sessions.

General goals were again formulated and distributed to attendants in both groups to guide their efforts during the three weeks of this phase. These goals are included as Appendix I. Both experimental and control attendants continued the work towards teaching trainers independence in those tasks secondary to instruction of students: getting students and returning them to their wards, setting timers, etc. Some skills of instructing trainers seemed to be acquired more slowly by attendants than others. Among these were the ability to provide enough vocal praise for the trainer's appropriate instructional interactions with their students, shaping the trainer's skills to directly handling the misbehaviors of his students, and keeping daily logs or records of training interactions (Group C attendants kept diary accounts in daily logs while Group E attendants recorded their impressions and the MLAP parts trained by each trainer). The first two behaviors seemed to run opposite to "survival behavior" often developed by overworked attendants in many institutions while the latter difficulty appeared to be due to lack of time in Group E. In Group C, it appeared due to a lack of reinforcement from experimental staff for keeping the logs. However, experimental staff attempted to openly encourage these behaviors as well as model them repeatedly during Phase II.

Often, unanticipated problems arose with trainers. In these cases many supervising attendants were able to contribute as much to creative solutions as did experimental staff. One example included two trainers, one from each group, who appeared unaffected by praise from attendants or experimental staff, i.e., their performance remained at a low level of quality with many errors in carrying out Group E trainer

procedures or little initiative in Group C interaction with the student. One attendant began withholding trainer pay when the trainer's performance was poor; next, with the experimenter's suggestion, she began paying the trainer, one penny at a time, during the training session when he showed some interaction with his student. This shaping procedure was also tried with some success on the Group E trainer.

Phase II: Training Group E Attendants to Supervise One Trainer at a Time

Group E attendants were expected to achieve in other areas as well as those mentioned for control attendants. As outlined in Appendix J, increasing their skill levels from Phase I in the use of MLAP and in the application of reinforcement and modeling principles. In addition to these performance goals listed for Phase Ib, the attendants were expected to be able to adjust picture task cards for trainers, to maintain a high level of correct instructional technique in trainers, and to be able to teach new language training procedures to trainers using the Burke-Rowland method. Generally their abilities included language assessment, implementation of training programs through a retarded trainer, and reassessment. The flow chart in Figure 7 outlines this process of supervising the trainer. Steps 1 through 3 were done for each student before the study. Therefore Group E attendants were involved during Phase II in learning to carry out steps 4 through 10.

Although Group C attendants could probably have supervised two trainers rather easily during this phase the attendants in Group E

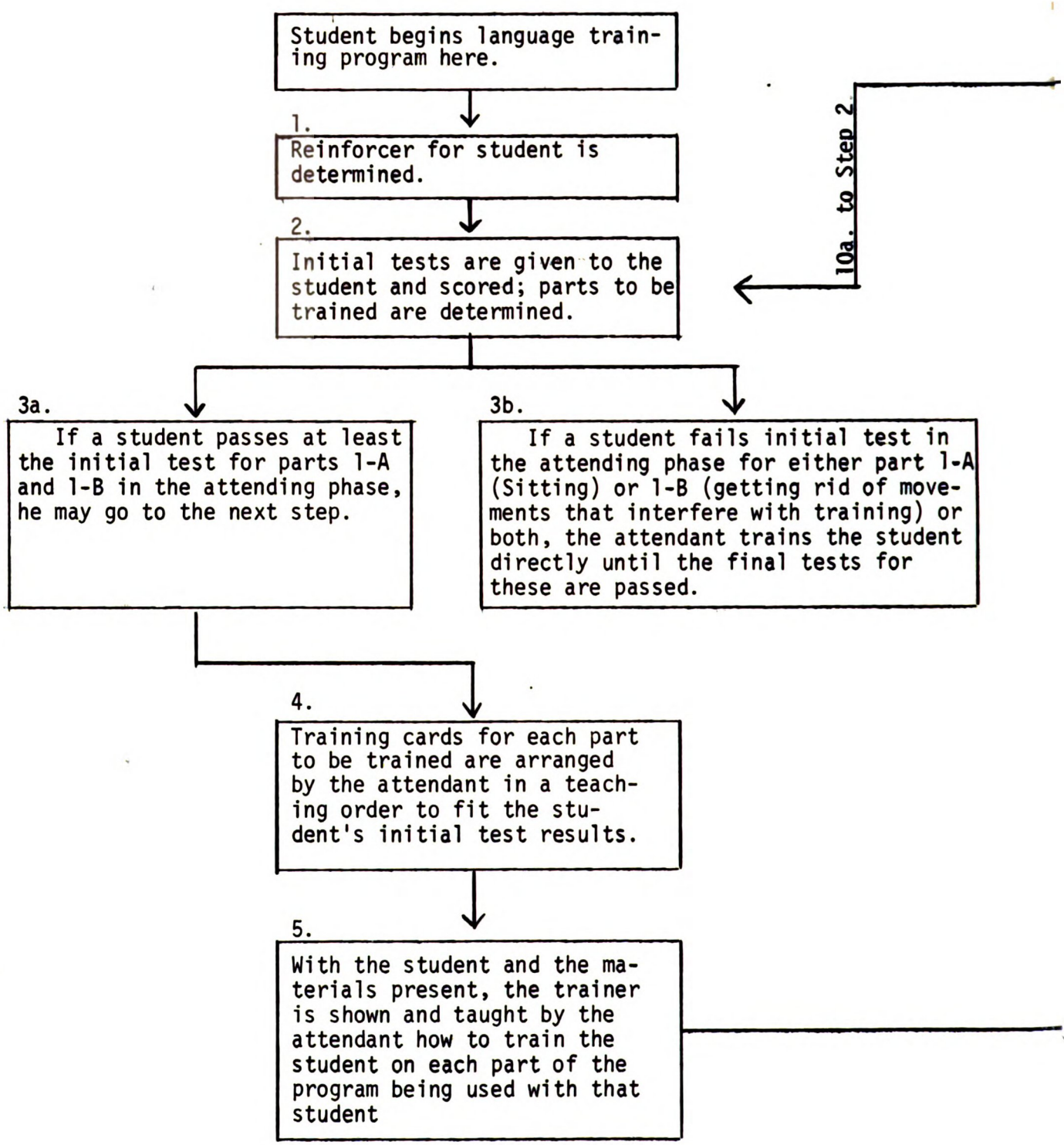
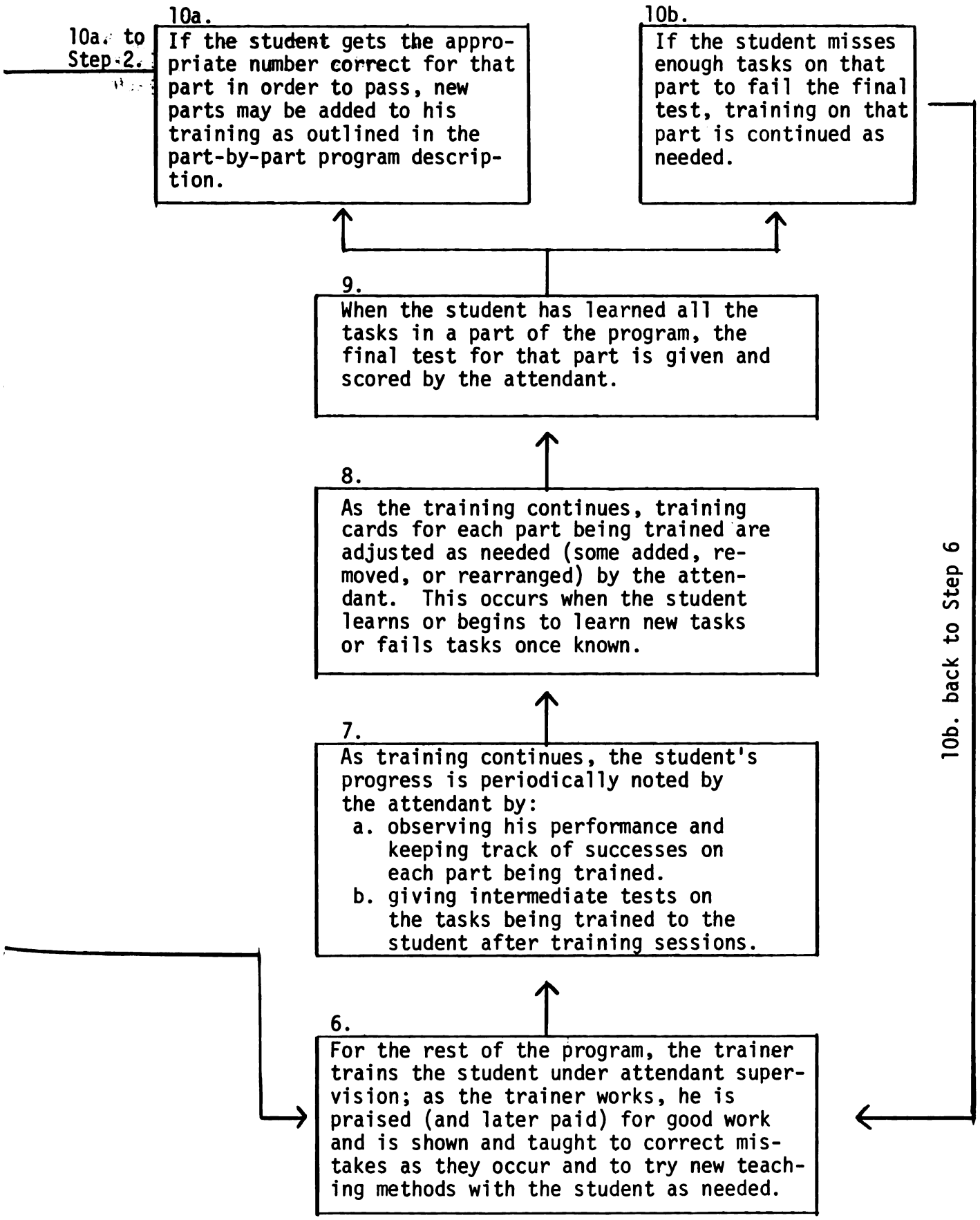


Figure 7. Flow Chart of the MLAP for Attendant Supervised Retarded Trainer-Student Pairs.


10a.
10a. to Step 2.
If the student gets the appropriate number correct for that part in order to pass, new parts may be added to his training as outlined in the part-by-part program description.
10b.
If the student misses enough tasks on that part to fail the final test, training on that part is continued as needed.
9.
When the student has learned all the tasks in a part of the program, the final test for that part is given and scored by the attendant.
8.
As the training continues, training cards for each part being trained are adjusted as needed (some added, removed, or rearranged) by the attendant. This occurs when the student learns or begins to learn new tasks or fails tasks once known.
7.
As training continues, the student's progress is periodically noted by the attendant by:
a. observing his performance and keeping track of successes on each part being trained.
b. giving intermediate tests on the tasks being trained to the student after training sessions.
6.
For the rest of the program, the trainer trains the student under attendant supervision; as the trainer works, he is praised (and later paid) for good work and is shown and taught to correct mistakes as they occur and to try new teaching methods with the student as needed.
10b. back to Step 6

needed the additional three weeks to practice their new skills with one trainer at a time before progressing into Phase III.

Phase II: Training Group C Attendants to Supervise One Trainer at a Time

Group C attendants spent all of Phase II implementing the general goals for that time period (Appendix I). Their work, therefore, centered around teaching the trainers to interact and play with their students, to train towards the language goals, and to become more proficient in the tasks secondary to student instruction.

Phase III: Procedures Common to Both Groups

Apart from intermittent assistance to experimental attendants on language training, Phase III procedure was essentially the same in both groups and included a large decrease in the direct instruction and constant support from experimental staff. It included, however, the provision of intermittent reinforcement to attendants and to trainers (although trainers received most of their support from the attendants supervising them). The sequence of the first two phases was employed as the means to prepare retarded residents and paraprofessional staff for the positions they held in Phase III. By Phase III Group E attendants were equipped with enough skills in behavior control and language training to independently operate the retarded trainer programs in language acquisition training. Group C attendants had developed enough of the skills of praising trainers, instructing them in play activities when needed, and efficiently operating the training units so that they

were also able to independently operate their retarded trainer programs in play or "mothering" of students. This attendant independence did not include the withdrawal of experimental staff reinforcement which, as previously discussed, is of major importance.

Phase III involved an increased intensity of training from two sources: number of persons supervised and frequency of supervision. That is, in this phase both trainers worked simultaneously in the same training room and each student received two training sessions per day. Also, due to a pending community placement of five of the twelve trainers, training was intensified and operated on a Monday through Sunday basis but in accordance with the attendant's 5 day schedule. Whenever an attendant was on duty, including weekends, she held training sessions. All training sessions except two make-up sessions were held solely by attendant staff during Phase III. This procedure was not used in Phase I and II when training sessions were not held on weekends but were held by experimental staff on all Mondays through Fridays inculding those when the attendant of a particular training unit was off duty.

Experimental staff visited most training sessions for at least a few minutes during this phase. Their main duties were to provide reinforcement for appropriate supervisory behaviors in the attendants and to handle the daily problems which often arose and delayed or prevented scheduled training sessions from being held. These problems included the location of missing trainers or students (taken on walks, to dentist, etc.), refilling student reinforcer supplies, and making adjustment in training room locations. Although the institution

was extremely supportive and cooperative with the demands of experimental staff, the lack of space and the tendency for different professional and ward staff to set different priorities for the same resident often resulted in conflict. For example, one ward wanted to confine a trainer to the ward for the day because of her misbehavior on the ward, apart from her performance as a trainer. This discipline then interfered with her availability as a trainer. Another case included a student sent for cataract surgery one third of the way through the study. The doctor did not know of the student's status in the study nor did the experimenter know of the long awaited plan for surgery. Also it was necessary in a few cases to request that a student be removed from other training programs to avoid contamination of the experimental treatment. Because of a desire to train on the wards and a lack of space, all training sessions were held either in resident dining rooms or bedrooms. Therefore training schedules were adjusted to begin only after the housekeeping staff finished after-meal mopping. When residents whose beds were in training rooms were sick, other beds had to be used or training sessions were moved to other bedrooms. Provision of solutions to these problems by experimental staff was often necessary in order that training sessions be held with some degree of certainty.

Besides resolving the daily problems mentioned, experimental staff offered praise and encouragement to the attendants and assistance only if needed. Student gains were proudly shared by attendants and trainers with experimental staff, as well as the less obvious gains of trainers made in training and social skills. However, for the students and trainers whose improvements were slow and minimal, more encouragement

was needed to stimulate the continuation of effort invested by attendants. Videotaping of all trainer and students was done near the end of each phase. The taping served two purposes. First, it allowed many to see training sessions without the constant disruption of visitors. These tapes were shown to ward supervisors and programming staff as well as to a number of graduate classes. And this in turn provided an indirect source of reinforcement to all participants. The attendants and trainers were informed of these showings and appeared honored. Second, the taping itself seemed to result in a bit of status for the participants since videotaping was not commonly done in the institution. Another source of indirect reinforcement was directed towards participants in the study. The participants, though not identified by the group, were discussed in three articles in the monthly institutional newspaper which is read by all staff. These articles described the study prior to its implementation, during its second phase and following an analysis of the main results.

Description of Measures and Testing Procedures

Overview of Testing

In Figure 8, the testing procedures are outlined as they took place during the study. The Modified Language Acquisition Final Tests (MLAPFT) were used on a pretest, posttest basis to measure student gains in early language skills. The Cattell Infant Intelligence Scale was also given to students on a pretest, posttest basis to estimate mental age gains during the study. The Behavioral Observation Record (BOR)

was used to observe the instructional interactions between trainer and student in two different settings: during actual training sessions with retarded trainers and students, and during experimenter structured training sessions with supervising attendants and again with retarded trainers instructing an individual student not assigned to that attendant or trainer during the study. The BOR was used three times in the first setting near the end of each experimental phase. In the second setting the BOR was used on a pretest, posttest basis to record the instructional interactions between a supervising attendant and a chosen student and again between a retarded trainer and a chosen student.

Testing During Study

Pretesting	Phase I (2 weeks) Phase II (3 weeks) Phase III (3 weeks)	Posttesting
1. Students a. MLAPFT b. Cattell		1. Students a. MLAPFT b. Cattell
2. Trainers a. BOR*	BOR: Trainers observed during actual training sessions with their students	2. Trainers a. BOR*
3. Attendants a. BOR*		3. Attendants a. BOR*

*Experimenter-structured training sessions were observed rather than the regularly occurring training sessions.

Figure 8. Testing Procedures Before, During and After the Experimental and Control Treatment.

Modified Language Acquisition Program Final Tests (MLAPFT)

description.--The MLAPFT tests the preverbal skills of attending, motor imitation and vocal imitation as well as the early verbal skills of

receptive and expressive language. The complete test form is presented in Appendix K. This test was adapted from the final inventory tests used in Kent, et al.'s (1972) LAP. As stated previously, the LAP was developed for institutionalized severely and profoundly retarded persons who were either nonverbal or in early stages of emergent speech. The final inventories were used in the LAP to determine when criterion levels of performance on parts of the program had been reached. However, in this final inventory form the test scores were not addable to yield a total test score nor had the test's reliability for retarded populations been determined. (In conversations with Kent she reported the test-retest correlations were obtained on young normal populations to compare the sequencing of training items for normals with retardates. Test-retest correlations on the LAP with normals ranged from .8 to .9.) For this study a procedure, described below, was developed whereby the scores for the 29 tests could be added to produce a total test score. In addition the test-retest reliability was determined. The general procedures for administering and scoring the MLAPFT are given in Appendix L.

The total score for any subject on the MLAPFT is a converted total of his correct responses on each of the final tests for each of the 29 parts in the program. Since the final test for each part consists of unequal numbers of test items and therefore different variances, the final test scores were converted to the same metric by calculating the standard deviation which was pooled across groups and/or testing times on each of the 29 final tests and then by dividing each subject's scores on a single final test by that test's standard

deviation. A subject's 29 final tests were all similarly divided by the various standard deviations and the quotients were added to yield a total MLAPFT score.

Reliability.--A procedure was developed to answer two questions relating to these test scores. First, do two examiners observing the same test performance agree on the scoring? A check of examiner agreement was regarded as necessary since assigning a score to a subject required close observation by the examiner of the child's stream of behavior.

Second, what is the conventional test-retest reliability of the total scores used in the hypothesis testing?

To answer these questions a group of 20 retardates, similar in characteristics to those subjects in the study, was selected from the study institution. Table 6 summarizes the characteristics of this sample, and provides data for a comparison of this group with Groups E and C. It will be noted that this sample closely matches the study groups. However, the MLAPFT first test means for pairs of subjects appear to differ greatly: 38.21 (reliability group) and 66.12 (Groups E and C). This apparent discrepancy is a function of the differences in the pooled standard deviation divisors used for the reliability group and for Groups E and C. The standard deviations for the reliability group were higher than those for Groups E and C, thereby resulting in larger divisors and lower total scores in the reliability group.

Though very similar to Groups E and C in IQ and MLAPFT scores, a few students in the reliability group functioned below the lowest students in Groups E and C but generally more reliability group students

functioned above the highest students in Groups E and C. And it was this wide variability of the reliability group which caused its large standard directions on the MLAPFT.

Table 6. Group Ranges and Means for the Reliability Group and Comparison with Combined Group E and C Means.

	Reliability Group Ranges	Reliability Group Means	Group E and C Combined Means
CA	11.68-40.27 yrs.	19.48 yrs.	17.23 yrs.
IQ	5-38	18	11
Years Institutionalized	3.08-28.27 yrs.	12.30 yrs.	12.06 yrs.
MLAPFT 1st test	0.27-80.03	38.21	66.12
MLAPFT retest	0.66-78.53	39.88	-----

To answer the first question, the reliability group subjects were tested in a random order by the examiner who later did the testing for Groups E and C. During testing three of the 20 subjects were on a continual praise and intermittent food reinforcement schedule while the remaining 17 were on praise and token reinforcement. A second examiner, the writer, observed each testing session and independently scored the tests. This was done during the first testing period only and was not repeated in the retest. The sets of scores were then correlated to provide indices of rater agreement. The total score,

as well as the scores for each of the 29 tests of the MLAPFT were correlated. These correlations are presented in Table 7.

Table 7. Inter-Examiner Correlations for MLAPFT Scores for the Reliability Group (n=20).

Test	r
1a.	------
1b.	------
1c.	1.0
1d.	0.952
2a.	0.994
2b.	0.993
3a.	0.989
3b.	0.990
3c.	0.991
3d.	0.977
4a.	0.996
4b.	1.00
4c.	0.990
4d.	0.843
4e.	1.00
5a.	0.998
5b.	1.00
5c.	0.987
5d.	0.997
6a.	0.997
6b.	0.984
6c.	0.997
6d.	0.989
6e.	0.899
7a.	1.00
7b.	0.734
7c.	0.798
7d.	0.954
7e.	0.991
Total scores	0.9961

------Scores were perfect for all subjects.

It is apparent that high scorer agreement was achieved on these tests. On test 7b., "Telling Where an Object Is," the subject was required either to label the room part on or in which an object was placed or to point to the object and give a demonstrative expression ("There," "Here," etc.). It appears that judgment of the correctness of the vocal response may have been more difficult for the demonstrative and the room part words than for any other group of words. (chair, table, floor, box, there, and here.)

The study examiner then readministered the MLAPFT to the same subjects approximately a week following the first testing. The first test and the retest total scores of the same subjects were correlated to determine the test-retest correlation coefficient, i.e., the stability of the test's scores when given to the same subject twice in a short period of time. The test-retest correlation coefficient was 0.9965, representing very high test-score stability. This correlation coefficient was later used in the statistical analysis of the MLAPFT results.

Testing procedures.--All 24 students involved in the study were tested in their own training room on the ward or as close to this room as possible. Each student was individually tested by an author of the original Language Acquisition Program (Kent, et al., 1972) who was intimately familiar with LAP and MLAP testing and training procedures as well as with low-functioning retarded populations. (In prior conversations with Kent and Klein it was reported that unless the examiner was somewhat familiar with severely and profoundly retarded populations,

the students seemed less responsive and spurious testing results were often obtained despite the use of reinforcement during testing.)

Two weeks prior to testing, each student had 5 to 15 minutes of token training with the examiner and the experimenter. During this time it was informally determined whether a token reinforcement system could be used during testing and later training sessions. The particular type of token economy described here is one in which each token does not have a unit value but rather has general association with primary reinforcers; any amount of tokens can be exchanged for a reinforcer during token trade-in times. Briefly, the procedure consisted first of defining one or more responses in the student that occurred often or was easily evoked. This response then would either be commanded by the examiner (and prompted if needed) or the examiner would wait a few seconds for the response to be emitted by the child. These responses included eye contact, hand folding, motor imitative tasks, etc. As soon as the response occurred the child was handed a poker chip token and praised, with an immediate exchange of the token for a choice of edibles (candy, salty foods, drink, soft food, etc.). When a child had no observable desire for edibles, toys were used as reinforcers: e.g., a few seconds of a music box, play with a toy car, or one pull of a pull-string talking toy. This process was repeated a number of times depending upon the child, and then gradually the student was required to hold onto two, then three and four tokens before an exchange was granted. Therefore, a larger number of responses was required for each primary reinforcement, but social praise and tokens remained on a continuous schedule. Next, a token can was introduced

so tokens could be given out more efficiently and retained by the student between exchanges. Most students demonstrated an association of the tokens with the primary reinforcers. That is, it was observed that these students eventually tried to hand the examiner tokens prior to an exchange time as a means of obtaining primary reinforcement; that they cooperated with the introduction of the token can and the gradually increasing delay between token exchanges; that the frequency of the reinforced response increased; and that attending responses increased. The students exhibiting these behaviors at the end of one or two, 5 to 10 minute token training sessions were tested (and later trained) using token reinforcement: i.e., all correct, partially correct, and incorrect test responses were reinforced with praise and a token while token exchanges were given occasionally. The three to four students not displaying behaviors to indicate understanding of a token reinforcement system were tested (and later trained) using praise and intermittent edible or toy reinforcement. The token system was more efficient allowing more trials to be presented since there were less delays for edible reinforcement and continual token reinforcement did not result in satiation on primary reinforcers.

In order to avoid the occurrence of an instructional shaping process or low response levels during testing, all correct, partially correct and incorrect responses of the student were reinforced. However, no instances of a "no response" or disruptive behaviors were reinforced. This contingency resulted in an increase in the number of responses made by the child during testing and a decrease in the disruptive behaviors and no response trials. Also, since the child did

not receive selective feedback on his test performance, his allover performance was greatly improved by testing alone.

The objects used during testing (labeling objects, imitation toys, etc.) were not identical to those used during training. Testing usually was done in one sitting unless it was apparent that the child's inattention interferred with testing. In these few instances testing was ended quickly and repeated in its entirety later that day or the following day. Testing rarely extended beyond an hour and, on the average, lasted less than 30 minutes. The group to which each student had been assigned was not known by the examiner and the testing order was random. All students appeared to relate well with the examiner and it was felt that an optimal sample of each student's early language behaviors had been obtained in all testing interactions.

Cattell Infant Intelligence Scale

Description.--The Cattell Scale tests from the second month of mental development through the fourth year. At the third year, the scale links with items on the Stanford Binet Intelligence Test. There are a total of 113 subtests in the entire scale. Motor items are the main emphasis from the second through the seventh month. Attending to sounds is tested at the second, fourth and fifth months. Verbal concepts are tested at the eighth month (combining two sounds). Although motor imitation tasks predominate until the 23rd to the 24th month, the receptive and expressive verbal factors of understanding commands and using labels are intermittently tested through 30 months.

Generally the Cattell has greater item interest for the young child than other infant tests (London, 1961). This is an important factor in securing optimum performance from young normal children as well as institutionalized profoundly retarded children. Despite its frequent use, the Cattell has not been widely investigated with normal or retarded children (London, 1961). However, it has been shown to have high predictive validity for young mentally retarded children (Erickson, 1968), high test-retest correlation for retarded children, and the sensitivity to discriminate between groups of mongoloid and organically retarded children (Kralovich, 1959).

Reliability.--Using a large sample of mildly retarded children, London (1961) correlated their mental age scores on the Cattell with their retest scores on the Cattell, or another infant scale, or on the Binet, if their MA was beyond 3.5 years. Since testing data was gleaned from medical records, there was no control for the interval between the first test and the retesting. The results showed that a sample of mentally retarded children will demonstrate greater stability of IQ than a sample of average children. London's findings further suggested that the more retarded a child is the more stable would be his IQ. The correlation coefficient obtained for the lowest scoring third of the mildly retarded sample tested was .78. The sample of retardates in this study was drawn from the profoundly retarded population functioning more than three standard deviations below London's sample. Considering this, it is reasonable to assume, on the basis on London's data and without further testing of profoundly retarded subjects, that the test-retest correlation on the Cattell for profoundly retarded

subjects is approximately .80. Therefore, the stability of the IQ in the profoundly retarded subject is assumed to be slightly more stable than it is in the mildly retarded subject. This correlation was later used in the statistical analysis of the results.

Testing procedures.--The Cattell was given to the 24 students in the study on a pretest, posttest basis by an examiner thoroughly familiar with the educational assessment of lower-functioning retarded populations. In addition, the examiner had had some contact with many of the students. All students were tested in a random order; the examiner was unaware of their group membership. All testing was done in a small building within walking distance from the institution. Praise was used by the examiner to reinforce all student responses so as to keep the response level high and to avoid instructional feedback to the student. Tokens and food were used intermittently by the examiner to reinforce students.

Testing was generally begun at a point estimated by the examiner as the student's basal level. Then, as necessary, testing was extended downward to establish a basal and upward to establish a ceiling. Ten of the 24 students were tested on some early items in the Stanford-Binet Intelligence Scale since a ceiling had not been reached by the second half of the third year at which point the Cattell extends into the Stanford-Binet. The testing period ranged from 15 minutes in length to 45 minutes, with an average testing period of 20 minutes. A few students were tested in two shorter sessions due to inattention developing after the first 20 to 30 minutes of testing. However, most

students were given a brief rest from testing by the examiner after 10 to 15 minutes of testing. Test breaks included walks down the hall, food reinforcers, etc.

It was the examiner's opinion that the test results, both pre- and posttests, reflected an accurate estimation of the student's mental ages. As evidence, the examiner noted his familiarity with the students as well as their general high level of cooperation which did not appear to change much from pre- to posttesting.

Behavioral Observation Record (BOR)

Description.--The BOR was developed to record in behavioral terms the ongoing instructional interactions between a trainer and a student. A similar observation technique was reported by Lawrence (1971) to record language training sessions between an experimenter and retardates. The BOR is a coding technique which allows an observer to record the stimuli presented by a trainer to a student, the prompts given to the student, the student's response, and the consequences provided by the trainer after the student's response. An observer, skilled in using this coding technique, can record most instructional interactions occurring within a training dyad. The BOR observation key and a sample recording sheet are found in Appendices M and N respectively.

The basic observation unit in the BOR is called a trial and at the least consists of a stimulus presentation. However, most trials also contained a student response and a consequence provided by the trainer. Five main event categories could occur in each trial in the following sequential order: Attention of the child; Stimulus

Presentation by the trainer; Prompting the child; Response of the child; and Consequence occurring immediately following the child's response. If attention-evoking stimuli were provided by the trainer these were merely classified by the amount of effort exerted (e.g., trainer calls child's name, turns child's head) rather than further recording the attention-evoking procedure as a trial within itself. Stimulus presentation was that category in which the trainer's commands and actions were categorized (e.g., "Show me the car," "What is this?"). Prompts used by the trainer included all cues and physical and imitative assistance provided by the trainer following a stimulus presentation which acted to further evoke a correct or a partially correct response from the child. The student's responses were classified as correct, approximate, incorrect or as a no response. Consequential events were further subdivided into classes of Feedback, Reinforcement, and Other Consequences. Feedback was limited to language training feedback to reinforce learning of specific words (e.g., trainer says, "That's the BALL," after child correctly touches the asked for object). Reinforcement was categorized as to its type: praise, tactual, food, etc. Other consequences included negative comments (e.g., "No," "Bad boy") and temper tantrum intervention procedures or those actions taken by the trainer specifically to control disruptive behaviors (e.g., time out).

In addition to these five main events the interventions by supervising attendants or experimental staff occurring during the instructional interaction between trainer and student could be coded. These generally took the form of praising or assisting the trainer.

Reliability.--During the pilot development of the BOR, it was determined that 3-minute observations were long enough to obtain an accurate sample of the instructional behaviors of a trainer during a particular training session whether it be a retarded trainer or an attendant trainer. Five minute observations did not give much more additional information while 8 or 10 minutes of observation yielded only redundant information. Therefore all BOR observations were timed with a stopwatch to be three minutes in length.

A simple percentage of agreement was calculated to determine how well observers could agree on using the BOR. Whenever two observers recorded the same response this was recorded as an agreement. The total number of responses consisted of the agreement responses plus the total of the nonagreement responses given by each observer. That is, if observer A coded a consequence to include tactual and vocal reinforcement while another observer coded the same consequence to include only the vocal reinforcement, one disagreement would be counted out of a total of two observations. This would yield 50 percent agreement. This is a conservative estimate of agreement since the total count did not include the times when both observers were in agreement that a behavior did not occur and no code was recorded, e.g., both judged, in the example cited, that feedback had not been given by the trainer and therefore coded nothing in the feedback column of that trial.

The final percentage of agreement between observers is based on the average of four pairs of observations made simultaneously but recorded independently by the experimenter and the study's single observer. The observations, each three minutes in length, were done on

the interactions between four different retarded trainers and students in two observation settings: experimenter-structured using students new to the trainer and actual training sessions with regularly assigned students. Three of the observations were made in the former setting while one was made in the latter setting. Two of the retarded trainers observed were trained to use Group E procedures while two remaining used Group C procedures. Percentage of agreement combining all observer responses ranged from 74.0 percent to 94.5 percent across the four pairs of observations. The mean percentage of agreement, 86.4 percent, indicates that the BOR can be used with a high level of consistency by different observers to record the same instructional interaction between a retarded trainer and a student. Separate rater agreement percentages were not calculated for the categories of information later drawn from observations, such as number of student responses during a single observation.

Observation procedures.--As indicated in Figure 8, the BOR was used to observe instructional interactions in two different settings: during actual training sessions with retarded trainers and students and during training sessions especially arranged by the experimenter so as to get samples of attendant and retarded trainer instructional styles before and after treatments. The observer who used the BOR during the training sessions participated in pilot work preceding the study during her last two terms of her senior year. As a psychology major, she was thoroughly familiar with behavioral terminology and quickly gained competence in using the BOR. Since the trainers, students, and attendants had become used to her presence during pilot work

and since she entered training rooms only before training sessions had begun, her presence during observation periods was not regarded as a threat nor as a disruption to training sessions.

The application of the BOR in actual training sessions was repeated for each trainer during the last few days of each of the three experimental phases. These samples, taken at the end of each phase, were meant to reveal the progressive differences that occurred over the study in the instructional techniques used by trainers in the two groups. During these times the observer entered a training room at the beginning of a 20-minute session and, in a predetermined random order, observed the trainer as he or she worked with their student. All observation periods were three minutes in length and the observer had 10 to 20 minutes (depending on whether there were one or two trainers in the room) in which to take the three minute continuous sample. The first few minutes of a training session were never used as part of this observation and generally neither were the last few minutes. This precaution was to avoid recording unrepresentative training periods during which a trainer was either preparing to begin or a student and/or trainer might begin to show some fatigue. The observer waited until it appeared that the trainer and student were settled and into the beginning of an instructional interaction. Once an observation was begun it was continued for three minutes. Therefore, when a student was asked by a trainer to exchange his tokens for a reinforcer, when time outs were given for student misbehavior, or when an attendant gave the trainer an instructional demonstration, training between the trainer and the student stopped but the observation continued. These latter events

occurred primarily in Group E. Because of these interruptions some observations taken during the Group E training sessions may appear far less instructional than others where no interruptions occurred.

A strict arrangement of selecting a randomly determined three minute observation period did not yield good samples of instructional interactions and were very difficult to schedule. For these reasons the observer generally had a 10 minute period of time within which to take a three minute observation.

Group membership of the trainers, though not directly revealed to the observer, became rather obvious because of her familiarity with the MLAP and the obviousness of the differences in training procedures used in the two groups. This difficulty could have been controlled by employing at least two observers either blind to the differences or viewing only one treatment. However, this alternative was not available.

The observer in the experimenter-arranged training settings was the experimenter. These observations were done on a pretest, posttest basis. Each of the retarded trainers and attendants in both groups instructed specially selected students. These students were either nonparticipants in the study with similar levels of functioning or were participant students in training units other than the unit to which the attendant or retarded trainer belonged. Standard instructions were used with the person in the instructor role to inform him of the task, the length of the observation and the reason. These standardized instructions are found in Appendix O. Basically each person observed in the instructor role was asked in a randomly determined order

to train a student on either motor imitation tasks or on receptive labeling tasks. The training levels of the students selected had already been identified by their results on the MLAPFT so that they did not readily perform the tasks presented to them. The persons doing the training were given a choice of three imitative or labeling tasks on which to train the student. They could work with a supply of reinforcers for that child to be used at their discretion.

Those latter observations, as well as those taken of retarded trainers during training sessions, were expected to reveal what training techniques would be used by the instructor and whether the techniques incorporated modeling and reinforcement principles. It was not considered important that the student learn a response during an observation but rather that the student be exposed to consistent, instructional techniques which embodied the reinforcement and modeling principles conducive to learning.

After the BOR observations were taken during training sessions, eleven different categories of information were drawn from the data collected. When observations were taken of attendants and trainers during experimenter-structured situations only nine of these eleven categories of information were drawn from the data collected. The two categories omitted during these observations were the number of reinforcements and the number of instructional demonstrations and comments given to the trainer by supervisory attendants or experimental staff. This was because these did not occur during structured situations. All the categories were calculated in one of three forms: frequency counts of an event observed, percentage of times an event was observed

to occur, or judgment ratings on an event. Appendix N, which gives a sample observation and a frequency, percentage or judgment on each of the eleven categories, should be consulted to illustrate the following explanations.

Five categories of information were collected from the data in a frequency count form.

1. Number of complete trials presented to the student. A complete trial was defined as consisting of at least a stimulus presentation, a correct or approximate response by the student and a reinforcing consequence. It was assumed that the more frequent were the complete trials during a training session the more likely student learning would occur. Therefore, whenever all three events, stimulus presentation, correct or approximate response, and reinforcing consequence were observed to occur in that sequence and during a single trial, one complete trial was counted. Intervening events such as attention-evoking prompts, response prompts, or response feedback could also occur during a complete trial, by definition, but were not necessary for a trial to be regarded as complete.

2. Number of times a student was attending prior to a stimulus presentation. It was assumed that the more often a student was attending the more likely it was that the student would be able to respond correctly, approximately on his own, or that he would be able to benefit from being prompted by the trainer. Therefore, whenever the student's attention was observed to be present, a check was recorded in the attention column. To estimate this category these checks were totalled. In addition, whenever the student's attention was

successfully evoked by the trainer just prior to stimulus presentation, these times were also included in the total attention count.

3. Number of student responses following a stimulus presentation. It was assumed that the more times a student responded, the more likely he would be to make the correct response, thereby facilitating learning. Even incorrect responses, when not reinforced, provide learning feedback to the student. Therefore this count included all student responses, correct, approximate or incorrect, made following a stimulus presentation. Observations of no responses were not included in this count. However, responses prompted by the trainer were counted.

4. Number of times the supervising attendant or experimental staff praised or otherwise reinforced a trainer. It was assumed that these reinforcements were appropriate and acted to increase the quality of instruction given to the student by the trainer. An asterisk was used to record the times a trainer was reinforced by supervisory persons. These asterisks were totalled to estimate this category.

5. Number of times the supervisory attendant or experimental staff provided instructional demonstrations, comments or commands to the trainer. It was assumed that trainers would need varying levels of intermittent instruction throughout the entire study in order that the quality of instruction remain high. Only their frequency and not the comprehensiveness of instructions given to trainers was judged by the observer. All demonstrations on the student by supervisory persons and verbal comments or commands were counted together in this category.

Three categories of information were collected from the observation data in a percentage form.

1. Number of correct and approximate student responses reinforced by the trainer divided by the total number of correct and approximate responses. Since the frequency of responses that are consistently and immediately followed by reinforcing consequences increases over time, this percentage was important in the evaluation of trainer effectiveness. It was not the purpose of the observer to judge the actual reinforcing value of the consequences provided by the trainer. Therefore praise, food, toys, and tokens, when given by the trainer, were recorded as assumed reinforcers. (In all cases trainers and attendants were provided with objects and/or food determined to be reinforcing to the student.) Only rarely were there no positive responses occurring in an entire training session. Since a trainer can easily create opportunities for positive reinforcement to be given (e.g., reinforcing attending responses, prompting correct responses) these rare incidences were scored as 0 percent rather than a "no opportunity." Other cases of 0 percent scores occurred when some correct or approximate responses occurred but none were reinforced.

2. Number of tangible reinforcers given the student simultaneous with praise divided by total number of times tangible reinforcers were given. Since for many students praise was not reinforcing, it was regarded as a desirable procedure to always associate praise with tangible reinforcers as a method of establishing praise as a generalized reinforcer. Therefore, each time was counted that tokens, toys, or food was given to a student; this total was then divided into the

number of times praise was given along with the tangible reinforcer(s). An exception in scoring occurred with trainers not using tangible reinforcers during an observation. This happened quite often in Group C although as mentioned earlier all students were provided with tangible reinforcers. When this occurred a "no opportunity" score was given the trainer. However, when all tangible reinforcers were given without ever being paired with the trainer's praise, this resulted in a 0 percent score.

3. Number of trials when a student made an approximate, an incorrect, or a no response on the preceding trial and the same stimulus presentation was repeated along with student prompting or the same stimulus presentation was merely repeated without prompts on the next trial but this resulted in an improved level of response (approximate or correct) divided by the total number of times these opportunities to prompt the student occurred. It was assumed that the more often a student made a response the more quickly learning would occur: prompting to evoke correct or approximate responses was taught Group E trainers as a strategy to get an unresponsive student to perform, to be reinforced and to eventually associate a particular stimulus presentation with a particular response. Many times opportunities for prompting occur when a stimulus presentation is given and a response delay occurs: i.e., the student does not appear to know how to respond. At these times appropriate prompts could immediately be given without repeating the stimulus presentation. In these cases the student's response in the preceding trial necessarily had had the same stimulus presentation. However, from the observation data these cases could not reliably be

discerned to be appropriate or necessary prompting, but only to be prompting. Since the observer did not make instant judgments as to the appropriateness of the prompt, the information taken from the observation data on prompting had to be limited to those incidents when responses were affected or not affected by the prompt or repetition of a stimulus presentation.

In scoring this category when the trainer observed a need for prompting, and did so, and the resulting response was not improved, this incident was still regarded in the score as an appropriate prompt. However, the next trial following was also regarded as an opportunity for prompting the student and perhaps with stronger prompts.

The three remaining categories of information drawn from the observation data consisted more of judgments made about the particular observation rather than actual frequency or percentage counts. These three categories, therefore, should be interpreted with more caution than the preceding categories which are less judgmental in character.

1. Consistency and appropriate repetition of stimulus presentations. Especially with nonverbal or low-verbal students, it was assumed to be of particular importance that stimulus presentation be consistently given by trainers and that the acquisition of new responses be facilitated by repetition of the same stimulus presentation. Since all stimulus presentations could not be recorded word for word, the actual changes in the verbal form of a stimulus presentation were not observable from the data. But since the observer noted the key word activity or object used in the stimulus presentation, it was possible to tell how often and in what order stimuli were presented. When the same

stimulus presentation was repeated twice consecutively, a single point was awarded; when the same stimulus presentation was repeated three times consecutively, two points were given; and when the same stimulus presentation was repeated four times with at least one prompt during this series of presentations, three points were given. In the latter case if prompts were not given over a series of four repetitions, only two points were assigned and it was regarded as a stimulus presentation repeated three times. To further avoid assignment of points to inappropriate repetition of stimulus presentations which occurred more often in Group C (e.g., student successfully commanded without prompts to put tokens in a can for 10 minutes straight), points were not given to a series of the same stimulus presentation repetitions longer than four with a prompt or three without a prompt. In addition to the above rules, a single point was awarded when eight consecutive trials consisted of stimulus presentations in the same language task category (e.g., labeling common objects, touching body parts, imitative tasks). All points were totalled to yield a score for this category. The higher the score, as in all categories, the better the trainer was assumed to be in this category. Because of the limitation of the observation data collected it is recognized that efforts to rate this category are less reliable than other categories.

2. Appropriate fading of prompts. When prompts or cues are used as a strategy to evoke a correct or an approximate response, it is important that they be gradually faded out so as to bring the response under stimulus control. To judge the trainer's skill in applying

appropriate fading procedures a rough judging technique was employed. One of four ratings could be assigned depending upon a trainer's observation data.

a. No opportunity (N.O.). This rating was given when there was no observed opportunity to fade prompts. This occurred when no prompts were necessary to evoke correct responses, as in review training, and when so few trials occurred during an observation that fading was not possible. The trainer was not penalized for failure to prompt when there did not appear to be an opportunity to do so.

b. Minus (-). This rating was given when the trainer probably could have attempted to fade out prompts but did not do so. For example, a trainer with this rating might continuously give a full prompt (P_3: putting the student through the entire correct response) over a large portion of the observation without ever testing to see if a withdrawal or a decrease of the prompt could be made.

c. Plus (+). This rating was given when prompts were inappropriately increased rather than kept at the same level unnecessarily (as in b.). For example, a trainer with this rating might use a medium level of a prompt (P_2: helping the student through the initial portion of the response to evoke a correct response) and then in the next trial use a full prompt to evoke the same correct response (P_3: helping the student through the entire response). Also, a trainer could unnecessarily begin prompting a response formerly evoked without prompts in a preceding trial.

d. O.K. This rating was given when there was some evidence of successful fading or of attempts to fade by the trainer. In the

first case a trainer could decrease the level of prompts or cues given the student or could fade them out altogether while the student would continue to respond at an approximate or correct level. In the second case a trainer could attempt to fade by "testing" the student's response strength and decreasing or omitting a prompt or cue but reinstating it when the student stopped responding or began responding incorrectly.

3. Appropriateness of task to the student. If the language training is initiated at a level just above the child's independent level of performance there is a higher probability that learning will occur than if training is begun below or too far above that independent level of performance. Since all trainers and attendants in both groups were informed of the language training levels appropriate for each student, this rating was deemed fair. One of three ratings was roughly assigned to an observation depending upon the student's observed responses.

a. Minus (-). Training tasks were regarded as too easy when all the observed responses were correct and no prompting or cues were given by the trainer.

b. Plus (+). Training tasks were regarded as too difficult if the student's responses were all incorrect or were nonoccurring and prompts were given by the trainer at least once during the observation (if no prompts in this case were given a + rating would not be given to the trainer but rather an Appropriate rating since one could not be sure that the tasks were too difficult; this trainer's score in the category of percentage of appropriate prompting would reflect his failure to prompt).

c. Appropriate (A). When the tasks presented to the student appeared appropriate to his level of performance an "A" rating was given; the student's responses probably included a combination of correct, approximate, incorrect and no responses and may have included some prompted responses.

Hypotheses

As previously mentioned, the unit of analysis in this study for both groups was the mean score on the dependent variables of the two students trained by the same trainer. This was so because neither student's score in a pair of students was independent of the other's score since they were both trained by the same trainer, and therefore, the comparison of the two groups may be actually regarded as a comparison of trained trainers (Group E) versus untrained trainers (Group C). Each trainer was rated by the mean growth score of his pair of students on both measures.

Therefore the two main hypotheses tested by this study are:

1. For the Modified Language Acquisition Program Final Tests, the overall group mean of the mean score of each pair of students trained by a single trainer in Group E will be higher than the group mean of mean scores for pairs of students in Group C.

2. For the Cattell Infant Intelligence Scale, the overall group mean of the mean scores of each pair of students trained by a single trainer in Group E will be higher than the group mean of mean scores for pairs of students in Group C.

Treatment of the Data Relating to the Major Hypotheses

To test the two main hypotheses comparing the effectiveness of the Group E trained trainers with Group C untrained trainers, the statistical analysis was based on the mean scores on both dependent variables of the pairs of students trained by the same trainer for each group. A one-way ANOVA was done on the index of response for each of the two dependent variables: the Cattell Infant Intelligence Scale scores and the MLAPFT scores. Since the unit of analysis was the pair of subjects trained by each trainer, the scores used in the analysis were the mean scores of the two students on both variables.

The index of response analysis requires that Z scores, obtained in the following way, be analyzed by a one-way analysis of variance rather than merely analyzing pure gain scores:

$$Z = Y - KX$$

where: Y = the posttest of the dependent variable,

X = pretest on the dependent variable,

and K = the known test-retest correlation coefficient for the dependent variable.

Use of this particular analysis, in addition to the random assignment of attendants and trainer-child pairs to groups, improved the precision of the analysis of results by subtracting the retest error from the pretest, posttest difference prior to analysis, i.e., an effort to decrease the probability of committing a type II error (acceptance of the null hypothesis when it is false) while holding the probability of a type I error (rejection of the null when it is true) constant.

Where probability values were determined, the alpha level was set at .05.

No attempt was made to statistically analyze the related questions involving the observational data. Because of the complexities and problems of interpretation inherent in post hoc statistical analyses, these questions, concerning the nature of the treatment, were informally answered by comparing the mean category scores of both groups of attendants and trainers observed during different phases of the study.

CHAPTER III

RESULTS

Hypothesis

It was hypothesized that after eight weeks of training the students in Group E would demonstrate more gains in prelanguage and early language skills than would students in Group C. These skills were measured by the MLAPFT before and after the training period. As previously explained, the pretest scores (X scores) for both groups were first averaged across pairs of students trained by the same trainer. This same procedure was repeated with the posttest scores (Y scores). Next, the error inherent in the measure itself, estimated by the test-retest correlation coefficient, or K was removed from the gain made by the students by first multiplying the pretest score by the test-retest correlation coefficient. The test-retest correlation coefficient for the MLAPFT, as previously mentioned, was .9965. Finally, this product was subtracted from the Y scores to yield a Z score for each pair of students. The formula below summarizes this transformation:

$$Z = Y - KX$$

Next, a one-way analysis of variance was done on these Z scores to determine in a rather precise way which group's mean post score was greater. The mean Z score on the MLAPFT for Group E was 18.33 with a standard deviation of 13.49 while the mean Z score for Group C was 0.65

with a standard deviation of 3.09. Raw pre- and posttest scores for the total test and its seven phases for all pairs of students are reported in Appendix P. The results of the one-way analysis of variance of the index of response are reported in Table 8.

(The decision to employ an analysis of variance of index of response was made prior to the determination of the near perfect test-retest correlation. Despite this fact this analysis was used rather than an analysis of variance of gain scores.)

Table 8. Analysis of Variance of Index of Response on the MLAPFT Group Means of Mean Scores for Pairs of Students.

Sources of Variation	df	MS	F	p less than
Between groups	1	937.32	9.78	.01
Within groups	10	95.83		
Total	11			

These results are interpreted to mean that the gain in language skills in Group E was significantly greater than the gain in Group C at the .01 level of significance. Therefore the null hypothesis of no difference between the groups in MLAPFT Z scores can be rejected.

These results indicate that retarded trainers using a developmentally ordered language training program which incorporates principles of modeling and reinforcement and being supervised by attendants skilled in applying the language program are significantly more effective at training language skills in profoundly retarded students than

are similar trainers untrained in these techniques and using unstructured play methods of training with untrained attendant supervision.

An examination of the raw gain scores (posttest score minus pretest score) of pairs of students in Table 9 reveals some interesting information on the effectiveness of specific trainers. In Group C it appears that the lack of structured training procedures resulted in little gain by students and no differentiation of trainer effectiveness.

Table 9. Raw Gain Scores on the MLAPFT for Pairs of Students in Groups E and C.

Group E Trainer	Raw Gain Score	Group C Trainer	Raw Gain Score
E-1	+4.76	C-1	+2.11
E-2	+23.39	C-2	+2.57
E-3	-2.45	C-3	-3.41
E-4	+26.42	C-4	-3.70
E-5	+26.93	C-5	+1.67
E-6	+29.49	C-6	+3.30

However, in Group E, it is apparent that four of the trainers were responsible for the significant mean gain of the entire group. Also, the students of two of the six trainers made little or no gain. These two trainers had the lowest IQ scores of all 12 trainers (19 and 21) and, in addition, their students' IQ scores and attending skills were in the lower range of the student participants. One of these two trainers continually forgot common aspects of the routine training procedure such as turning the training card, turning only one training card at a time, giving tokens along with praise, etc. It is difficult to know whether

the lack of gain in language skills is due to the less attentive and intelligent students, the less skillful and intelligent trainers, or an interaction between the two.

In addition, these mean gain scores could mask a trainer who was effective with one student but ineffective with another student. However, an examination of the raw MLAPFT scores for single students did not reveal this occurrence in either group.

Efforts were made to control the variable of training time. This variable affected all participants in the study. Students received instructional time from their trainers, trainers received instructional time from the experimental staff and their supervising attendants while attendants received instructional time from experimental staff.

The time spent by students with trainers in language training sessions was not significantly different across all phases nor during any single phase and therefore this variable cannot account for the difference in gains made by the two groups. The F-tests on the mean number of training hours given to students, averaged first across pairs of students trained by a single trainer, then averaged across the groups, are reported in Table 10.

The amount of time trainers spent with experimental staff during Phase I and with experimental staff and their supervising attendants during Phases II and III also was not significantly different between the two groups as reported in Table 11.

The amount of time attendants in both groups spent with experimental staff, perhaps most important during Phase I and II, was

Table 10. Group Means for Number of Training Hours During Phases for Groups E and C Students.

Variables	Group E (n=6)	Group C (n=6)	F*
Phase I	2.56	2.83	.87
Phase II	2.45	2.75	.70
Phase III	8.48	7.31	2.33
Total	13.22	12.48	.76

*No F-values were significant at the .05 level.

Table 11. Group Means for Number of Hours with Experimental Staff and Supervising Attendants for Group E and C Trainers During Phases of the Study.

Variables	Group E (n=6)	Group C (n=6)	F*
Phase I	8.33	7.50	.39
Phase II	7.67	7.33	.31
Phase III	27.00	22.83	3.28
Total	43.00	37.67	3.69

*No F-values were significant at the .05 level.

also not significantly different between the two groups and cannot account, therefore, for the differences in student gains. Table 12 reports these results; the total figure is a total taken across the two instructional phases, Phase I and II, while Phase III, although listed,

did not include much contact time between experimental staff and attendant staff and merely represents the mean amount of time each attendant spent independently supervising their training units during Phase III.

Table 12. Group Means for Number of Hours of Contact with Experimental Staff for Attendants in Groups E and C During the Phases of the Study.

Variables	Group E (n=3)	Group C (n=3)	F*
Phase I	4.67	4.00**	.40
Phase II	10.67	9.00	1.14
Phase III	26.33	24.67	.28
Total I and II	15.57	13.33	1.69

*No F-values were significant at the .05 level.

**For two of the three attendants in Group C these hours of training were given during Phase II's time period although they were spent in Phase I activities: this was due to the replacement of two Group C attendants during the second and fourth weeks of the study and the need to make up training hours lost.

In the interpretation of these results, the preceding variables, alone or in combinations, cannot be regarded as those responsible for significant differences between the groups, since they were controlled across the two groups. Therefore, the significant difference in language skills demonstrated between the two groups on the posttest is interpreted as being due to the reinforcement and modeling methods and the developmentally ordered, language training program in which Group E attendants and trainers were instructed.

It also was hypothesized that after eight weeks of training the students in Group E would demonstrate more gain in mental age than would students in Group C. Mental age was measured by the Cattell Infant Intelligence Scale. The same procedure used to obtain Z scores for the language measure just reported was repeated with the pretest, posttest mental age estimates. The test-retest correlation coefficient for the Cattell used in this transformation was .80. The results of the one-way analysis of variance are reported in Table 13.

Table 13. Analysis of Variance of Index of Response on the Cattell Mental Age Group Means of Mean Scores for Pairs of Students.

Sources of Variation	df	MS	F	p less than
Grand Mean	1	247.88	131.18	.0001
Between Groups	1	1.87	0.99	.34
Within Groups	10	1.89		
Total	12			

The between group results in the second line of Table 11 are interpreted to mean that the gain in mental age in Group E was not significantly greater than the gain in Group C at the .05 level of significance. Therefore, the null hypotheses of no difference between the two groups in the mental age Z scores cannot be rejected.

The failure to find a significant difference between groups as reported in Table 13 can be partially explained in a number of ways. First, the length of treatment may not have been enough to affect mental age gains, although language skill gains were made. In a prior

chapter, the high stability of the MA in lower functioning retarded persons was discussed (London, 1961). In this study, the trend noted in the MA gain scores for both groups, 1.1 months in Group E and 0.8 months in Group C, is in the predicted direction, making plausible the hypothesis that the difference between the groups would increase as training time increased.

A second explanation may be given for the results reported in Table 11 which concerns the skills tested by the Cattell. However, this explanation is somewhat incongruous with the preceding discussion regarding length of treatment. It was noted earlier that a smaller number of items in the Cattell test prelanguage and early language skills than test fine and gross motor skills, social skills, and cognitive skills other than language. For example, an examination of the test manual (Cattell, 1960) reveals that during the second to the seventh month, the main skills tested are motor skills. An informal task analysis of language related skills in the Cattell reveals that some attending skills are tested during the second to the seventh month and some motor and vocal imitation skills are tested from the eight to the twentieth month; but, the early receptive and expressive language skills are not tested until later months, primarily from the sixteenth through the thirtieth month.

An examination of the students' mean pretest mental age reveals that most students in both groups reached ceilings on the Cattell prior to the sixteenth month. Therefore, the average mental age for students in both groups was not as heavily dependent upon the language

skills trained in Group E as they were upon skills such as motor, social, and cognitive skills other than language.

It is of interest to examine gains in mental age apart from the above comparison of differences between the two groups. On the basis of previous research it would be predicted that retardates at this profound level would make no MA gains. Fisher and Zeaman, (1970, p. 161) referring to MA growth, state, "The Profounds flatten off before 15 years." However, as reported in Table 14, gains were prevalent in both groups when all but four of the 24 subjects were close to or over 15 years of age. Also three out of these four younger students made gains below the mean gain of 0.9 months which cannot, therefore, account for the growth in both groups. Eight of the subjects made zero gain or gains less than 0.5 months, the result that would be anticipated. But many made gains over this short period that represent appreciable growth.

When the grand mean MA gain for both groups is compared to the expected gain of 0 in a one-way analysis of variance of the index of response, the significance of this gain is illustrated. As shown in the first line of Table 13, this difference is significant at the .0001 level of probability. These results are interpreted to mean that the combined group gain in MA is significantly greater than the 0 gain which would be expected for similar students not spending time with retarded trainers or not being exposed to other instructional treatments.

Despite the preparation of their trainers, students beyond the MA growth ceiling are still apt to make significant MA gains by merely spending time with retarded trainers. As mentioned earlier, this

Table 14. Chronological Ages, Pre- and Post-Mental Ages and Mental Age Gains for Students in Groups E and C.

Student	Pre CA (yrs.)	Pre MA (mo.)	Post MA (mo.)	Gain (mo.)
		Group E		
1	16.08	18.2	18.8	0.6
2	18.75	16.4	17.2	0.8
3	20.08	13.6	16.8	3.2
4	13.00*	23.6	27.2	3.6
5	15.58	5.8	6.8	1.0
6	6.83*	7.2	7.6	0.4
7	19.83	22.4	22.4	0.0
8	17.75	26.4	27.8	1.4
9	19.42	19.2	19.2	0.0
10	21.33	24.2	26.0	2.2
11	19.33	29.8	29.8	0.0
12	25.33	25.6	25.6	0.0
Group Means	17.78	19.37	20.43	1.1**
		Group C		
1	15.25	12.8	15.4	2.6
2	15.67	14.2	15.2	1.0

Table 14. Continued.

Student	Pre CA (yrs.)	Pre MA (mo.)	Post MA (mo.)	Gain (mo.)
3	12.08*	7.4	8.0	0.6
4	14.67	21.0	21.2	0.2
5	19.08	15.2	16.0	0.8
6	19.17	18.2	18.2	0.0
7	19.75	23.4	24.4	1.0
8	20.08	27.8	27.8	0.0
9	14.50	20.4	21.6	1.2
10	24.50	23.2	22.2	1.0
11	17.75	18.6	19.4	0.8
12	7.33*	7.8	8.4	0.6
Group Means	16.65	17.50	18.15	0.8**

*Students with CAs under the MA growth ceiling.

**The transformed Z score gain difference between groups as reported in Table 13 is not significant at the .05 level.

gain could be due in part or total to an improvement in the students' test-taking behaviors--e.g., sitting, working with objects at a table, and attending to people and objects.

Informal Questions

To determine the quality of the training given to students by Group E trainers and indirectly by attendants, observations were gathered with the BOR. These data were evaluated to more carefully define the actual procedures used by trainers and attendants in Group E as compared to Group C in order to provide objective evidence of the treatment differences. All the three-minute observations were taken in one of two different settings.

1. Regular training sessions with assigned students (Phase I, Phase II, and Phase III observations).
2. Experimenter-structured training sessions with newly assigned students (pre- and post-observations).

Only retarded trainers were observed in the first setting, while both retarded trainers and attendants were observed training new students in the experimenter structured training sessions.

The results of observations taken in regular training sessions and the related questions are reported and discussed first. Some of these observations were missing because of the illnesses or absences of trainers or students. Table 15 reports the number of observations taken in each group during each phase of the study. Since each trainer was observed with both students, a total of twelve observations was possible for each group in each phase. Mean group scores were computed on

the number of observations taken in each group for each phase with the number varying from 8 to 12.

Table 15. Number of BOR Observations Taken of Trainers During Regular Training Sessions.

	Phase I	Phase II	Phase III
Group E	8	12	12
Group C	8	10	11

Next, the results of the observations taken of trainers and of attendants in experimenter-structured training sessions and the related questions are presented and discussed. No observations for attendants or for trainers were missing from the data collected in the experimenter-structured setting. In all the graphs Group E trainers and attendants are represented by solid lines while those in Group C are represented by broken lines.

It was not the intent of the writer to statistically analyze these observational results, but instead to treat this data as exploratory in nature and to seek out general trends rather than to test specific hypotheses.

Questions and BOR Results for Trainers in Regular Training Sessions

1. Would Group E trainers have a greater average frequency or percentage of the following categories of training behaviors than trainers in Group C?

a. Number of complete trials presented.

Figure 9 presents the results of the observations taken to answer this question.

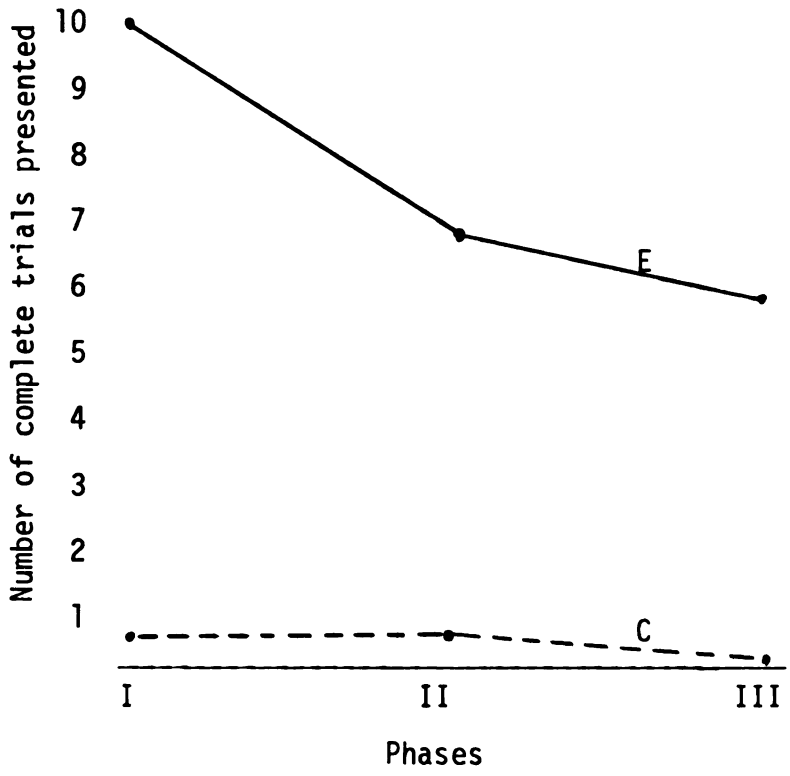


Figure 9. Mean Number of Complete Trials Presented by Trainers During Three-Minute Observations Taken During Regular Training Sessions at the End of Each Phase of the Study.

Complete trials consist of a stimulus presentation given by the trainer, a correct or approximate response by the student, and a reinforcing consequence. Group E trainers consistently presented more complete trials than did trainers in Group C. Therefore, the students in Group E had more opportunities for learning to occur, i.e., correct and approximate responses given by the student after a stimulus presentation were positively reinforced by the trainer. The most frequently missing event in

the Group C trials were the reinforcing consequences provided by the trainer. Although they presented stimuli to their students in the form of questions and commands with or without materials, Group C trainers more often failed to reinforce their student's approximate and correct responses. Therefore, although many trials may have been presented in Group C, they were often incomplete because the reinforcing consequences were not provided. Another factor contributed to the recording of incomplete trials: namely, the omission of stimulus presentations in the form of commands or questions. For example, in a few observations the student repeatedly dropped poker chips into a can while the trainer intermittently talked to the student but did not attempt to direct the student's responses.

The drop in mean number of complete trials presented in both groups over the three phases is a trend noticeable in most of the categories of training behavior observed. This phenomenon will be discussed in the final chapter.

b. Number of trials when the student was attending prior to a stimulus presentation.

Figure 10 presents the results of the observations taken to answer this question.

Group E students were observed to have a higher mean number of attending responses made just prior to the trainer's stimulus presentation than did Group C trainers. Attending included the times a student attended on his own as well as the times he was prompted by the trainer to attend preceding the presentation of stimulus materials, question or command. The failure to reinforce attending and other

responses less often in Group C probably resulted in the observed lower frequency of attending responses. Also, the lowered attention level would most likely result in a lower rate of learning and therefore correct responses would be made less often.

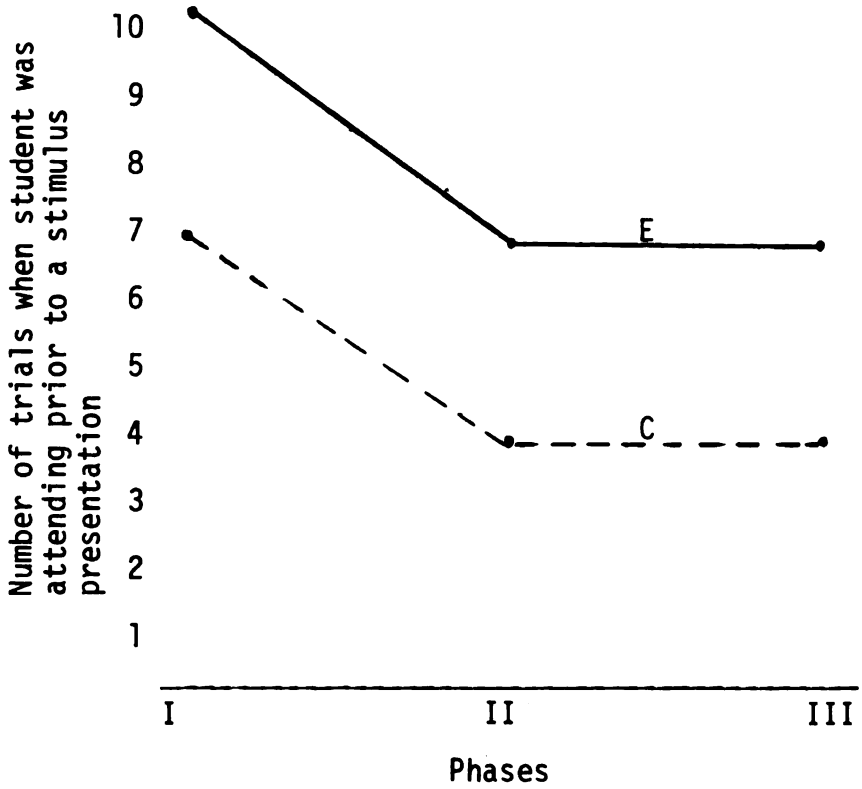


Figure 10. Mean Number of Trials when the Student was Attending Prior to a Stimulus Presentation During Three-Minute Observations Taken During Regular Training Sessions at the End of Each Phase of the Study.

The decreasing trend was again observed in both groups across the first two phases. However, the frequency of attending response remained stable from the second to the third phase in both groups.

c. Number of student responses.

Figure 11 presents the results of the observations taken to answer this question.

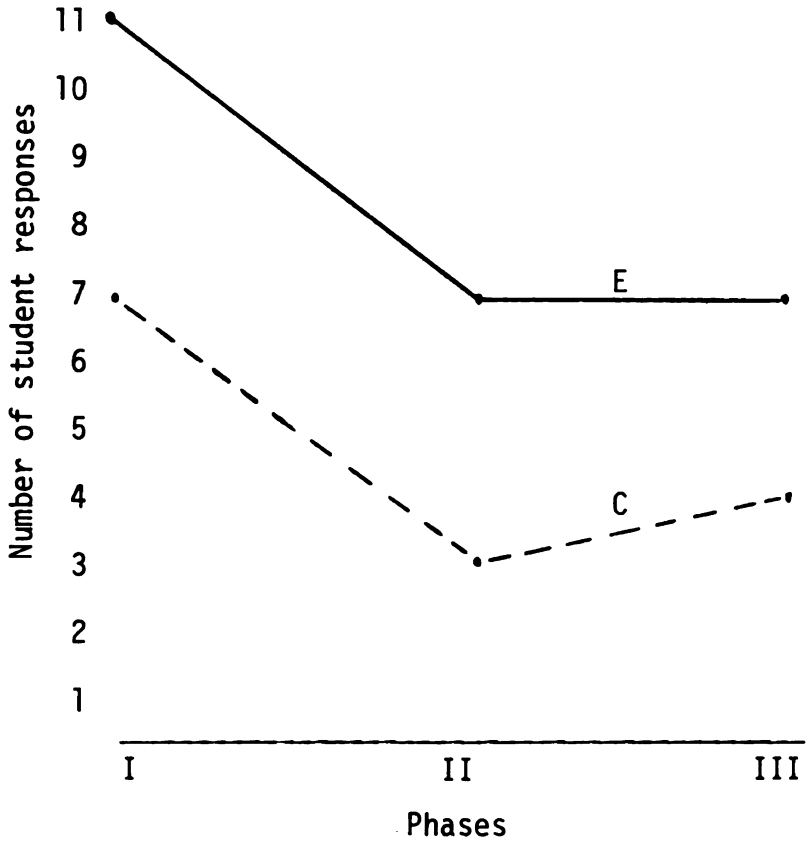


Figure 11. Mean Number of Responses Made by the Student During Three-Minute Observations Taken During Regular Training Sessions at the End of Each Phase of the Study.

Responses counted included incorrect as well as correct and approximate responses. Students in Group E made more responses than did Group C students. Although this graph does not reflect the intent or correctness of the student's responses, mere frequency still reflects a group difference. A large decrease in responses exists in both groups from Phase I to Phase II.

The differences between Figure 9, number of complete trials, and Figure 11, number of student responses, for both groups illustrates some interesting points. Since Figure 9 includes only correct and approximate responses and Figure 11 includes incorrect responses as well, it seems that Group E students made few incorrect responses during the observations. The close similarity in the curves for Group E in these two figures may be explained by the fact that trainers were not only taught to train at levels just above the student's independent level of responding but also because these trainers quickly prompted the student when he failed to respond on his own. Both these factors resulted in more approximate and correct responses, and the potential for more complete trials. However in Group C, the curves in Figure 11 and Figure 9 are not parallel. This may be due to the lack of reinforcing consequences or stimulus presentations needed for complete trials or perhaps it is due to the lower attending levels and higher level of incorrect responses.

d. Percentage of correct and approximate student responses reinforced by the trainer.

Figure 12 presents the results of the observations taken to answer this question.

The data in Figure 12 suggests that Group C trainers fail to reinforce students for correct and approximate responses while Group E trainers display a consistently high tendency to reinforce students. Despite the general reinforcing quality of the daily training sessions for students in both groups, the additional differential reinforcement given by Group E trainers was necessary for specific learning to occur.

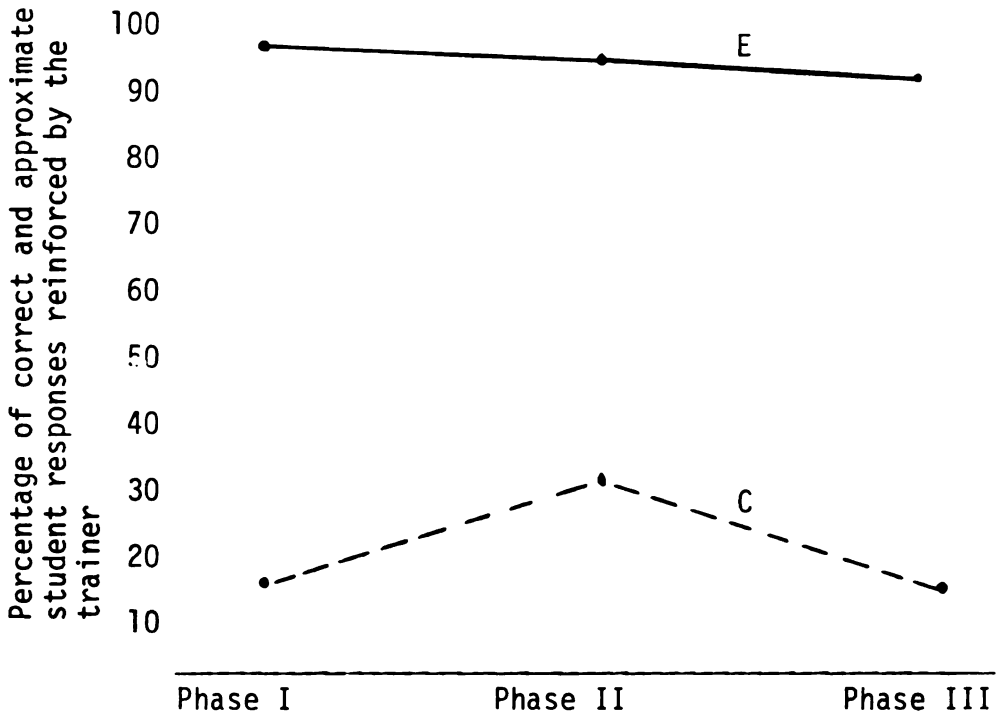


Figure 12. Mean Percentage of Correct and Approximate Student Responses Reinforced by the Trainer During Three-Minute Observations Taken During Regular Training Sessions at the End of Each Phase of the Study.

d. Percentage of tangible reinforcers given simultaneously with praise.

Figure 13 presents the results of the observations taken to answer this question.

Tangible reinforcers consisted of food, toys, or tokens, while praise generally took the forms of "Good boy (girl)," or "Good," often coupled with smiles and/or pats. Tangible reinforcers had to be given in order for a percentage score to be calculated for a trainer. Some trainers did not give any tangible reinforcers during an observation. This is illustrated in Figure 13 by Group C during Phases II and III where no tangible reinforcers were given, thereby resulting in an

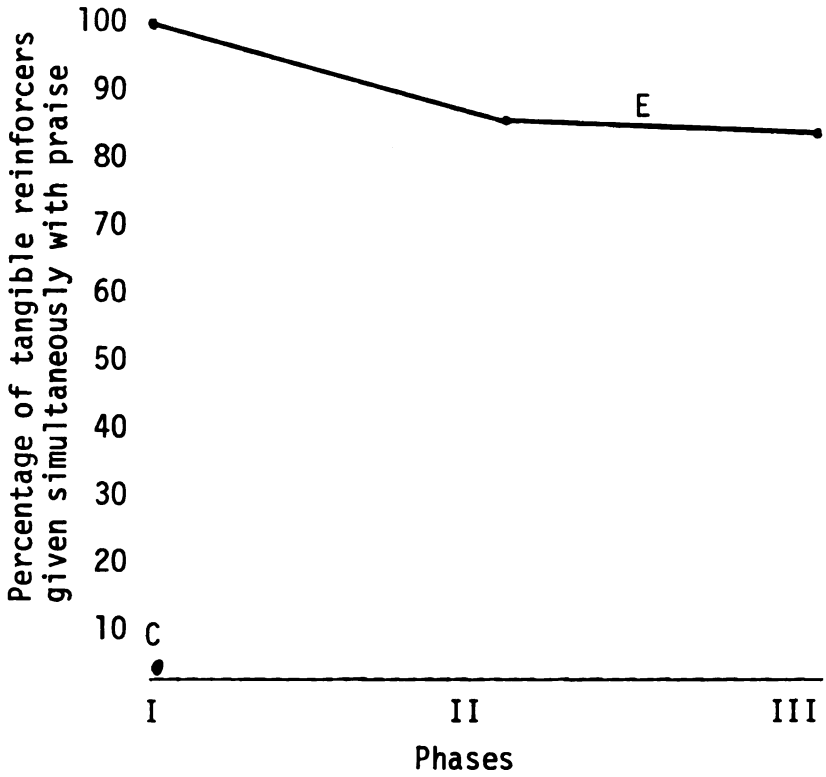


Figure 13. Mean Percentage of Tangible Reinforcers Given by the Trainer Simultaneously with Praise During Three-Minute Observations Taken During Regular Training Sessions at the End of Each Phase of the Study.

absence of percentage scores for these times. Table 16 presents the number of trainers giving tangible reinforcers upon which the percentages in Figure 13 are based. For example, in Figure 13 the mean percentage score of 99 percent for Group E during Phase I was based on the performance of seven of the eight trainers observed. One trainer out of eight did not have an opportunity to give tangible reinforcers, while the seven that were observed to give tangible reinforcers to students praised them simultaneously on the average of 99 percent of the time.

In this category, Group E trainers generally gave tangible reinforcers simultaneously with praise. Group C trainers were rarely

Table 16. Number of Trainers Giving Tangible Reinforcers During Observations of Training Sessions.

	Phase I	Phase II	Phase III
Group E	7 of 8	10 of 12	9 of 12
Group C	3 of 8	0 of 10	0 of 11

observed to give tangible reinforcers and when they did, during Phase I, no praise was coupled with the tangible reinforcers. Since many students were not observed to be reinforced by praise alone, food or toy reinforcers had been identified and were made available for all students. These were rarely used by Group C trainers. Token reinforcement procedures, taught to Group E trainers, were never used by Group C trainers. Therefore, the opportunity to teach students to associate praise with tangible reinforcers was not used by Group C trainers.

The information from Figures 12 and 13 together leads one to conclude that the majority of "reinforcers" given by Group C trainers, especially in Phase II and III, were praise; and the reinforcing power of this praise, because it was not coupled with tangible reinforcers, can be questioned. However, Group E students by being exposed to tangible reinforcement and praise simultaneously were learning to regard the trainer's praise as reinforcing.

e. Percentage of appropriate prompts.

Figure 14 presents the results of the observations taken to answer this question.

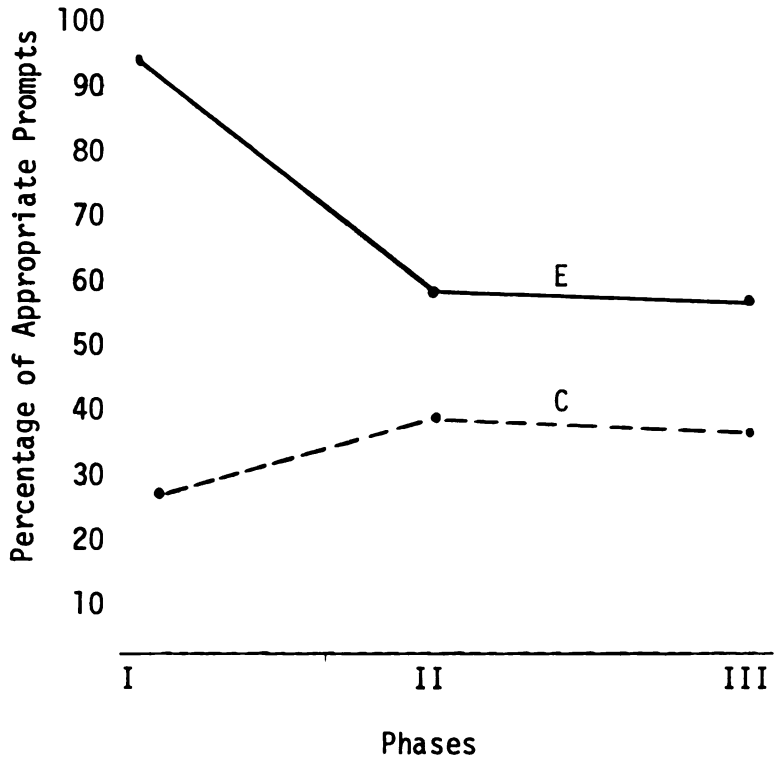


Figure 14. Mean Percentage of Appropriate Prompts Given by the Trainer During Three-Minute Observations Taken During Training Sessions at the End of Each Phase of the Study.

Appropriate prompts included those times when a student made an approximate, an incorrect, or a no response on the preceding trial and the same stimulus presentation was repeated along with student prompting; or the same stimulus presentation was merely repeated without prompts on the next trial, but this resulted in an improved level of response (approximate or correct). Prompts had to be given by a trainer in order for a percentage score to be calculated. However, some observations had no incidents of prompting--either the student was responding well and needed no assistance or the trainer failed to prompt every time it was needed. Table 17 presents the number of trainers giving prompts, appropriate or inappropriate, during the

observations and upon which the percentages in Figure 14 are based. Therefore in Figure 14 the mean percentage score of 93 percent for Group E during Phase I was based on the prompting performance of seven trainers out of eight observed. One trainer did not have an opportunity to prompt while the other seven observed, prompted appropriately on the average of 93 percent of the time.

Table 17. Number of Trainers Prompting Students During Observations of Training Sessions.

	Phase I	Phase II	Phase III
Group E	7 of 8	6 of 12	7 of 12
Group C	5 of 8	5 of 10	7 of 11

Based on this smaller number of observations Group E trainers still tended to prompt appropriately more often than did Group C trainers. The rules for appropriate prompting perhaps were more difficult for retarded trainers to implement than were some of the other categories of instructional technique taught to Group E trainers. Group E demonstrated a rather large drop during Phase II in their observed ability to appropriately prompt while Group C trainers improved somewhat.

2. Would Group E trainers have higher average judgment ratings than Group C trainers in the following areas?

a. Consistency and appropriate repetition of stimulus presentations.

Figure 15 presents the results of the observations from which judgments were made to answer this question.

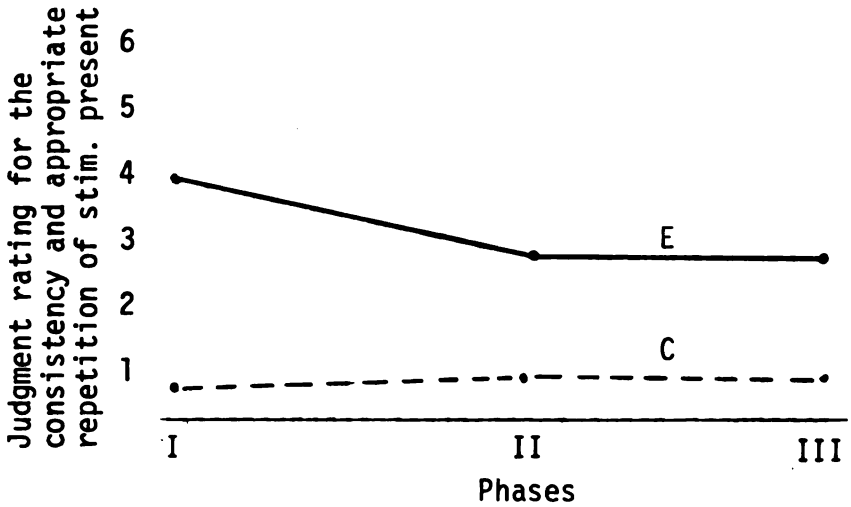


Figure 15. Mean Judgment Ratings for the Consistency and Appropriate Repetition of Stimulus Presentations by Trainers During Three-Minute Observations Taken During Regular Training Sessions at the End of Each Phase of the Study.

Points were given to an observation depending upon how often and in what order stimuli were presented to the student. Group E trainers were programmed to present tasks in a particular order with certain repetitions depending upon how the picture task training cards were arranged by the experimenter or the supervising attendant. Therefore they tended to present tasks more consistently and with more appropriate repetitions than did Group C trainers who did not have training cards as guides.

b. Appropriate fading of prompts.

Table 18 presents the results of the observations from which the judgments were made to answer this question.

Table 18. Mean Percentage of Appropriate Fading of Prompts, Overprompting, Unnecessary Prompting, or No Opportunity to Prompt Done by Trainers During Training Session Observations.

	Phase I		Phase II		Phase III	
	Group E	Group C	Group E	Group C	Group E	Group C
Judgment: OK good fading of prompts	25	0	0	0	17	9
Judgment: + overprompting	12	38	17	0	17	9
Judgment: - Unnecessary Prompting	25	25	0	0	8	18
Judgment: N.O. No opportunity to fade prompts	38	38	83	100	58	63

On the average Group E trainers tended to fade prompts more often than Group C trainers. The percentages also seem to indicate that there were slightly more times Group C trainers did not have an opportunity to fade prompts. This could in turn be due to an inappropriate level of task difficulty; when tasks are too difficult there would be no opportunity to fade prompts and when tasks are too easy there would be no opportunity to prompt. No trend is apparent in the two inappropriate fading techniques used by trainers. The skills of prompting and fading of prompts are difficult even for the nonretarded trainer and, as is illustrated by these results, also proved difficult for the supervised trained retarded trainer.

c. Appropriateness of task to student.

Table 19 presents the results of the observations from which the judgments were made to answer this question.

Table 19. Mean Percentage of Trainers Providing Appropriate, Difficult, or Easy Tasks for Students as Observed During Training Sessions.

	Phase I		Phase II		Phase III	
	Group E	Group C	Group E	Group C	Group E	Group C
Judgment: Appropriate	88	38	75	50	75	27
Judgment: too difficult	0	0	0	20	0	18
Judgment: too easy	12	62	25	30	25	55

Although differences are not as large as with some other categories, it is still apparent that Group E trainers performed better than Group C trainers--they presented tasks at appropriate levels of difficulty more often than Group C trainers. That is, their students tended to make many correct and approximate responses but still needed intermittent prompting when errors were made. Group E trainers also made errors in the level of task difficulty less often than Group C trainers. It is interesting to note that Group E trainers were never judged to make the tasks too difficult during the observations taken, although at times they did make the tasks too easy. The judgment that the tasks were too easy refers to a performance in which a student made

no errors or very few, and in which he gave all correct responses needing no prompting (i.e., prompts given following an error on the same task). This would appear to be a lesser training error than making tasks too difficult. In fact, review training or overlearning of newly acquired tasks is used as an effective strategy to increase the retardates' retention of learned responses (Denny, 1966; Kent, 1972).

> The retarded appear to benefit more from repeated presentations (trials) during original learning (overlearning) than do normals, and like normals, this repetition gives the biggest return when it is fairly well spaced within a session and across sessions. Such a procedure permits many different stimulus elements to participate in the control of the approximate response (meaning). With the repeated use of many different stimulus contexts, the effects of stimulus generalization are greatly increased, and transfer becomes possible (Denny, 1966, p. 8).

It is of interest to contrast the mean BOR scores of individual Group E trainers in the nine categories of training behavior observed during regular training sessions with the mean untransformed MLAPFT gain made by each trainers' students. This information is presented in Table 20. The skill of Group E trainers to produce gains in the language scores of their students is reflected in varying degrees by the first three BOR categories listed in Table 20.

1. number of complete trials presented
2. number of trials when the student was attending prior to a stimulus presentation
3. number of student responses

In Table 20 trainers 1 and 3, whose students made little or no language gain, consistently demonstrated lower mean frequencies of these training behaviors in an average three-minute observation taken during regular training sessions.

Table 20. BOR Scores for Group E Trainers Taken During Regular Training Sessions and Averaged Across the Three Phases and Two Students Assigned to Each Trainer and Untransformed MLAPFT Gain Scores for Group E Student Pairs.

BOR Score Categories	Trainer 1	2	3	4	5	6
1. number of complete trials presented	3.5	6.0	4.8	7.7	7.8	11.0
2. number of trials when the student was attending prior to a stimulus presentation	3.8	6.8	5.0	8.7	11.3	11.7
3. number of student responses	3.8	6.7	5.5	8.7	9.3	11.8
4. percentage of correct and approximate responses reinforced by trainer	90%	92%	92%	93%	100%	100%
5. percentage of tangible reinforcers given simultaneously with praise	100%	100%	66.7%	76.8%	100%	87.3%
6. percentage of appropriate prompts	100%	80%	0%	62%	100%	50%
7. consistency and appropriate repetition of stimulus presentation	2.3	2.3	2.0	3.2	3.3	6.5
8. appropriate fading of prompts (fraction of time for each rating)	-	OK (½) + (¼) - (¼)	+	OK (½) + (½)	N.O.	N.O.
9. appropriateness of task to student (fraction of time for each rating)	A	A	A	A (½) - (½)	A (½) - (½)	A (¾) - (¼)
Untransformed MLAPFT Gain Scores for Pairs of Group E Students Trained by the Same Trainer	+ 4.76	+23.39	-2.45	+26.42	+26.93	+29.49

To a lesser degree, the following BOR score categories listed in Table 20 reflected somewhat less consistently the effectiveness of a Group E trainer to obtain language gains in his students:

5. percentage of tangible reinforcers given simultaneously with praise
6. percentage of appropriate prompts
8. appropriate fading of prompts

Categories 4, 7, and 9, listed in Table 20, did not show this differentiation between the effective and the ineffective trainers in Group E.

3. On the average did Group E attendants and experimental staff reinforce trainers more often than Group C attendants and experimental staff?

Figure 16 presents the results of the observations from which judgments were made to answer this question.

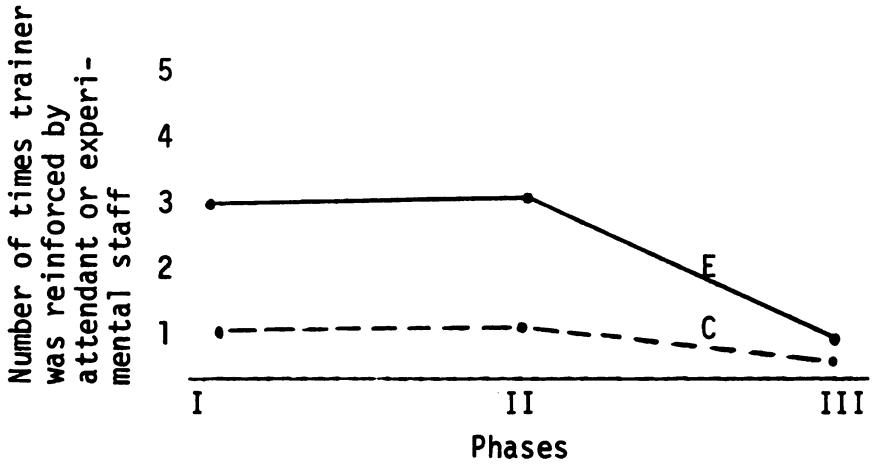


Figure 16. Mean Number of Reinforcements Given to Trainers by Attendants and Experimental Staff in Groups E and C During Three-Minute Observations Taken at the End of Each Phase of the Study.

These reinforcements generally consisted of praise given in a nonspecific form, e.g., "Good work, Sally," or in a specific form, e.g., "You got Alex to say 'ball'! Great!" The trend again favors Group E attendants and experimental staff in that they gave slightly more praise to their trainers than did Group C.

It should be remembered that during Phase I these results are reported for experimental staff since attendants did not interact with trainers then; during Phase II the results reflect experimental staff and attendants while during Phase III, the results reflect only the attendant's performance in praising trainers. As discussed earlier, attendants tended to praise trainers less often than experimental staff and had to be encouraged to increase their efforts. The decline in Phase III could reflect this, however, during Phase III attendants were busy supervising two trainer-student pairs rather than only one. In addition, attendants were encouraged and able to lessen their praise and instruction to trainers since they were more capable and confident at this time.

4. On the average, did Group E attendants and experimental staff interrupt training with instructional comments directed towards the trainer more often than Group C attendants and experimental staff?

Figure 17 presents the results of the observations from which judgments were made to answer this question.

Instructional comments to trainers included demonstrations on the student, verbal explanations and verbal commands to modify the trainer's techniques of working with a student. Again the experimental staff and attendants in Group E tended to give slightly more instructional

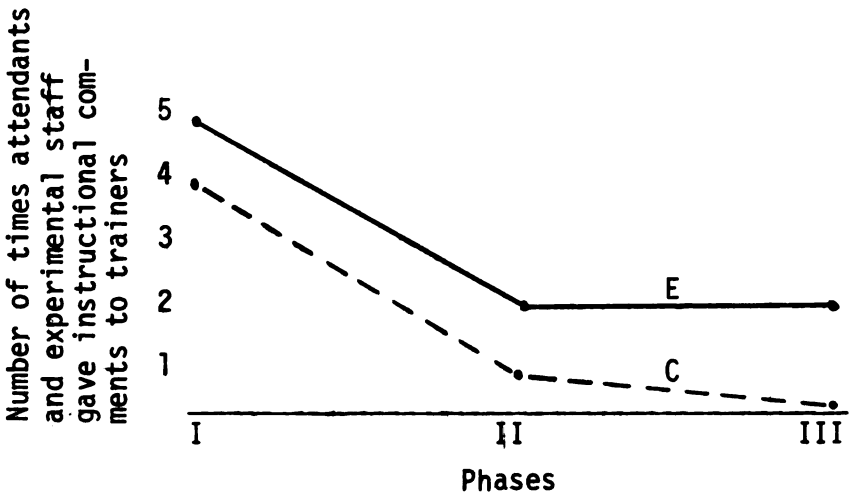


Figure 17. Mean Number of Instructional Comments and Demonstrations Given to Trainers by Attendants and Experimental Staff in Groups E and C During Three-Minute Observations Taken at the End of Each Phase of the Study.

demonstrations and comments to their trainers than did Group C. In both groups more instruction was given during the first phase. As with question three, the Phase I results reflect the performance of the experimental staff rather than the attendants. These results could mean that experimental staff were more apt to give instructions to trainers than were attendants and/or that more instruction was needed in the first phase than in other phases. The number of instructional comments did decline as was expected since trainers in both groups became more independent in their skills over the eight weeks of the study.

Questions and BOR Results for Trainers in Experimenter-Structured Training Sessions

1. Would Group E trainers have a greater average post-study frequency or percentage of the six categories of training behavior observed than trainers in Group C?

Table 21 presents the results of the observations taken of the frequency and percentage categories during experimenter-structured training sessions and repeats the results from regular training sessions. Group E trainers did consistently better on all post-study frequency and percentage scores for the six training behaviors observed. The numbers of trainers upon which percentage scores e and f are based are reported in the footnotes of Table 21.

2. Would Group E trainers have higher average post-study judgment ratings than Group C trainers in the three categories of training behavior observed?

Table 22 presents the results of the observations taken of the judgment categories during experimenter-structured training sessions and repeats the results from regular training sessions. Again Group E trainers did consistently better on all post-study judgment scores for the three training behaviors observed.

3. In the skill categories listed in questions 1 and 2, did the average frequency, percentage, and rating scores of the trainers during the post-study observations in Groups E and C decrease from their scores during the training observations?

Rather than decrease, the majority of scores in the post-study observation for both groups increased over their Phase III training session observations. All post-study scores marked by a single asterisk in Tables 21 and 22 reflect this increase while those in Table 22 marked by a double asterisk are judgment scores whose improvement over Phase III scores are reflected by a decline, e.g., inappropriate fading of prompts.

Table 21. Mean Frequency and Percentage Results of BOR Observations of Trainers in Experimenter-Structured Training Sessions and in Regular Training Sessions. (Frequency and Percentage Scores.)

	Group	Pre-Study	Phase I	Phase II	Phase III	Post-Study
a. Number of complete trials presented	E	3	10	7	6	9*
	C	3	1	1	0	1*
b. Number of trials when student was attending prior to stimulus presentation	E	8	11	7	7	18*
	C	13	7	4	4	8*
c. Number of Student Responses	E	6	11	7	7	15
	C	10	7	3	4	6*
d. Percentage of correct and approximate responses reinforced	E	39	98	96	57	78*
	C	41	15	31	38	32
e. Percentage of tangible reinforcers given simultaneously with praise[1]	E	N.O.	99	86	82	100*
	C	50	0	N.O.	N.O.	100*
f. Percentage of appropriate prompts[2]	E	29	98	96	92	75
	C	21	15	31	13	44*

[1] number of trainers out of 6 per group observed on this variable.

Group E pre-study: n=0 Group E post-study: n=3
Group C pre-study: n=1 Group C post-study: n=1

[2] number of trainers out of 6 per group observed on this variable

Group E pre-study: n=5 Group E post-study: n=5
Group C pre-study: n=5 Group C post-study: n=6

*post-study scores greater than Phase III scores

Table 22. Mean Judgment Results of BOR Observations of Trainers in Experimenter-Structured Training Sessions and in Regular Training Sessions. (Judgment Scores.)

	Group		Pre-Study	Phase I	Phase II	Phase III	Post-Study
a. Consistency and appropriate repetition of stimulus presentations	E		2	4	3	3	6*
	C		3	1	1	1	3*
b. Appropriate fading of prompts	E	OK	0	25	0	17	83*
	C		0	0	0	9	17*
	E	+	0	12	17	17	0**
	C		0	38	0	9	0**
	E	-	33	25	0	8	0**
	C		17	25	0	18	0**
	E	N.O.	67	38	83	58	17**
	C		83	38	100	63	83**
c. Appropriateness of task to student	E	A	83	88	75	75	100*
	C		100	38	50	25	100*
	E	+	0	0	0	0	0
	C		0	0	0	0	0**
	E	-	17	12	25	25	0**
	C		0	62	30	55	0**

*post-study scores greater than Phase III scores

**post-study scores improved over Phase III scores by declining

Trainers in both groups were able to successfully generalize the training behaviors from their assigned students in regular training sessions to a new student in a training session structured by the experimenter. Reasons for this successful generalization may be the changed working situation where the trainer was told specifically what activities to do with the new student, worked only a few minutes, and was positively encouraged not to hurry but to spend all his time working with the student. Before these observations, efforts were taken to make the trainer feel relaxed, special, and valuable as a teacher. All of the trainers had a friendly working relationship with the experimenter who did these observations. Each was individually taken to a quiet room on their ward and individually observed. Each generally received a large amount of attention and vocal reinforcement before and after the observation. Only if a trainer demonstrated fear did the observer offer encouraging words during the observation time; and, in most observations, nothing was said to the trainer during the three minutes so as not to influence his performance.

In summary, during the post-study observation trainers were very aware yet comfortable that they were being observed while this same awareness was not generally present when trainees were observed during the regular training sessions. During those latter observations, trainers were not told their teaching performance was being observed and were not necessarily aware the observer was even present. It seems that the trainer's performance improved when, in a well-defined and positive situation, he was aware of being observed.

4. Did these average frequency, percentage and rating scores of the trainers in Group E decrease less than those of trainers in Group C?

As discussed above, the average post-study scores of the trainers increased for both groups, but all the scores of the Group E trainers increased more than did those of the Group C trainers.

5. Were the training skills observed to be approximately equal in both groups of trainers during the pre-study observations?

As measured by the pre-study observations shown in Table 22, the training skills of both groups of trainers were approximately the same. However, it should be noted that Group C trainers performed better than Group E trainers in five of the nine categories observed: number of trials where student was attending; number of student responses; percentage of tangible reinforcers given simultaneously with praise; and appropriateness of task to student. Group E trainers performed better than Group C trainers in only one category: percentage of appropriate prompts. However, it is not known whether these differences are meaningful. In any event, it appears that Group E trainers did not have a pre-study advantage over Group C in the training behaviors observed.

Questions and BOR Results for Attendants in Experimenter-Structured Training Sessions

1. Would Group E attendants have a greater average post-study frequency or percentage of the six categories of training behavior observed than attendants in Group C?

Table 23 presents the results of the observations taken of the frequency and percentage categories during experimenter-structured training sessions. Except one score which was the same for both groups, all post-study scores were better for attendants in Group E than Group C attendants. The number of attendants observed that gave tangible reinforcers (e) and prompts (f) upon which these group scores are based are indicated in the footnotes of Table 23.

2. Would Group E attendants have higher average post-study judgment ratings than Group C trainers in the three categories of training behavior observed?

All post-study judgment scores in Table 23 were the same or better for Group E attendants than for Group C attendants. Throughout the observations, Group E attendants improved in their skills of directly training a student although the majority of their instruction and supervised practice during Phase I and II was at the level of teaching retarded trainers rather than students.

It is important to note that there was less difference of training skills between groups of attendants than between groups of trainers. A comparison of attendants and trainers within groups also reveals some interesting findings. Group C attendants performed better in all nine post-study categories of training behavior than did Group C trainers; while Group E attendants performed about the same or somewhat better than Group E trainers in all but one of the nine categories observed. This exception in superiority of scores occurred when Group E attendants faded prompts appropriately 67 percent of the time while Group E trainers did so 83 percent of the time.

Table 23. Mean Frequency, Percentage and Judgment Results of BOR Observations of Attendants in Experimenter-Structured Training Sessions.

	Pre-study		Post-study	
	Group E	Group C	Group E	Group C
Frequency and Percentage Scores				
a. Number of complete trials	1	0	12	9
b. Number of trials where student was attending prior to stimulus presentations	11	12	17	14
c. Number of student responses	9	11	17	16
d. Percentage responses reinforced	15%	41%	94%	76%
e. Percentage tangible reinforcers paired with praise[1]	25%	N.O.	100%	100%
f. Percentage of appropriate prompts[2]	40%	33%	89%	56%
Judgment Scores				
a. Consistency and appropriate repetition	7	7	8	7
b. Appropriate fading of prompts	OK 33%	33%	67%	33%
	+ 0%	0%	0%	0%
	- 67%	67%	0%	33%
c. Appropriateness of task to student	A 100%	67%	100%	100%
	+ 0%	0%	0%	0%
	- 0%	33%	0%	0%

[1]number of attendants out of 3 in each group observed on this variable:

Group E pre-study: n=2 Group E post-study: n=3
Group C pre-study: n=0 Group C post-study: n=1

[2]All attendants in both groups were observed on this variable (n=3).

A final comparison can be made in the post-study scores of Group C attendants and Group E trainers. These attendants' and trainers' scores were the same or only slightly different in all categories except the two concerning prompting. Group E trainers prompted appropriately 75 percent of the time in the post-study observations while Group C attendants did so only 56 percent of the time. Appropriate fading of prompts was done by Group E trainers 83 percent of the time but only 33 percent of the time by Group C attendants. In this same category, the trainers in Group E were not observed to give any unnecessary prompts while Group C attendants did so 33 percent of the time. From these results one can conclude that if retarded trainers are exposed to intensive instruction in reinforcement and modeling procedures and MLAP training sequence, as was provided by the Group E treatment, their training skills are comparable to attendants exposed to Group C treatment; and, in the skill areas of prompting and fading of prompts, these trainers perform better than the attendants.

8. Were the training skills observed to be approximately equal in both groups of attendants during the pre-study observations?

As shown in Table 23, both groups of attendants, when observed before the study, were similar in their performance in all but two of nine categories of training skills. Group E attendants were better in training at the appropriate level of difficulty for the student, while Group C attendants reinforced the student's correct and approximate responses 41 percent of the time as compared to Group E's reinforcing 15 percent of the time.

Informal Accounts of Training Sessions by Attendants and Experimental Staff

Informal results described in daily notes taken by experimental staff and supervising attendants reveal additional information on the day-to-day content and progress of training in both groups. Daily logs were used mainly by Group C attendants and experimental staff to describe, in more detail than Group E accounts, the activities between trainers and students, progress, complaints and whenever training sessions were cancelled. Group E experimental staff and attendants used their training session schedules to record the MLAP parts trained each day and some brief descriptions of significant occurrences. During Phase I all these written accounts were made by the experimental staff. During Phase II accounts were recorded both by experimental staff and by attendants while during Phase III only attendants recorded descriptive accounts of the training sessions.

Examples Taken from Group E Accounts

Each example begins with the phase in which it was recorded, followed by the person recording, and the actual comments; students and trainers are identified in parentheses.

Phase I, experimenter: Joanie (trainer) remembered to say "Do this," today when training imitation tasks with Lyle (student).

Phase I, experimenter: Went well today; Ralph (trainer) needs only one demonstration with David (student) and then he can duplicate it perfectly!

Phase I, experimenter: Bob (trainer) always begins a session by greeting his student: "Hi. How are you today Arthur?" And his student always smiles back.

Phase I, experimental staff: Matt (student) is imitating all the tasks with objects. Often without apparent reason he grabs onto Roger's (trainer) arm; Roger gently releases his grip and continues. Will try a time out with Matt tomorrow whenever he picks at his face or stares at his hand--both of which interfere with training.

Phase II, attendant: David (student) started using the two-syllable "ta-ta," instead of the usual "ta" for table today!

Phase III, attendant: Bob (trainer) used time outs with Connie (student) once at the table and once in a chair in the corner. She was not very cooperative.

Phase III, attendant: Kerry (student) would look at Linda (trainer) for part 3a (gross vocal imitation) and open his mouth, watching her carefully! That's progress and an approximation!

Phase III, attendant: Stevie (student) touched his eye on Linda's command (trainer) without any prompt--the first time!

Phase III, attendant: Joe (student) began whispering labels again today; Roger (trainer) gave him a time out.

Phase III, attendant: Matt (student) knows "march!" Did it three times in a row without help.

Examples from Group C Accounts

Phase I, experimental staff: Tom (trainer) really needs a lot of encouragement still and tends to have a negative attitude toward work sometimes. Mark's (student) attention and eye contact are better than yesterday.

Phase I, experimental staff: Tom (trainer) immediately got out the cowboy hat for Mark (student) remembering how much he loves it. Then he combed Mark's hair--something he loves. Tom is doing amazingly better today. Hopefully his self-confidence is increasing.

Phase I, experimental staff: The second day and Sally (trainer) is already going to the ward and getting Danny (student) by herself, setting timer, getting objects out, and giving Danny juice on her own.

Phase I, experimental staff: When we picked up Joe (student) today the attendant looked happy to get rid of him. He was engaging in varied stereotypic behaviors. Once he was sitting down with Sally (trainer) and had things to do, this behavior terminated.

Phase I, experimental staff: Kathy (student) ran around room screaming, threw reinforcers, and toys across the room.

Phase I, experimental staff: Implemented behavior modification program today with Kathy (student). Ruth Ann (trainer) cooperated. The three of us played ball on the floor together until Kathy threw ball and began screaming; we ignored her and continued to play ball and left her out. When Kathy was quiet we allowed her to play with us.

Phase II, experimental staff: Ruth Ann (trainer) has better control over Kathy (student) than I do--as long as she is not yelling. When Ruth Ann yells, Kathy gets upset and either runs out of the room or throws things. Kathy seems to enjoy walking hand-in-hand with Ruth Ann. Kathy seems to throw things so Ruth Ann will get after her to pick them up.

Phase II, experimental staff: Cindy (trainer) now calls out "Betty Jean" before working on any specific tasks and waits for her attention. She also uses very intermittent reinforcement--says, "Good."

Phase II, attendant: Cindy (trainer) waited for suggestions. Opened toy box herself and took out ball. Played with ball and doll herself ignoring her student. Following my suggestion and demonstration she showed Betty Jean (student) how to put chips in can, then handed Betty the chips. Betty and Cindy both laughed frequently and speeded up their movements.

Phase II, attendant: Cindy (trainer) showed Steve (student) how to play chimes. Gave him a cracker. Gave him bell to ring. Showed him the car, bell, and comb. He made "oh" sounds and said "car" and made sounds for bell and comb.

Phase II, attendant and experimental staff: Ruth Ann (trainer) was playing with Gino (student) on the mat--tickling him and putting his socks on. Ruth Ann complained about her health often in previous sessions. Did not while playing with Gino. She attended to Gino instead of relating his news or gripes to attendant.

Phase II, experimental staff: Belinda (trainer) held up objects and asked Mary (student) "What is this?" Belinda's praise was unenthusiastic. Belinda asked her to name body parts, but Mary always repeated "eye."

Phase III, attendant: All students and trainers did very good today. Mitch (student) will get his own chair. Joe and Danny (students) were good at stringing different objects with Sally (trainer) to help.

Phase III, attendant: Tom worked better when I told him he would not get paid unless he tried harder with his students. It worked very well. I think maybe they are getting a little bored with the same things. I will get some different toys from C-building next week.

Phase III, attendant: Videotaping today. Mitch and Danny (students) very good. Tom (trainer) is still working very good when he thinks he will not get paid unless he does!

Phase III, attendant: Gino (student) took hammer from Ruth Ann (trainer) and pounded peg board which she held for him. He held hammer and moved it without direct prompting! Then repeated several more times without prompting!

The value of these written accounts lies mainly in their illustration of the day-to-day problems and successes occurring within the individual training units. Also, these written accounts tend to support the BOR findings.

Summary

Based on the results of the formal and informal analyses and restricted to the population from which the sample for this study was drawn, certain generalizations may be stated.

1. Retarded trainers using a developmentally ordered language training program which incorporates principles of modeling and reinforcement and supervised by attendants skilled in applying the language program are

   a. more effective at training prelanguage and early language skills in profoundly retarded students; but
   b. are not more effective at increasing the mental ages of profoundly retarded students than are similar trainers untrained in these techniques and using unstructured play methods of training with untrained attendant supervision.

2. Regardless of being trained in operant and developmental language training techniques or being supervised by trained or untrained attendants, students spending time each day with supervised retarded

trainers are likely to make significant mental age gains over students not exposed to retarded trainers.

3. In comparison to trainers using structured play methods of training with untrained attendant supervision, retarded trainers, using operant and developmental language training techniques and supervised by attendants trained in the same skills, were observed to consistently and more frequently

a. present complete trials to students,
b. have students attending to stimulus presentations,
c. evoke student responses,
d. demonstrate appropriate reinforcement of students' responses,
e. couple tangible reinforcers with praise,
f. demonstrate appropriate prompting of students,
g. provide consistent stimulus presentations with the appropriate repetition,
h. fade prompts appropriately,
i. teach tasks appropriate to the students, and
j. successfully generalize their training skills to new students in experimenter-structured training situations.

4. In comparison to untrained attendants, attendants skilled in the application of an operant, developmentally ordered language training program were observed to consistently and more frequently

a. provide reinforcement and instruction to the retarded trainers they supervised, and

b. demonstrate a high quality of training skills when asked to instruct a student in a particular early language task (these training skills are described in 3a through 3i).

CHAPTER IV

SUMMARY AND CONCLUSIONS

Summary of the Study

Within most institutions for the retarded are barriers which prevent adequate intellectual stimulation of its residents. These barriers include the low ratio of attendants to residents, the low ratio of education and speech professionals to residents, the inadequate preparation and motivation of attendants to train residents, and the administrative priorities which in practice generally do not result in adequate educational programming for residents. As a consequence of these factors, institutions for the retarded have been shown to retard even further the social, cognitive, and language skills of their residents.

The purpose of this study was to demonstrate and compare the effectiveness of a strategy for utilizing the higher functioning residents of an institution to train the lower functioning residents under the guidance of the attendant staff. Specifically, this study sought to determine whether significant gains in language functioning and in the ability to respond to a standard measure of intelligence could be produced by retarded trainers who were trained to administer a developmentally ordered language program which incorporated principles of reinforcement and modeling (Group E). In order to determine the

effectiveness of the instruction given to these retarded trainers and their supervising attendants in Group E, a control group (Group C) was employed where trainers were encouraged to provide their students with reinforcement on a noncontingent basis, verbal and tactual stimulation, training based on their own or their attendant's ideas, and play interaction.

Identical in both groups, the organization consisted of basic training units. Each of these units was composed of one supervising attendant who directed two retarded trainers. Each trainer, in turn, was assigned to two retarded students, although all training was done with one student at a time. Each group included three of these training units or a total of three attendants, six trainers and twelve students. Trainers and students were paired together first and then randomly divided into the two groups. Attendants were randomly divided into two groups and then paired with two trainer-student triads.

Regarding the characteristics of the students averaged across both groups, the mean chronological age was 17 years; mental age was one year and 10 months; IQ was 11 and there was an average of 12 years of institutionalization. Retarded trainers had a mean CA of 28 years; MA of 7 years 4 months; IQ of 43 and 14 years of institutionalization. With the exception of one characteristic of the trainers, neither the two groups of students nor of trainers were significantly different on these characteristics. The exception occurred when Group C trainers were found to be institutionalized significantly fewer years than were Group E trainers; a factor which could have acted to favor Group C.

Attendants participating in the study had a mean age of 29 years and worked a mean of 2 1/2 years in institutional settings. Neither group was significantly different from the other on these two characteristics.

The experiment consisted of three phases. Phase I, lasting two weeks, was an initial training period which varied for Groups E and C. Phase II, lasting three weeks, involved the training of attendants in the supervision of one triad at a time, while Phase III, lasting three weeks, involved each attendant supervising her two triads with maintenance levels of supervision and instruction from experimental staff.

During Phase I and II Group E trainers and attendants were trained to teach toward specific language goals by applying conditioning principles as embedded in the Modified Language Acquisition Program (MLAP). During this same time, Group C trainers were also given language training goals for their students, but without training in the use of this program or behavioral principles. Insofar as possible, all other training variables were made equivalent for the two groups. Thus, the independent variable was the application of a developmentally ordered language training program which incorporated the principles of reinforcement and modeling.

In both groups the daily training sessions between trainer and student lasted 20 minutes. Each trainer worked with one of his assigned students for a single session and then with the second student for another single session. Throughout the entire 8-week study each student received a mean of 13 hours of training. Except for brief

demonstrations given to the trainers by attendants and experimental staff and for some extreme cases of behavior control, all the direct interaction with the students during these training sessions was done by the trainers.

The main dependent variables were measures of language ability (The Modified Language Acquisition Program Final Tests, MLAPFT) and intelligence (Cattell Infant Intelligence Scale). The design analyzed the pretest, posttest scores on both dependent variables of all pairs of students trained by a single trainer by a one-way analysis of variance of the index of response. The scores of the two students in a triad were combined in the analysis since they were considered not to be independent but to be, in part, a function of the skill of the trainer in the triad.

A less formal dependent variable, the Behavioral Observational Record, BOR, was utilized to gather data in both groups regarding the instructional interactions between trainers and students in regular training sessions and between trainers and students and attendants and students in experimenter-structured training sessions which utilized students new to trainers and attendants.

It was the main hypothesis of this study that the intensive training of Group E at the attendant and trainer levels in the use of reinforcement and modeling techniques and the Modified Language Acquisition Program would yield greater growth in language skills by the Group E students than by the Group C students who were paired with untrained retarded trainers and supervising attendants. This hypothesis was supported since the mean gain in language skills in Group E students was significantly greater than the gain in Group C.

An examination of the MLAPFT gain scores of pairs of students in both groups revealed great differentiation between trainers in Group E and little or no differentiation between trainers in Group C. That is, the pairs of students for four trainers in Group E made all the gain that contributed to the significant difference between the two groups. However, the gain scores for students of the two remaining Group E trainers were minimal or negative as were all the gain scores for pairs of students in Group C. Also, the two Group E trainers whose students made little or no language gains were observed to be less skilled and both had IQs of 20, the lowest of all trainers in the study.

It was further hypothesized that Group E students, being differentially reinforced for attending skills and early language skills commonly tested by infant intelligence tests, would demonstrate greater mean scores on the Cattell Infant Intelligence Scale than would the students in Group C. The results did not support the hypothesis.

Two somewhat contradictory explanations were offered for these results. First, since the trend in MA gains slightly favored students in Group E and due to the high stability of MA in profound retardates, it was hypothesized that an extension of the training may have resulted in significant MA gains in Group E students as compared to Group C students.

Second, the Cattell Test items to which the students were exposed were not largely concerned with early language skills. Therefore, the MAs measured by the Cattell were not largely affected by Group E's gains in language skills.

Although this hypothesis was not supported by a significant mental age gain difference in favor of Group E students, the results of the analysis did reveal that both groups of students made significant MA gains as compared to the expected zero gains for the population of older, profoundly retarded students from which they were drawn. This finding was interpreted to mean that regardless of being trained by operant and developmental language training techniques or being supervised by trained or untrained attendants, students spending time each day with supervised retarded trainers are likely to make significant mental age gains over students not exposed to retarded trainers.

The series of questions posed to investigate the actual interactions between an instructor and a student was answered informally by an examination of the data gathered with the BOR. Some of this data were collected from three-minute observations made of each student and his trainer during regular training sessions at the end of each phase of the study. The remainder of the observations, also each three-minutes in length, was taken before and after the study in training sessions structured by the experimenter. These latter observations included not only trainers and students but also attendants and students from both groups. All students trained during these observations were new to the attendant and the trainer.

The results of these observations of attendants and of trainers in both groups are summarized below.

A. In comparison to trainers using unstructured play methods of training with untrained attendant supervision, retarded trainers using operant and developmental language training techniques and supervised

by attendants trained in the same skills were observed to consistently and more frequently

1. present complete trials to students,
2. have students attending to stimulus presentations,
3. evoke student responses,
4. demonstrate appropriate reinforcement of student's responses,
5. couple tangible reinforcers with praise,
6. demonstrate appropriate prompting of students,
7. provide consistent stimulus presentations and with appropriate repetition,
8. fade prompts appropriately,
9. teach tasks appropriate to the students, and
10. successfully generalize their training skills to new students in experimenter structured training situations.

B. In comparison to untrained attendants, attendants skilled in the application of an operant, developmentally ordered language training program were observed to consistently and more frequently

1. provide reinforcement and instruction to the retarded trainers they supervised, and
2. demonstrate a high quality of training skills when asked to instruct a student in a particular early language task (these training skills are described in A.1 through A.9).

Discussion

The wide array of conclusions drawn from this study can be logically grouped into four categories: those concerning trainers, attendants, students, and the MLAP. Discussions relating to each of these categories will be followed by recommendations for related research or further implementation of the retarded-trainer program.

As strongly supported by the language gains and the BOR observations, retarded trainers can be taught to successfully instruct under supervision early language skills according to the principles of reinforcement and modeling. This provides strong support to Whalen and Henker's similar findings (1971). This is so even though, on the average, trainers in this study as compared to Whalen and Henker's trainers were 8 years older, 13 IQ points lower, and had been institutionalized 8 years longer and the students in this study were 10 years older, 19 IQ points lower and had been institutionalized 10 years longer.

> Recommendations. As a successful means of supplementing staff and stimulating lower functioning retardates, the higher functioning retarded adults should be trained and employed to work in training units under the supervision of the attendant staff. Training areas could be expanded into the self-care skills of eating, dressing, toileting and grooming. In such expansions, the trainer would learn to instruct new content, but the reinforcement and modeling methods would remain the same.

As support for McKinney and Keele's results (1963), gains in the mental ages of profoundly retarded students occurred after spending a mean of 13 hours with trainers regardless of whether the supervised trainers were taught specific instructional techniques.

> Recommendation. To aid in the prevention of further retardation due to a lack of stimulation and continuous contact with a single person, institutional wards could be arranged such that students and trainers lived together with formal daily supervised interactions occurring between pairs. Also self-care training, scheduling of sessions, and unplanned informal interactions of trainers and students would be facilitated by this arrangement.

As was apparent from the BOR observations for all trainers and from a breakdown in language gains for Group E students, some trainers were more skilled than others in their interactions with students and more successful in their training. In Group E those more successful in applying the reinforcement and modeling procedures were also those whose students made larger language gains; and the trainers who were less skilled, according to their BOR observations, were those whose students did not make language gains. In Group C the BOR observations revealed that some trainers, even without special instruction, were better than others. However, there was not enough differentiation in Group C language gains for these to be correlated with observed trainer quality. Also, the trainers that scored poorly in some or most of the BOR categories observed before the study also scored poorly in later observations. In addition, trainers with physical handicaps, though carefully matched to less mobile students, had good and poor training results and BOR observations, thereby disqualifying this factor as a means of trainer selection.

> Recommendation. BOR observations should be used to select the potentially successful trainers as well as to assess deficits in trainer skills that could be then more specifically remediated.

In support of Cleland, et al. (1972), Houglan (1963), and Whalen and Henker (1971), the retarded trainers in this study were more

successful in regular training sessions with supervision from experimental staff or attendants than they were without. Although this need for supervision occurred in varying amounts from trainer to trainer, supervision seemed to be necessary for two reasons. First, praise and attention from the supervisor tended to maintain or improve the trainer's skills and enthusiasm. And second, instructions and demonstrations from supervisors assisted trainers when they were unable to intuitively adjust training procedures to fit the student's progress or lack of progress.

The need for supervision varied widely from trainer to trainer. Some trainers could function well on a very sparce schedule of supervisory reinforcement showing little concern for their monetary earnings, while others seemed to need almost continual praise plus tangible reinforcers. The latter trainers rarely saved their money while the former trainers either did not spend their money or spent it only infrequently. In addition, some trainers learned to give appropriate time outs without supervisory direction and to shape responses and fade prompts. Other trainers, even after hours of instruction still depended greatly upon their supervisors for direction in some of the basic trainer tasks, e.g., taking toys out for the students, setting the timer, turning the training cards after each task presentation.

Related to trainer supervision is the phenomenon observed in the BOR data of a consistent reduction in all the trainer's skills from Phase I to Phase II with little or no change from Phase II to Phase III. A number of explanations can be given. First, during Phase I the experimental staffs' time was devoted solely to one trainer at a time, but

during the second phase it was divided between the trainer and the attendant in that training unit. Along with this, the fact that the frequency of instructions given to the trainer was observed to decline from the first to the second phase may have resulted in lowered trainer skills although the frequency of praise remained at the same level. Perhaps more important and not reflected in the BOR results was the fact that the quality of instructions given to trainers also changed along with the frequency. Less demonstrations were given and more verbal instructions were used by experimental staff and attendants. Therefore, the trainer worked more on his own. Another factor affecting this decline in observed trainer skills could be the fact that trainers worked every other day during the second phase rather than daily as they did in Phase I. There is an additional possibility that trainer enthusiasm could have lessened during Phase II although this was not apparent.

> Recommendation. Retarded trainers need some amount of supervision so their performance can be maintained and the more difficult methods of adjusting training techniques to fit the student's progress can be incorporated. In addition, trainers should work daily with days off given according to their supervising attendant's schedule. Also it seems that trainers should be more slowly weaned from continuous schedules to intermittent schedules of reinforcement and instruction.

Since no Group E trainers were without picture task training cards and no Group C trainers were given cards, the effect of these cards cannot be assessed apart from the additional instruction given to Group E trainers. Therefore, training cards may have been one of the important factors in the higher BOR trainer ratings and higher student gains in Group E. Some of the difficulties observed by Whalen and Henker (1971) in the training done by retardates may have been

eliminated or reduced by the use of training cards. Trainers who used these cards to guide their instruction had more task consistency and appropriate repetition, and presented more tasks, demonstrated less excessive verbalizations, and presented tasks in an order determined by experimental staff or attendants rather than themselves.

> Recommendation. Picture task training cards should be used to guide trainers instructing early language skills and could be expanded to guide their instruction of students in self care skills.

Although formal data are lacking, trainers, as in the research reviewed, were observed to develop pride in their work, to eagerly anticipate work times, to gain confidence and patience in their interactions with assigned students and to develop assurance and self-reliance in carrying out trainer tasks and getting to work on their own. Along with these changes attendants appeared to allow trainers more privileges and responsibilities and to give respect for their ability as trainers. Institutional staff not directly involved in the project expressed surprise over the trainers' skills shown in the videotaped training sessions.

> Recommendation. As a planned portion of programming to prevent the development of dependence upon others and of inadequate self concepts, institutionalized retardates should be trained to handle increasing levels of responsibility and independence.

During Phase III when attendants independently operated the training units, the quality of training shown by the BOR ratings did not decrease from Phase II. Although attendants were encouraged by experimental staff and given small amounts of intermittent instructions,

they essentially maintained the entire retarded trainer program. Attendants were never absent from their regular ward work for much more than two hours per day to participate in the study. These findings are important in illustrating the untapped or inefficiently tapped resource institutions have in their attendant personnel. As pointed out by Harmutz (1973):

> If specific, visible, behavioral goals were set forth for the children's behavior and reinforcements of the staff were made contingent upon the child achieving these goals, no doubt this would effect a realignment of the staff time allocations (p. 557).

In addition, it must be noted that attendants in this study volunteered to participate and that two attendants, both in Group C, decided during Phase I not to continue their participation. It appears that not all attendants would welcome a redefinition of their role to include educational duties.

> Recommendation. Attendants with expressed interests should be given the inservice training, the time, the responsibility, and the reward necessary to participate in resident-training programs.

Originally it was planned to include as students only those residents with basic attending skills of sitting without stereotypic movements and attending to objects. Attention training seemed to be a task too difficult for retarded trainers. However, although all students selected could sit without stereotypic movements, some students with poor object attending responses had to be included because of the limited population from which to select. Seven of the 24 students in the study had difficulty attending to objects plus no imitative skills. Of these students six held the lowest pretest mental age scores and all

but one made gains under the average. However, six of the seven did make small gains in attending and imitative skills. In summary, only small gains in language or in mental age were made by low attending students who also had no other early language skills.

> Recommendation. The basic attending behaviors of sitting in a chair, absence of stereotypic motor responses, and looking at objects on command should be present in a student prior to his inclusion in a retarded-trainer program.

Withholding reinforcement and time out procedures were effective in the reduction of disruptive behaviors in students. In Group E these methods of control were used directly by the students while in Group C intervention and assistance by the supervisor was often needed. Also a token reinforcement system where tokens have no unit value was used by five Group E trainers with 10 of the 12 students. (Two low-attending students trained by the same trainer were unable to be placed on a token system.) The token reinforcement system seemed to noticeably increase the efficiency of training sessions.

> Recommendation. Programs for profoundly retarded persons should employ extinction and time out procedures to control disruptive behaviors and simple token reinforcement procedures to increase appropriate behaviors.

The procedures of the MLAP were generally well grasped by the three attendants in Group E and easily adapted to retarded trainers. However, it seemed that some additional instruction time would have been profitable for attendants during Phase I. These areas for more instruction in the MLAP included understanding the differences between testing and training procedure, use of the three types of tests: initial, intermediate, final, and the finer techniques of training retarded

trainers, and more practice in the direct training and testing of students. Some of the instruction time for Group E attendants could have been more efficiently done in a small group. It appeared that the MLAP manual served attendants as a source of information in the absence of experimental staff. Attendants in Group C were given MLAP training after the study so as to participate in a continuation of the retarded trainer project. Comments from both groups of attendants indicated that the program's features of assessment-based training to criterion performance levels, sequential levels of training and early language development were especially important and relevant as compared to other training programs they had been exposed to for retarded residents.

> Recommendation. Training programs for the retarded in which attendants are employed as teachers should be relevant, as perceived by the attendants, based on developmental evidence, consist of training levels that are defined by simply administered tests of performance, and available to attendants in an understandable and organized manual.

Implications for Research

Additional research is necessary to explore the following questions and topics raised by this study.

1. What amount of a student's gains in language skills and in mental age takes place during the Phase III portion of a retarded trainer program, i.e., when the training units are operated by an attendant?

2. If the third phase of a retarded trainer program were extended, would the decline in the trainer's instructional skills observed between Phase I and II in this study recur and continue its

decline during this time or would the trainer's skills remain stable during this extension of Phase III?

3. Besides the instructional skills, do retarded trainers make any measurable gains in the affective areas of self-confidence, independence, responsibility, and social awareness?

4. For those retarded trainers in the IQ range of 20 to 50, to what extent can IQ level be a factor in the prediction of their success, i.e., as reflected in gains made by their students or in their BOR ratings?

5. Which BOR ratings for a trainer are most related to the gains made by that trainer's students?

6. Which BOR ratings for an attendant are most related to the gains made by the trainers and students supervised by that attendant?

7. To what extent is the generalization of a student's language skills from training sessions to the ward facilitated by holding training sessions on the ward? What are other techniques of facilitating this generalization?

8. Alternative assistive training devices besides the picture task training cards need to be developed for the more skilled and the less skilled retarded trainers as well as for the trainer with little or no arm movement and/or speech.

9. The procedures of instructing supervising attendants and retarded trainers, as occurred during Phase I and II of this study, need to be standardized and defined with criterion levels of performance.

10. Since many of the higher functioning residents of institutions are being placed back into the community, it is most important for future applications of retarded trainer programs that an exploration be made of the utilization of trainers in community programs for the severely and profoundly retarded as a supplement or an alternative to the trainers' placement in sheltered workshops.

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APPENDICES

APPENDIX A

LETTER TO PARENTS AND GUARDIANS OF STUDENTS

LETTER TO PARENTS AND GUARDIANS OF STUDENTS

June 14, 1972

Dear

Your has been selected to participate with 23 other residents in a language training program this summer at Howell State Hospital. This program is directed towards improving and developing a variety of prelanguage and language skills ranging from attending to understanding and using a variety of words. We feel that all participants will benefit from the training.

This is an intensive training program and will be carried out either once or twice a day, Mondays through Fridays. Training will begin June 26th and continue through August 25th. It is imperative to have an evaluation of all participants before and after this training program in order to assess their progress and evaluate the effectiveness of the program. The 2 periods set aside for testing are from June 19th through June 25th, and from August 28th through September 1st.

It is necessary that be available at the institution during all these testing and training times in order to remain included as a participant in the program. However, all weekends and evenings will certainly be available for institutional and home visits.

We realize that these summer months are often used for vacations; unfortunately, the present training program has been planned for this same time span. We greatly hope that will be able to participate during these times. If, however, this interferes with your summer plans for and you are unable to make adjustments, please notify the Social Services Department at Howell State Hospital as soon as possible on or before June 19th, so that another person may be included in the program in place of your .

If you have any questions regarding the training program, please leave your name, telephone number, and when you may be reached with the Howell State Hospital Social Services Department so that I may contact you as soon as possible. Thank you.

Sincerely yours,

Martha S. Rowland
M.S.U. Graduate Student
Special Education

APPENDIX B

LETTER TO PARENTS AND GUARDIANS OF TRAINERS

LETTER TO PARENTS AND GUARDIANS OF TRAINERS

June 14, 1972

Dear

Your has been selected to participate with 11 other residents at Howell State Hospital as trainers in a language training program this summer. will be assisting myself, other graduate assistants, and hospital attendants in the individual training of lower functioning residents living at Howell State Hospital. Trainers will learn to train a variety of early language skills as well as how to become an effective worker with others. Each trainer will be paid a small amount for their work in the program which can be saved or spent on items chosen by the trainer. We feel that all participants will benefit from the training.

Since the training program begins on June 26th and continues until August 25th, operating Mondays through Fridays, it is imperative that be available at the institution during these dates in order to participate as a trainer in the program. However, all weekends and evenings will certainly be available for institutional and home visits.

We realize that these summer months are often used for vacations; unfortunately, the present program has been planned for this same time span. We greatly hope that will be able to participate during these times. If, however, this interferes with your summer plans for and you are unable to make adjustments, please notify the Social Services Department at Howell State Hospital as soon as possible on or before June 19th, so that another person may be included in the program in place of your .

If you have any questions regarding the training program, please leave your name, telephone number, and when you may be reached with the Howell State Hospital Social Services Department so that I may contact you as soon as possible. Thank you.

Sincerely yours,

Martha S. Rowland
M.S.U. Graduate Student
Special Education

APPENDIX C

STUDENTS' PLACEMENT IN MLAP BASED UPON INITIAL OR FINAL TEST RESULTS

STUDENTS' PLACEMENT IN MLAP BASED UPON
INITIAL OR FINAL TEST RESULTS

Direction of Training Prior to and Upon Completion of
the Required Number of Correct Responses for Each Part

Phase	Part	Program part(s) needed before training this part	Program part(s) to be trained upon completion of this part
1. Attending	*a. sitting	None	1a or 1b (if no interfering behavior exists)
	*b. getting rid of motor behavior that interferes with training	1a	1c
	c. looking at objects on gesture and command	1a and 1b	1d
	d. looking at trainer before each command	1c	2a
2. Motor Imitation	a. with objects	1d	2b
	b. with body parts	1d and generally 2a	3a, 4a, 4b, 4c, 4d
3. Vocal Imitation	a. gross vocal imitation: copying the trainer's sound by making any sound	2a, 2b	3b (if the child can imitate words, go to 3c)
	b. vowel imitation	3a	3c

Phase	Part	Program part(s) needed before training this part	Program part(s) to be trained upon completion of this part
3. (continued)	c. word imitation	3b or some words imitated during initial testing	3d, 6a, 6b, 6c, 6d (if 4a, 4b, 4c, 4d, respectively are completed)
	d. phrase imitation	3c	no completion of training
4. Basic Receptive Phase: Understanding Words that Label	a. touching objects	2b	4e, 5a, 6a
	b. pointing to room parts	2b	5b (if 4a is completed) 6b
	c. pointing to body parts	2b	5c, 6c
	d. performing activities	2b	6d
	e. finding objects (not visible)	4a	5d (if 4e is completed)
5. Receptive Expansion Phase: Understanding Two Words that Label	a. giving trainer two objects	4a	5d (if 4e is completed)
	b. putting objects on room parts	4a and 4b	7b (if 6a and 6b are completed)
	c. touching body parts: possession--student's and baby's	4c plus "baby" from 4a	7c (if 6b and "baby" from 6a are completed)
	d. finding two objects (not visible)	4e and 5a	7e (if 6a is completed)
6. Basic Expressive Phase: Using Single Words to Label	a. naming objects	4a, 3c	6e, 7a
	b. naming room parts	4b, 3c	7b
	c. naming body parts	4c, 3c	7c

Phase	Part	Program part(s) needed before training this part	Program part(s) to be trained upon completion of this part
6. (continued)	d. naming activities	4d, 3c	7d
	e. naming concealed objects	6a	7e (if 7a is completed
7. Expressive Expansion Phase: Using Combinations of Words to Label, to Ask, to Tell Whose and Where	a. asking for objects	6a	7e (if 6e is completed
	b. telling where an object is	6b	none
	c. telling whose body part is pointed to	"baby" from 6a and 6c	none
	d. telling trainer to perform an activity	6d	none
	e. naming missing objects	6a and 7a	none

APPENDIX D

SAMPLE TRAINING OBSERVATION

SAMPLE TRAINING OBSERVATION

Student Billy Date 7-18-72

Attendant Jill Trainer Mary

_____ Initial Test

_____ Intermediate Test

_____ Final Test (1 2 3 4)

✓ TRAINING OBSERVATION

Key: + correct response
(+) partially correct
- incorrect
0 no response

Program Phase and Part 4a

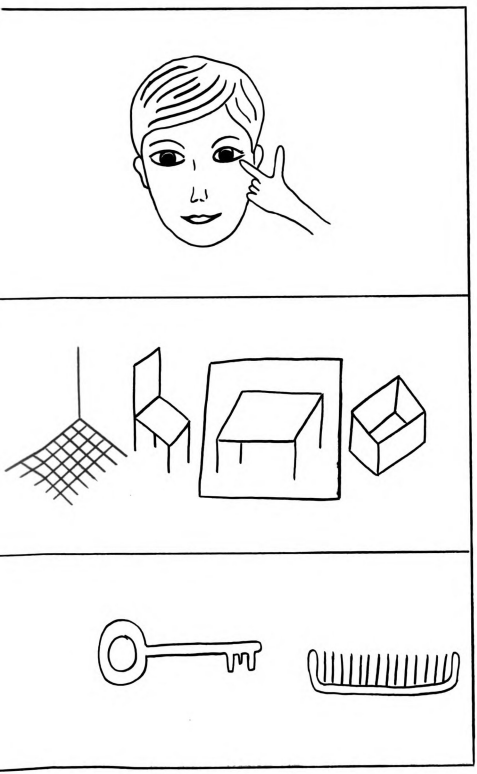
Tchg. Order	Task	Prompt	Response	Tchg. Order	Task	Prompt	Response
✓	BALL		+				
✓	SPOON		+				
	HAT	✓	+				
	COMB		(+)				
	COMB	✓	+				
✓	BALL		+				
	COMB		+				
	CAR		-				
	CAR	✓	+				
✓	BALL		+				
	KEY		-				
	KEY	✓	+				
✓	SPOON		+				
	HAT		-				
	HAT	✓	+				
✓	SPOON		+				

(✓ items correct without trainer prompting each time presented; these items are ready for intermediate testing.)

APPENDIX E

PICTURE TRAINING CARD EXAMPLES

PICTURE TRAINING CARD EXAMPLES



1. Used for parts 4c, 5c, 6c and 7c.

2. Used for parts 4b and 6b.

3. Used for parts 5a and 5e.

APPENDIX F

GUIDELINES FOR EXPERIMENTAL ASSISTANTS' WORK WITH TRAINERS DURING PHASE I

GUIDELINES FOR EXPERIMENTAL ASSISTANTS' WORK
WITH TRAINERS DURING PHASE I

General Group II Rules for Experimental Assistants:

1. Goals for trainers during Phase I (first two weeks)

   A. During the first session only, tell the trainers the specific language training levels for each of their two students in clear simple statements.

   B. Show the trainer, in the first session only, one simple demonstration of the training procedure needed to train the level explained in words above (A). Do not ask him to respond in imitation of your demonstration, but encourage him if he does no matter what his performance is (i.e., whether he attempts to copy your demonstration of appropriate training procedure or not).

   C. Make the trainer understand what kinds of things he should and could do with his students by:

      1. telling him he is a teacher to the students assigned to him and that . . .;
      2. he should try hard to teach him the goal mentioned in A above (however, this should be mentioned only during the first session);
      3. he should play with the student and get him to play;
      4. he should teach him new things;
      5. he should talk to him;
      6. he should use all the equipment provided;
      7. he should keep him in the room for the whole 20 minutes;
      8. he should give him physical contact (touching, pats, hugs);
      9. he should give the student the food or toy he especially likes whenever he wants during the training sessions;
      10. he should not hurt the student; and
      11. he should be encouraged to ignore the student and remove toys when the student begins disruptive behaviors (throwing, hitting, etc.).

   D. Instruct the trainer in how to pick up his student from the appropriate ward; accompany him initially giving help and instruction as needed but aiming to make the trainer independent in this skill by the end of the first phase. If the trainer is physically handicapped to the point where this is too time consuming or if the student is quite a distance from the training room (playground, etc.) then it might be more convenient to make adjustments in this part of the trainer's job; for example, the trainer might bring the student part of the way to the training room and the assistant or attendant bring the student the first part of the way.

E. Teach the trainer how to set the timers to 20 minutes at the beginning of each training session (a small piece of red tape at the "20" place might help initially).

F. Teach the trainers to end each session when the bell rings that the 20 minutes are over; at this time, the trainer should learn to put away equipment.

G. Teach the trainer to return the student to ward or play area after each session (see D).

H. Payment procedure:

1. Initially the trainers will be paid at the end of each training session so that they understand the payment for work rule; also trainers during the first one or two times will be able to buy items from the store box after each training session.
2. After the first few days (or sessions) trainers will be paid only once following both training sessions after the second student has been returned to the ward.
3. Trainers receive five cents per session; or 10 cents at the end of their second session.
4. It is best, if time allows, to count out the pennies for the trainer and try to get him to begin counting with or after you; then allow him to decide whether he wants to buy something (showing him the store box) or whether he wants to put his money in his box and save it; if he decides to buy, help him count out the right amount.

I. Training calendar:

1. Teach the trainer how to locate the appropriate box that stands for that day and to place a check or a star (depending on whether the trainer enjoys stars over checks--some older trainers may think stars are "childish").
2. As with payment, this should be done after each session only initially until the trainer has the idea of this type of reward and record for his work.

J. Encourage trainer independence by:

1. training the trainers to pick up and return both of their students to their respective wards;
2. training the trainers to use timers; and by
3. using screens to allow the trainer to work more by himself; at first these might not be used during the entire 20 minute session but before the first phase is finished, the trainer should be use to working behind a screen and getting only minimal comment and assistance from the assistants.

K. Trainers may work at the tables or they may work on the floor with their students; however, they should be encouraged to spend some time each session (probably at the beginning) working at the table while sitting in chairs.

L. When the student is engaging in disruptive behaviors 50 percent or more of the training period, then a behavior modification program will be worked out and implemented using the trainer; however, before any disruptive behavior reaches this point, the assistant or attendant should try to handle it through the trainer by suggesting various methods (ignoring child and removing toys--"time-out"; saying a loud "No!", etc.); hopefully most trainers will initiate their own forms of control and no intervention will be needed. If the trainer appears to be reaching the point of frustration, help should be provided in a way which allows the trainer to remain in his position of control with the student (let the trainer implement any suggestions you might have). Under no conditions should the trainers be allowed to physically control the students through punishment.

M. Main job of the assistant during Phase I is to encourage all instructional and play interactions of the trainer with his students and provide vocal support.

N. Each trainer will meet daily in a one hour block with the assistants during Phase I, training each of his two students once (20 minutes a piece).

APPENDIX G

GENERAL TRAINER GOALS FOR ATTENDANTS IN CONTROL GROUP

GENERAL TRAINER GOALS FOR ATTENDANTS
IN CONTROL GROUP

Goals for trainers during Phase I (first two weeks): Group I attendants.

1. Trainers will learn what kinds of things they should do with their students, such as

   a. trying to play with the student and getting him to play,
   b. trying to teach each student his individual learning goal,
   c. trying to teach each student things he does not already know,
   d. talking to the student,
   e. using all the equipment with the student,
   f. changing activities when the student looks bored,
   g. keeping the student in the room for the entire 20 minutes,
   h. giving the student hugs, pats, smiles and praise when he does something that the trainer thinks is good,
   i. giving the student food during the session when he wants to,
   j. not hurting the student in any way but letting him know that the trainer is boss and stopping the student when he hurts others or destroys things, and
   k. trying to ignore the student when he engages in small, minor, bad behaviors (removing his toys, and not giving him any food or attention, and possibly saying "No.").

2. Trainers will learn how to pick up their students from where they live, how to return them and pick up the next students to be trained (this responsibility will vary depending on the trainer).

3. Trainers will learn to put out the equipment and put it away in the box; also they will learn to pick up after the student at the end of each session (or teach the student to assist).

4. Trainers will learn to set the timers at the beginning of each session; to quit when the bell rings and begin putting equipment away and then to return the student to his ward.

5. Trainers will learn about being paid for good teaching work and how to either save or spend their earnings.

6. Trainers will learn to use the training calendar to record training sessions.

EXAMPLES OF STUDENT LANGUAGE TRAINING GOALS
PROVIDED FOR ALL ATTENDANTS DURING PHASE I

1. Mitch

present prelanguage training goals: improve his ability to

a. look at objects on command and gesture,
b. look at the trainer before each command is given, and
c. imitate movements with objects.

following success on a, b, and c

future prelanguage training goals: develop his ability to

d. imitate movements of body parts.

2. Debby

present prelanguage training goals: improve her ability to

a. imitate movements of body parts.

following success on a.

future early language training goals: improve her ability to

b. imitate vowel sounds of ah, ee, oh, oo,
c. show the trainer objects he calls for by name,
d. show the trainer room parts he calls for by name,
e. show the trainer body parts he calls for by name, and
f. perform simple activities that the trainer commands.

APPENDIX I

GENERAL TRAINER GOALS FOR ATTENDANTS IN BOTH GROUPS

GENERAL TRAINER GOALS FOR ATTENDANTS IN BOTH GROUPS

Goals for Trainers During Phase II

(July 10-July 28): Group I and II attendants

1. Teach the trainer to perform as independently as possible in each of the following areas:

   *a. getting training equipment,
   *b. getting screen and setting up,
   *c. getting student(s) and informing attendant on ward,
    d. setting timer,
    e. working directly with student on a number of different activities,
    f. stopping work when timer rings,
   *g. returning student(s) and informing attendant on ward,
   *h. putting away equipment, and
   *i. meeting attendant on assigned ward in correct area at correct time and returning by self to own ward after training is over.

   *These areas will be the most difficult for some trainers and their independence will vary.

2. Be sure to remember:

   a. to have trainer put check or star on training calendar following training,
   b. to help remind trainer of next work day, time and place,
   c. to pay trainer and help him learn about counting, saving and buying if possible,
   d. to praise trainer as often as you can when he does well, and
   e. to let trainer do most of the direct work with the student and to also do most of the discipline with the student.

3. Try to teach trainer a number of different activities to do with each of his two students based on that student's ability and needs. Also get the trainer to be familiar with these different activities so when a change in activity is needed (and the trainer does not change on his own) the supervising attendant can simply name another activity which the trainer would be able to promptly engage in with the student.

4. Try to work out solutions to any misbehavior problems with the student or with the trainer; if the student is the misbehaver then try to get the trainer to do the appropriate discipline rather than controlling the student yourself directly.

5. Also whenever there is time, please try to write down the different things that happened between student and trainer and between trainer and attendant each day in the daily log notes. This will help to define how the students made the gains that they already are making because of the trainer's and your efforts and hard work.

APPENDIX J

PERFORMANCE GOALS FOR ATTENDANTS IN EXPERIMENTAL GROUP

PERFORMANCE GOALS FOR ATTENDANTS IN EXPERIMENTAL GROUP

Extra Goals for Group I during Phase II (July 10-July 28)

1. Learn to test students on any of the 27 training parts of the Modified Language Acquisition Program to determine whether new parts need to be added to a student's training, old training procedures need to be dropped, or changes in parts being trained are needed.

2. Become familiar with the training procedures for all parts of the language program so trainers can be taught by you to train students in the correct way.

3. Learn to adjust the training cards for the trainers to fit the training needed for each student.

4. Be able to observe the student's performance as he is being trained so as to know when the student needs to be tested or when his training program should be adjusted to fit his progress or lack of progress.

5. Be able to interact with both trainers so that needed training changes can be made as soon as they are observed. Also become skilled at praising the trainers for all their improvements and good work to keep their quality of work with the students at a high level.

6. Be able to achieve all of the above with each trainer separately so that during the last month of the project (Phase III: July 31-August 25) you will feel able to supervise both trainers as they train simultaneously in one room. I will not provide much assistance during this phase but will be available to talk over the progress and changes you make with your trainers and students.

APPENDIX K

THE MODIFIED LANGUAGE ACQUISITION PROGRAM FINAL TESTS TO ACCOMPANY THE MODIFIED LANGUAGE ACQUISITION PROGRAM

THE MODIFIED LANGUAGE ACQUISITION PROGRAM FINAL TESTS TO ACCOMPANY THE MODIFIED LANGUAGE ACQUISITION PROGRAM*

Student _____

Date _____

Examiner _____

Test Purpose: Check One

_____Initial Test

_____Follow-up Final Test (1,2,3,4)

Reinforcer:

A. Check one:

_____ token _____ no token

B. Check one or more and specify:

_____ food: 1. solid _____
2. soft _____
3. drink _____

_____ other: 1. toy _____
2. other _____

GENERAL DIRECTIONS: The child's performance on each trial is recorded in the blank following the response as one of the following:

+	correct response
(+)	approximation
-	incorrect response
NR	no response

With the exception of the first two parts in the Attending Phase (see the description for those parts in the testing manual) each correct response is worth one point and all other responses are not worth any points or fraction of points.

SUMMARY OF SCORES: Number of possible points follow individual part, and number of points needed to pass are in parenthesis. Total scores, enter them below, and circle training area(s).

I. Attending Phase

A. Sitting - 30	_____(30)
B. Elimination of ICMR - 30	_____(30)
C. Looking at objects - 5	_____ (5)
D. Pre-Trial Eye Contact - 5	_____(5)

*MLAP was adapted from: Kent, L., Klein, D., Falk, A., and Guenther, H., "A Language Acquisition Program for the Retarded." In McLean, J. E., Yoder, D. E., and Schiefelbusch, R. L., (eds.) Language Intervention with the Retarded: developing strategies, Baltimore, Maryland: University Park Press, 1972; by Martha S. Rowland, Michigan State University, Department of Elementary and Special Education, 1972.
The MLAPFT are meant to be accompanied by the testing and training procedures described in: A Modified Language Acquisition Program for use by Attendants and Attendant-Supervised Retarded Trainer-Student Pairs, Martha S. Rowland, 1972.

II. Motor Imitation Phrase
- A. With Objects - 8 _____ (7)
- B. With Body Parts - 8 _____ (7)

III. Vocal Imitation Phase
- A. Gross Vocal - 3 _____ (3)
- B. Vowel - 12 _____ (11)
- C. Word - 36 _____ (33)
- D. Phrase - 20 _____ (no passing score)

IV. Basic Receptive Phase (Understanding single words that label)
- A. Touching Objects - 16 _____ (15)
- B. Pointing to Room Parts - 8 _____ (7)
- C. Pointing to Body Parts - 8 _____ (7)
- D. Performing Activities - 12 _____ (11)
- E. Finding an Object - 16 (Not Visible) _____ (15)

V. Receptive Expansion Phase (Understanding combinations of words that label)
- A. Giving Trainer 2 Objects - 10 _____ (9)
- B. Placing Object on Room Part - 10 _____ (9)
- C. Pointing to Body Parts - 16 (self and baby's) _____ (15)
- D. Finding 2 Objects - 10 (Not Visible) _____ (9)

VI. Basic Expressive Phase (Using single words to label)
- A. Naming Objects - 16 _____ (15)
- B. Naming Room Parts - 8 _____ (7)
- C. Naming Body Parts - 8 _____ (7)
- D. Naming Activities - 12 _____ (11)
- E. Naming a Concealed Object - 16 _____ (15)

VII. Expressive Expansion Phase (Using combinations of words to label)
- A. Asking for an Object - 4 _____ (4)
- B. Telling Where Object Is - 16 _____ (15)
- C. Telling Whose Body Part is Pointed to - 16 _____ (15)
- D. Telling Trainer to Perform an Activity - 6 _____ (4)
- E. Naming a Missing Object - 8 _____ (7)

SCORING SECTION	PERFORMANCE

I. Attending Phase

I-A Sitting Still: Note whether child sits without prompts or receipts of reinforcers for 30 seconds. If less than 30 seconds, note number of seconds child sits: _____ seconds

_____

I-B Elimination of Incompatible Motor Responses (Getting rid of movements that interfere with training): Note whether child exhibits incompatible motor behavior within the 30 second sitting period; if so, note number of seconds child sits without ICMR: _____ seconds

_____

Description of any ICMR: _____

_____

I-C Looking at Objects: Note whether child looks at correct objects when trainer says, "Look at this," and points to the object. Total _____

1.	key	spoon	comb	baby	car	_____
2.	key	spoon	comb	baby	car	_____
3.	key	spoon	comb	baby	car	_____
4.	key	spoon	comb	baby	car	_____
5.	key	spoon	comb	baby	car	_____

I-D Pre-Trial Eye Contact: Trainer presents initial Inventory "C" again, delaying each trial slightly (may wait 5 seconds), giving each child an opportunity to look at her before giving the command to "Look at this." Note whether child looks at trainer (without prompting) prior to each of the 5 "Look at this" trials. Total _____

1.	spoon	comb	key	baby	car	_____
2.	spoon	comb	key	baby	car	_____
3.	spoon	comb	key	baby	car	_____
4.	spoon	comb	key	baby	car	_____
5.	spoon	comb	key	baby	car	_____

II. Motor Imitation Phase: Trainer says, "Do this," and presents the following imitative models for the child to imitate.

II-A Imitation with Objects Total _____

1. Hammer a peg on a toy peg table _____
2. Point to a chair _____
3. Place a single ring on a supported vertical stick _____
4. Point to a chair _____
5. Put a hat on one's head _____
6. Put a hat on one's head _____

7. Place a single ring on a supported vertical stick _____
8. Hammer a peg on a toy peg table _____

II-B Imitation with Body Parts Total _____

1. Touch one's nose _____
2. Stick tongue out of mouth _____
3. Stick tongue out of mouth _____
4. Touch stomach with both hands _____
5. Touch one's nose _____
6. Put both arms straight out horizontally at sides _____
7. Touch stomach with both hands _____
8. Put both arms straight out horizontally at sides _____

III. Vocal Imitation Phase

III-A Gross Vocal Imitation: Trainer says, "Do this, say 'ah'" presenting three times for the child to imitate. Total _____

1. "Do this, say 'ah'" _____
2. "Do this, say 'ah'" _____
3. "Do this, say 'ah'" _____

III-B Vowel Imitation: Trainer says, "Say 'ah'" presenting each vowel for the child to imitate. Total _____

1. ah _____
2. ee _____
3. oh _____
4. ee _____
5. oo _____
6. ah _____
7. ee _____
8. oo _____
9. oh _____
10. ah _____
11. oh _____
12. oo _____

III-C Word Imitation: Trainer says, "Say hat" presenting each word for the child to imitate. Total_____

1. hat _____
2. gone _____
3. floor _____
4. nose _____
5. comb _____
6. car _____
7. comb _____
8. table _____
9. eye _____
10. hat _____
11. spoon _____
12. shoe _____
13. spoon _____
14. chair _____
15. hair _____
16. box _____
17. chair _____
18. key _____
19. floor _____
20. ball _____
21. shoe _____
22. nose _____
23. hair _____
24. car
25. gone _____
26. table _____
27. baby _____
28. teeth _____
29. key _____
30. ball _____
31. baby _____
32. box _____
33. eye _____
34. mine _____
35. mine _____
36. teeth _____

III-D Phrase Imitation: Trainer says, "Say key and comb" presenting each phrase for the child to imitate. Total _____

1. Key and comb	_____	11. Baby's eye	_____
2. Key on chair	_____	12. Spoon baby	_____
3. My hair	_____	13. Baby floor	_____
4. Baby floor	_____	14. Key on chair	_____
5. My hair	_____	15. Baby's hair	_____
6. Key and comb	_____	16. My teeth	_____
7. Hat and spoon	_____	17. Baby's eye	_____
8. Spoon baby	_____	18. Baby's hair	_____
9. Hat and spoon	_____	19. My eye	_____
10. My teeth	_____	20. My eye	_____

IV. Basic Receptive Phase (Understanding single words that label)

IV-A Touching Objects: Trainer places objects on table in front of child and within his reach and says, "Show me the comb." Total _____

1. comb	_____	9. hat	_____
2. car	_____	10. spoon	_____
3. comb	_____	11. baby	_____
4. key	_____	12. key	_____
5. ball	_____	13. shoe	_____
6. ball	_____	14. shoe	_____
7. car	_____	15. baby	_____
8. spoon	_____	16. hat	_____

IV-B Pointing to Room Parts: Trainer places a box and chair in view of the child and says, "Show me the floor." Total _____

1. floor	_____	5. floor	_____
2. box	_____	6. chair	_____
3. table	_____	7. table	_____
4. chair	_____	8. box	_____

IV-C Pointing to Body Parts: Trainer faces child and says, "Show me (child's name) nose." Total _____

1. nose	_____	5. eye	_____
2. eye	_____	6. nose	_____
3. teeth	_____	7. hair	_____
4. teeth	_____	8. hair	_____

IV-D Performing Activity: Trainer places a ball and food on the table in front of the child. Both trainer and child stand as trainer gives each command. Note response to:
Total _____

1. jump	_____	7. sit	_____
2. sit	_____	8. jump	_____
3. roll the ball	_____	9. eat	_____
4. march	_____	10. bounce the ball	_____
5. roll the ball	_____	11. bounce the ball	_____
6. march	_____	12. eat	_____

IV-E Finding Objects - Not Visible: Objects are placed behind the screen while the child watches. Trainer says, "Go get the ball." Total _____

1. ball	_____	9. hat	_____
2. spoon	_____	10. shoe	_____
3. key	_____	11. comb	_____
4. baby	_____	12. car	_____
5. spoon	_____	13. comb	_____
6. key	_____	14. car	_____
7. baby	_____	15. hat	_____
8. ball	_____	16. shoe	_____

V. Receptive Expansion Phase (Understanding two words that label)

V-A Giving Trainer Two Objects: Trainer places all objects on table and says, "Give me the car and the baby." (Hold out both hands) Total _____

1. car and baby	_____	6. shoe and comb	_____
2. spoon and hat	_____	7. baby and ball	_____
3. key and car	_____	8. baby and shoe	_____
4. key and car	_____	9. shoe and spoon	_____
5. car and spoon	_____	10. baby and comb	_____

V-B Placing objects on room parts: Trainer places all objects and the box on the table and says, "Put the spoon in the box."
Total _____

1. spoon in box	_____	6. baby on table	_____
2. car in box	_____	7. key on chair	_____
3. spoon on floor	_____	8. baby in box	_____
4. shoe in box	_____	9. comb on floor	_____
5. car on table	_____	10. car on chair	_____

V-C Touching Body Parts (Self and Baby's): Trainer places a doll in front of child and says, "Show me the baby's teeth." Total _____

1. baby's teeth	_____	9. baby's teeth	_____
2. child's teeth	_____	10. child's eye	_____
3. child's teeth	_____	11. baby's hair	_____
4. child's hair	_____	12. child's nose	_____
5. child's hair	_____	13. child's nose	_____
6. baby's eye	_____	14. child's eye	_____
7. baby's hair	_____	15. baby's nose	_____
8. baby's eye	_____	16. baby's nose	_____

V-D Finding two objects (not visible): Objects are placed behind the screen while child watches. Trainer says, "Go get the comb and the shoe." Total _____

1. comb and shoe	_____	6. baby and car	_____
2. key and hat	_____	7. baby and car	_____
3. hat and shoe	_____	8. shoe and baby	_____
4. hat and shoe	_____	9. comb and hat	_____
5. car and spoon	_____	10. spoon and baby	_____

VI. Basic Expressive Phase (Using single words to label)

VI-A Naming Objects: Trainer says, "What is this?" as each object is held up, one at a time. Total _____

1. key	_____	9. hat	_____
2. baby	_____	10. spoon	_____
3. car	_____	11. key	_____
4. baby	_____	12. ball	_____
5. car	_____	13. hat	_____
6. shoe	_____	14. comb	_____
7. comb	_____	15. spoon	_____
8. ball	_____	16. shoe	_____

VI-B Naming Room Parts: Trainer notes the child's response while pointing to various room parts and says, "What is this?" Total _____

1. chair	_____	5. floor	_____
2. box	_____	6. table	_____
3. chair	_____	7. table	_____
4. box	_____	8. floor	_____

VI-C Naming Body Parts: Trainer notes child's response as she points to his body parts and to the child's body parts and says, "What is this?" Total _____

1. teeth	_____	5. eye	_____
2. nose	_____	6. hair	_____
3. nose	_____	7. teeth	_____
4. eye	_____	8. hair	_____

VI-D Naming Activities: Trainer performs activity and then says, "What did I do?" Total _____

1. eat	_____	7. roll the ball	_____
2. sit	_____	8. sit	_____
3. roll the ball	_____	9. march	_____
4. bounce the ball	_____	10. jump	_____
5. jump	_____	11. march	_____
6. bounce the ball	_____	12. eat	_____

VI-E Naming Concealed Objects: Trainer notes child's response while showing object to child, placing it in box, covering box, and saying, "What is in the box?"

1. ball	_____	9. hat	_____
2. baby	_____	10. spoon	_____
3. car	_____	11. key	_____
4. baby	_____	12. ball	_____
5. car	_____	13. comb	_____
6. shoe	_____	14. key	_____
7. comb	_____	15. spoon	_____
8. shoe	_____	16. hat	_____

VII. Expressive Expansion Phase (Using combinations of words to label)

VII-A Asking for Objects: Trainer notes child's response when he shows child box of eight objects, then tips it away or puts under the table, and says, "What do you want?" Total _____

1. "What do you want?"	_____	3. "What do you want?"	_____
2. "What do you want?"	_____	4. "What do you want?"	_____

VII-B Telling where an object is: Trainer puts the object on the room part as the child watches and then notes the child's response when asking, "Where is the baby?" Total _____

1. baby on floor	_____	5. spoon on table	_____
2. spoon in box	_____	6. spoon in box	_____
3. comb on table	_____	7. car on floor	_____
4. comb on chair	_____	8. hat on floor	_____

9. ball on chair	_____	13. car on table	_____
10. key on table	_____	14. baby in box	_____
11. key in box	_____	15. shoe in box	_____
12. ball on floor	_____	16. hat on table	_____

VII-C Telling whose body part is pointed to: Trainer points to body part on either the doll or the child and notes whether the child correctly answers with either "baby's," "mine," etc. in response to the question asked, "Whose nose is this?" Total _____

1. baby's nose	_____	9. baby's teeth	_____
2. baby's teeth	_____	10. child's eye	_____
3. baby's hair	_____	11. baby's hair	_____
4. baby's nose	_____	12. child's hair	_____
5. baby's eye	_____	13. child's eye	_____
6. child's teeth	_____	14. child's teeth	_____
7. child's nose	_____	15. baby's eye	_____
8. child's nose	_____	16. child's hair	_____

VII-D Telling Trainer to perform an activity: Trainer notes child's response to the question, "What do you want me to do?" performing each activity requested by the child after the question. Total _____

1. What do you want me to do? _____
2. What do you want me to do? _____
3. What do you want me to do? _____
4. What do you want me to do? _____
5. What do you want me to do? _____
6. What do you want me to do? _____

VII-E Naming Missing Objects: As the child watches, trainer places 3 objects in a box and removes one out of his view and then notes whether child names object missing from the group of 3 that he has just seen. Trainer asks, "What is one?" Total _____

1. spoon	baby	key	_____
2. comb	ball	car	_____
3. comb	car	baby	_____
4. baby	comb	ball	_____
5. key	ball	hat	_____
6. car	hat	comb	_____
7. hat	spoon	shoe	_____
8. key	baby	spoon	_____

Comments:

APPENDIX L

EXPERIMENTAL TESTING, RECORDING AND SCORING PROCEDURES FOR ADMINISTRATION OF THE MODIFIED LANGUAGE ACQUISITION PROGRAM FINAL TESTS (MLAPFT)

EXPERIMENTAL TESTING, RECORDING AND SCORING PROCEDURES FOR ADMINISTRATION OF THE MODIFIED LANGUAGE ACQUISITION PROGRAM FINAL TESTS (MLAPFT)

I. General Experimental Testing Procedures

A. Most of the final tests given for each of the 29 parts in the program include two trials on each item; since the test form lists all items to be tested, it therefore includes the appropriate number of trials allowed for each part.

B. All items in each part's test will be given in the randomly predetermined order which is listed on the test form.

C. All materials (toys and objects) used in the pre- and posttesting will be different materials than those used during training.

D. The examiner does not begin a trial unless the child is exhibiting appropriate attending behavior (sitting, no incompatible motor behaviors, looking at examiner or test materials); however, waiting need not extend beyond 10 seconds when that item is given anyway.

E. The examiner waits until the child completes the response before reinforcing him.

1. All correct responses, approximations and incorrect responses are immediately reinforced with continuous enthusiastic praise (smile, words, and perhaps tactual reinforcement) and with continuous token reinforcement, or with intermittent food or toy reinforcement; this latter choice (token or non-token reinforcement) depends upon which reinforcement system the child being tested is operating on. This information will be determined prior to testing. If the child is on a token system, the accumulated tokens may be exchanged for a choice of edible reinforcers or toy-usage reinforcers (i.e., one pull on a pull-the-string talking toy). This token exchange as well as toy or food reinforcement may be given intermittently throughout testing by the examiner to keep attending and responding at a high rate.
2. No reinforcement, social or otherwise, will be given when the subject makes no response following a test trial.

F. As is expected, no prompts of any kind will be used to evoke responses from the child during testing. (Imitative or demonstrative models used during the vocal and motor imitation phases are not considered prompts.)

G. Test Ceilings

1. Attending Phase: All subjects will be tested first on all parts of this phase. If there are no correct responses for this entire phase, no further testing for that subject will be done. All other parts will be scored as zero.
2. All subjects with at least some correct responses in the attending phase are tested in the following order on all the parts of the four phases listed below: (order exceptions*)
   Motor Imitation Phase (parts 2a and 2b)
   Vocal Imitation Phase (parts 3a, 3b, and 3c)*
   Basic Receptive Phase (parts 4a, 4b, 4c, and 4d)**
   Basic Expressive Phase (parts 6a, 6b, 6c, 6d, and 6e)***

*3. Part 3d, Phrase imitation, is tested only if the child makes some correct responses in 3c, word imitation.

**4. Part 4e, Finding one object (not visible), is tested only if the child makes at least one correct response on part 4a, touching objects. If there are any correct responses in any of the parts of the Basic Receptive Phase, then the subject is tested on those parts in the Receptive Expansion Phase which are expansions of the Basic Receptive Phase (e.g., 5b is an expansion of 4a and 4b). Those tests in this phase are then given immediately following the Basic Receptive Phase Testing and just prior to giving the Basic Expressive Phase tests. If there are no correct responses on any of the parts in the Basic Receptive Phase, then no testing is done in the Receptive Expansion Phase and it is scored zero.

***5. Part 5e, Naming a concealed object, is tested only if the child makes at least one correct response on part 5a, naming objects. If there are any correct responses in any of the parts of the Basic Expressive Phase, then the subject is tested on those parts in the Expressive Expansion Phase which are expansions of the Basic Expressive Phase (e.g., 7d is an expansion of 6d). Those tests in this phase are then given immediately following the Basic Expressive Phase tests. If there are no correct responses on any of the parts in the Basic Expressive Phase, then no testing is done in the Expressive Expansion Phase and it is scored zero.

APPENDIX M

BEHAVIORAL OBSERVATION RECORD

BEHAVIORAL OBSERVATION RECORD

Observational Key:

Trial: Each trial consists of a stimulus presentation at the very least; these are each numbered under the section labeled "trials." Generally, however, a trial includes a child's response and a consequence.

Events within a trial:

1. Attention: the child is looking at the trainer or the training materials as the stimulus is presented.

   A-1 In order to evoke the child's attention the trainer calls the child's name in an emphasized tone.
   A-2 In order to evoke the child's attention the trainer calls the child's name and says, "Look at me," while pointing towards himself.
   A-3 In order to evoke the child's attention the trainer repeats A-2 and physically helps the child turn towards the trainer to face him.

   \- The child is not looking as stimulus is presented.

   ✓ The child is already looking and no effort is made by the trainer (name may be called but should be regarded as part of the vocal stimulus presentation rather than as attention eliciter).

2. Stimulus Presentation: use of words and/or gestures which may or may not include a physical demonstration (as in imitation) and/or materials (objects, toys, etc.) to command a response by the child.

   VC Vocal command, i.e., "Touch the car."
   VGC Gestural and vocal command, i.e., "Touch the spoon," as the trainer takes hand to mouth to gesture "spoon."
   D A physical demonstration (model) of the response to be imitated by the child, i.e., motor and vocal imitative tasks.
   \- An incorrect stimulus presentation (includes none).

(Note: Under stimulus presentation the observer should also indicate the stimuli presented, i.e., ball-spoon-key [as in receptive labeling]).

3. Prompt: different kinds and degrees of assistance given to the child by the trainer to get the child to make the correct response.

IP a. Imitative physical or vocal prompt: used to get the child to imitate the correct response (motor response) i.e., in receptive labeling when the trainer gives a vocal command to touch an object and the child, after not responding, is prompted by the trainer who touched the correct object and says as he touches it, "Do this." (Vocal imitative prompts, "Say 'ball,'" are also in this category).

P_1 b. Physical prompt: The trainer touches the child's arm or another part of his body only briefly as a means of getting the child to begin and complete the correct response.

P_2 The trainer puts the child through the first half or three-quarters of the correct response but allows the child to complete the remainder of the response, i.e., trainer pushes the child's elbow toward the object asked for but does not push his hand to the point of contact with the object.

P_3 The trainer puts the child through the entire correct response.

C_1 c. Cueing: the trainer touches, points, taps or otherwise draws attention toward all the stimulus objects but does not cue the correct choice only; also there is no physical contact with the child during cueing as is during prompting physically.

C_2 The trainer gives a cue (tap, point to, touch, etc.) that indicates the correct choice to be made among the various stimulus objects; no physical contact with the child.

\- Some form of prompt (cue, IP, etc.) should have been given but was not given by the trainer.

X The trainer gave some form of prompt which was unnecessary (too much, i.e., P_3 rather than a P_1); difficult to judge as it is based on the child's responses following the unneeded prompt.

4. Response: refers to the child's response to the trainer's presentation of stimuli.

\+ correct response (whether done with or without prompts by the trainer

(+) an approximation of the correct response (e.g., child hits table with hammer rather than hitting pounding table in the motor imitation with objects part of the program)

\- incorrect response

NR no response (i.e., the child does not respond on his own and/or no assistance is given so that he does not make a response)

5. Consequence: refers to anything that happens to the child by the trainer immediately following the child's response or an NR (which was preceded by stimulus presentation) and occurs before the next stimulus presentation.

   a. Feedback: generally in the form of vocal feedback to the child by the trainer meant to emphasize the correct word or phrase connected with the correct response in that trial (in receptive labeling, "That's the BALL," is said following the child touching the ball when asked to do so by the trainer).

      + correct vocal feedback (should have emphasis on key work)
      - incorrect vocal feedback or none when there should have been some

   b. Reinforcement: the positive reinforcement that trainer gives to the child.

      V Vocal praise, "Good boy," etc.
      T Tactual reinforcement; pat, hug, etc.
      G Gestural reinforcement; clapping, jumping up and down, etc.
      Toy Concrete toy usage reinforcement given to the child
      F Food reinforcement (solid or liquid)
      Tk Token reinforcement

   c. Other Consequences:

      NF Negative feedback; "No," "Bad boy," etc.
      TI_1 Temper tantrum intervention: trainer says "NO!" loudly to the child upon first evidence of tantrum behavior.
      TI_2 Trainer says "NO!" more loudly and gives a short time out to the child (turns away from child, or turns chair of child around).
      TI_3 Trainer does all the above plus holds child in chair or physically restrains child in chair for the time out.

6. Intervention of supervising person: attendant, assistant or experimenter intervenes vocally and/or physically into the ongoing training between the trainer and child. (Code appropriate to the intervention is made at the point of intervention on the observation form).

   (*) Supervisor praises the trainer
   *V Supervisor intervenes with vocal assistance to the trainer
   *D Supervisor intervenes with physical assistance or a demonstration for the trainer

APPENDIX N

SAMPLE BEHAVIORAL OBSERVATION RECORD

SAMPLE BEHAVIORAL OBSERVATION RECORD

Trainer_____ Date _____ Group _X_ I ___II

Student_____ Training Level ___4a_____

Attendant_____ Phase __X__ I _____II _____ III

Trial	Attention	Stimulus Presentation	Prompt	Response	Feedback	Consequence	Comment
1	✓	baby VC		+	+	* V Tk	
2	✓	shoe VC		NR			
3	✓	shoe VC		-		★C NF	
4	✓	shoe VC	P_3	±	+	* V Tk	
5	✓	shoe VC	P_1	+	+	V Tk *	
6	✓	shoe VC		+	+	V Tk	
7	A_1 -	hat VC		-		★C	
8	A_3 ✓	hat VC	C_2	+	+	V Tk	
9	✓	hat VC	C_1	+	+	V Tk	
10	✓	car VC		+	+	Tk	
11	✓	car VC		+	+	★C	
12	✓	hat VC		-		NF	
13	✓	hat VC		+	+	★ V Tk	
14	✓	hat VC		+	+	V Tk	

Sample BOR observation and tabulation of 11 categories of events:

1. Number of complete trials 9
2. Number of times student was attending prior to stimulus presentation 13
3. Number of student responses 13
4. Number of times the supervising attendant or experimental staff reinforced the trainer 5
5. Number of times the supervising attendant or experimental staff provided instructional demonstrations or comments to the trainer 3
6. Percentage of correct and approximate responses reinforced by the trainer 90 percent (9/10)
7. Percentage of tangible reinforcers (tokens, toys, food, etc.) paired with praise 88 percent (8/9)
8. Percentage of appropriate prompts provided by the trainer 75 percent (3/4)
9. Consistency of the stimulus presentation 9
10. Judgment regarding the trainer's ability to fade prompts OK
11. Judgment regarding the appropriateness of the training task(s) to the student Appropriate

APPENDIX O

DIRECTIONS TO STRUCTURE TRAINING INTERACTIONS BETWEEN ATTENDANTS AND STUDENTS, RETARDED TRAINERS AND STUDENTS

DIRECTIONS TO STRUCTURE TRAINING INTERACTIONS BETWEEN ATTENDANTS AND STUDENTS, RETARDED TRAINERS AND STUDENTS

1. Structured use of BOR: Attendant instructing student

A. Motor Imitation

"Attendant's name I would like you to spend the next few minutes with student's name. I want you to try to get him (her) to imitate or copy you when you" (show cards).

1. put a block into a bowl
2. ring a bell
3. and when you hit the table.

"Work on teaching any or all these three tasks in any order you want and repeat them as often as you want and use anything you can think of to try and train ____ to copy or imitate you when you put the block in a bowl, hit the table, or ring the bell. You don't need to hurry. I'll let you know when to stop so just spend all your time working with ____. OK? You can start."

B. Receptive labeling

"I would like you to spend the next few minutes with student's name. I want to see you try to get ____ to show you an object you ask for. Here are some objects to use; ask him to show you or touch any one or more of these: spoon, baby, car. Work on teaching him to understand (not to say) these words; all or some of them. Train them in any order and repeat them as often as you want. Use any ideas you can think of to try and train ____ to understand these words--car, spoon, or baby--when you say them. You don't need to hurry. I'll

let you know when to stop so just spend all of your time working with ____. OK? You can start now."

2. Structured use of BOR: retarded trainers instructing students

A. Motor Imitation

"This is name of student. I want you to try to get ____ to do what you do. See if you can get him to ring the bell after you ring the bell; then try to get him to hit the table after you hit the table; and you can try this too--see if he will put the block in the bowl after you put the block in the bowl. You want to try to teach ____ to copy what you do. You just work real hard with ____ for a few minutes and I'll stand right here and just watch. Here's the bell to ring, and the block and bowl and the table to hit. OK? Let's go."

B. Receptive Labeling

"This is name of student. _____ doesn't know what the word 'toothbrush' means but he uses it every day. Could you teach him to get the toothbrush when you ask him? And here's two other things he does not know the words for: spoon and car. See if you can think of a way to teach _____ to know what the words 'toothbrush,' 'spoon,' and 'car' mean. Try to get _____ to show you which of these goes with the words 'toothbrush' and which goes with the word 'spoon' and which goes with the word 'car.' You just work real hard with _____ for awhile and I'll stand here and watch what you do. OK? Let's go."

APPENDIX P

PRETEST AND POSTTEST MLAPFT PHASE TOTALS AND TEST TOTALS FOR PAIRS OF STUDENTS IN GROUPS E AND C

Table 24. Pretest and Posttest MLAPFT Phase Totals and Test Totals for Pairs of Students in Group E and C.

Student Pairs'		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Total Score
Group E									
1 and 2	pre	52.90	2.31	0.0	0.56	0.0	0.0	0.0	55.77
	post	54.36	4.65	0.0	1.52	0.0	0.0	0.0	60.53
3 and 4	pre	55.00	3.09	3.98	3.09	0.0	0.46	0.0	65.63
	post	56.13	5.22	3.43	8.50	10.14	4.65	0.94	89.02
5 and 6	pre	51.28	0.0	0.0	0.0	0.0	0.0	0.0	51.28
	post	48.64	0.20	0.0	0.0	0.0	0.0	0.0	48.84
7 and 8	pre	55.49	5.02	4.44	5.65	4.38	4.81	0.0	79.79
	post	57.10	5.99	7.92	8.81	6.86	10.96	8.57	106.21
9 and 10	pre	52.74	3.69	0.0	9.97	6.23	0.0	0.0	72.63
	post	57.10	5.22	3.43	14.46	13.14	5.27	0.94	99.56
11 and 12	pre	56.78	5.02	5.42	5.75	5.85	1.83	0.0	80.64
	post	57.10	6.18	7.41	9.79	10.96	15.13	3.57	110.13
Group C									
1 and 2	pre	52.74	0.78	0.0	0.0	0.0	0.0	0.0	53.52
	post	53.87	1.56	0.0	0.20	0.0	0.0	0.0	55.63
3 and 4	pre	52.42	0.98	0.0	0.0	0.0	0.0	0.0	53.39
	post	51.77	2.34	1.29	0.57	0.0	0.0	0.0	55.96

Table 24. Continued.

Student Pairs'		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Total Score
5 and 6	per	50.96	0.78	0.0	0.47	0.0	0.0	0.0	52.21
	post	46.55	1.17	0.0	1.09	0.0	0.0	0.0	48.80
7 and 8	per	56.78	4.26	4.33	12.49	2.87	12.54	10.00	103.265
	post	56.45	5.41	8.06	12.51	3.66	6.96	6.50	99.65
9 and 10	pre	55.16	2.11	2.17	6.00	3.67	0.0	0.0	69.11
	post	53.87	5.41	8.06	4.79	4.05	0.64	0.0	70.78
11 and 12	pre	52.90	1.94	0.0	1.42	0.0	0.0	0.0	56.25
	post	53.22	2.33	1.04	2.75	0.21	0.0	0.0	59.55

Legend:

Phase 1: Attending Phase (total of scores from part 1a-1d)
Phase 2: Motor Imitation Phase (total of scores from parts 2a-2b)
Phase 3: Vocal Imitation Phase (total of scores from parts 3a-3d)
Phase 4: Basic Receptive Phase (total of scores from parts 4a-4e)
Phase 5: Receptive Expansion Phase (total of scores from parts 5a-5d)
Phase 6: Basic Expressive Phase (total of scores from parts 6a-6e)
Phase 7: Expressive Expansion Phase (total of scores from parts 7a-7e)
Total Score: Total of all phase scores

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