DOCUMENT RESUME

ED 183 371 SE 029 953

AUTHOR	Chernen, Leslie
TITLE	The Development of a Learning Laboratory at a Residential Treatment Center for Preadolescent Delinquents.
INSTITUTION	San Jose State Univ., Calif.
SPONS AGENCY	National Science Foundation, Washington, D.C.
PUB DATE	Jun 76
GRANT	NSF-EPP-75-09299
NOTE	331p.: Photographs will not reproduce well; Pages 193-225, Appendix 3, removed due to copyright restrictions
EDRS PRICE	MF01/PC14 Plus Postage.
DESCRIPTORS	Achievement; *Delinquents; Educational Diagnosis; Elementary Education; *Elementary School Mathematics; Individualized Instruction; Learning Laboratories; *Mathematics Instruction; Programed Units; Reading; Reading Instruction; Reinforcement; *Remedial Mathematics; *Remedial Reading; *Research; Tutoring

ABSTRACT

Described is a project conducted to achieve the following three goals: (1) the remediation of reading and arithmetic deficits of preadolescent delinquents; (2) the training of paraprofessional and peer tutors through a system of verbal and written presentation modeling, behavioral rehearsal, and evaluative feedback; and (3) the creation of a continuing learning laboratory based diagnosis, individualized prescription, programmed units, reinforcement and self-charting of progress. The study utilized experimental and control groups. Results indicated considerable gains in achievement by the experimental group in reading and arithmetic as compared to the control group. It is noted that less gain was shown on the reading subtests. (MK)

ED183371

Calif. State Univ. San Jose
EPP75-09299

THE DEVELOPMENT OF A LEARNING LABORATORY AT A RESIDENTIAL TREATMENT CENTER FOR PREADOLESCENT DELINQUENTS

A STUDENT-ORIGINATED

NATIONAL SCIENCE FOUNDATION GRANTED PROJECT

JUNE 1976

by

Leslie Chernen
Project Director

ACKNOWLEDGEMENTS

I would first like to thank the National Science Foundation whose support made this project possible (see Appendices 1 & 2). Gratitude is also extended to my project advisor, Dr. Dwight Goodwin, whose continual patience and guidance has been of considerable assistance to me. I would also like to thank my committee members, Dr. Madeleine Gross and Dr. Steven Zifferblatt, whose knowledge and confidence in me was instrumental in the project's development and completion.

To the project participants, Ms. Marilyn Coffron, Mr. David Giber, Ms. Christine Haggenmacher, Ms. Helen Hendrickson, Ms. Gina Herrera, Mr. Stanley Klein, Ms. Sharri Lepage, Mr. Daniel Pasutti, and Ms. Amy Rudnick, I would like to extend a special note of appreciation for their diligent tutoring throughout the summer, 1975. I would also like to thank Dr. Carl Thoresen for his assistance and support in the preparation of the proposal and his continual interest in the project's outcome. I would further like to extend a note of gratitude to the Learning House staff members, Mr. Curt Wilbur, Mr. Brian Yates, Mr. Chip and Ms. Jane Haven, and to the teaching parents, Mr. Jim and Ms. Linda Brown and Mr. Al and Ms. Marilyn, for their kind patience and reinforcement through the months prior to and during the project's duration. Finally, I would like to extend my warm appreciation to Ms. Kay Thoresen for her assistance, kindness, and support during the summer months, and most of all, for assuming the role of Learning Laboratory supervisor upon my departure.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF PHOTOGRAPHS

CHAPTER 1

INTRODUCTION

The objectives toward which this project was oriented were threefold: 1) the remediation of reading and arithmetic deficits of preadolescent delinquents residing at Learning House; 2) the training of paraprofessional and peer tutors through a systematized method of verbal and written presentation modeling, behavioral rehearsal, and evaluative feedback; 3) the creation of a continuing learning laboratory based on diagnosis, individualized prescription, programmed units, reinforcement (i.e., social/point/tangible/activity), and self charting of progress at the Learning House treatment facility.

Learning House was first conceived by three Stanford educators: Dr. Carl E. Thoresen, Dr. Steven M. Zifferblatt, and Dr. Michael Mahoney. These three psychologists were concerned that 80,000 children were located in prison-like institutions, not because they had committed any crime, but because there was no other place for them. Young children who had gotten into trouble or whose parents were unable or unwilling to care for them were often placed in large impersonal institutions with little more than custodial care. Without adequate treatment, the problem child had become caught in a cycle of behavior problems, crime, and further institutionalization which could last throughout his life. Thoresen, Zifferblatt, and

Mahoney initiated the Learning House program with the hope of breaking this cycle and returning the child to a productive existence.

Learning House was modeled after Achievement Place, a successful family-style treatment facility for problem adolescents (Phillips, 1968). Learning House is licensed by the California Department of Mental Health as a family-style treatment home. It is authorized to treat a maximum of six boys and girls, ranging in age from 7 through 13 years. Children were referred by social agencies such as the Department of Social Service, Child Welfare, and Juvenile Probation. These agencies serve as the major funding source for Learning House.

Youngsters are sent to Learning House when they exhibit a variety of problem behaviors (e.g., truancy, theft, fire-setting, physical aggression, and lack of social and academic skills). The goal of the Learning House program is to teach these children new behaviors which will help them become more responsible and self reliant members of society. This goal is accomplished through the identification of problem or target behaviors and the use of a modified token economy or point system to teach new, appropriate behaviors in place of former, inappropriate ones.

The children are supervised during the week by two "teaching parents" (married couples who alternate weeks on duty at Learning House). Teaching parents are professionally trained couples, skilled in the areas of behavior change, family counseling, and community relations. During the weekends, children visit their parents or potential foster families. An important objective of the Learning House program is to return the child to an improved home or foster home as soon as possible. Thus parents or guardians must participate in a training program in which they are taught how the child management skills used at Learning House can be duplicated in the home. This program begins when the child enters Learning House and continues throughout the one-year follow-up period after the child's "graduation." This process insures a smooth transition from the Learning House program to the child's home and community (Chernen and Yates, 1974).

To graduate from the Learning House program, children advance through a series of stages. This progression, for most youngsters, takes about nine months. The stages include: 1) the Item Exchange System, in which appropriate behavior results in immediate material or social reinforcement; 2) the Daily System, in which the child's cumulative point total determines the number of privileges he will receive the following day; 3) the Weekly System, in which the child's cumulative point total determines the number of privileges he will receive the following week; 4) the Merit System, in which points are no longer exchanged and all behaviors are controlled by natural consequences; 5) Homeward Bound, the final stage, which prepares the child to return to his own or foster home (Chernen and Yates, 1974). Throughout each of these stages, such skills as contracting, role-playing, decision making, and self management are taught and acquired by the child.

Children at Learning House attend local elementary and junior high schools since one criterion for acceptance into the Learning House program demands that they be able to function in a regular school setting. The Learning House staff maintains a continuous liaison with the children's teachers and principal, thus facilitating acquisition of new behaviors in the school as well as the family environment.

Under the supervision of Brian Yates, a third-year doctoral student in the Department of Psychology at Stanford University, an elaborate Student Involvement Program has been developed at Learning House. A continuing course (under Special Problems in Psychology and Education and the Stanford Workshop on Political and Social Issues) is taught each quarter. It is designed to involve high school, college, and university students in the Learning House treatment process.

During their first quarter at Learning House, students are trained as non-participant observers at Learning House, at school, and in the child's home. In this capacity, students systematically record each child's behavior in a variety of settings.

The students' second quarter at Learning House (before the initiation of this project) was spent academically tutoring an individual child. Since most children sent to Learning House are academically deficient and far below their classmates in academic skills, remediation of scholastic deficits has been an essential part of the child's Learning House program.

Formerly, college tutors assessed the child's academic needs through teacher and Learning House staff consultation.

A tutoring program was then designed upon these recommendations to foster study skills, self control, and increased classroom functioning (Chernen and Yates, 1974).

In the third quarter of the Student Involvement Program, students participate in one of three treatment positions: 1) teaching parent assistants, who act as substitute teaching parents at the treatment facility and on outside excursions; 2) parent intervention agents, who work with the teaching parents in counseling the child's parents or guardians; 3) cost efficiency analysts, who utilize an operations research approach in assessing the amount of behavioral change each child undergoes relative to the amount of money consumed (Pennypacker, Koenig, and Seaver, 1974; Zifferblatt and Yates, 1974).

The student involvement course also involves extensive readings in the area of social learning theory and its applications, two weekly one-hour seminars, guest lecturers, and discussion of topics in the area of prevention and treatment of the social problems of youth.

Learning House was also developed to serve as a preventative mental health delivery system. In this capacity, Learning House staff train local residents in behavior change skills and subsequently send these people into the community to train others. Thus Learning House has been designed to serve as a self perpetuating model, having broad ramifications above and beyond the treatment facility itself. Since Learning House is one of the few empirically-based facilities of its kind in the San Francisco Bay Area, it serves as a demonstration center for the type of treatment it utilizes and advocates.

Learning House accepted its first resident in December, 1972. Since then, it has had an impressive success rate with its charges. Only three out of twenty youngsters have failed to successfully complete the Learning House program. After an average of nine months of treatment, most youngsters at Learning House successfully graduate from the program. The seventeen Learning House "graduates" have shown a significant improvement in adjusting to their family, peer, school, and community environments after their return to their own or foster homes.

A number of investigators (Kuypers, Becker, and O'Leary, 1968; O'Leary and Drabman, 1971; Zimmerman, Zimmerman, and Russell, 1969) have reported that the target behavior least changed by token economies such as Learning House is that of academic deficits. This is thought to occur because most token economies usually focus on social targets, leaving academic deficits to be remediated incidentally when social behavior is improved. O'Leary and Drabman (1971) suggested that token economies fail to remediate academic behaviors because the primary function of token systems has been to increase the frequency of appropriate social behaviors already in the child's repertoire. Since skills necessary for academic progress have never been learned by the child, the use of prompting alone is not enough. Instead, considerable remedial instruction is necessary.

Significant changes in academic behavior have been reported by some investigators who utilized a token system in conjunction with an intensive, diagnostic-prescriptive, individualized program (Cohen, 1968; Hren, Spates, Ulrich, and Ulrich, 1974; Tyler and Brown, 1968).

Cohen (1968) devised an elaborate educational program encompassing the entire day for 28 juvenile offenders (85% having dropped out of school). Each resident was deemed a "student educational researcher" and was instructed to complete 140 programmed educational courses geared to each subject's diagnostic level. The environment offered a variety of contingencies not often available to prisoners. These included money, private bedrooms, "better" meals, and gifts. The subjects received tokens which could be used to purchase desired objects and privileges for achieving 90% accuracy on performance tests of completed materials. Continual self charting reminded each subject of his progress. If poor test performance occurred, the subject went "on relief," slept on an open bunk, and ate from a metal tray. After 90 hours of academic work, the average gain of the students was 1.9 grade levels on the Stanford Achievement Test and 2.7 grade levels on the Gates Reading Test.

Another study substantiating an increase in academic achievement as a result of the use of the above approach was conducted by the Napa Valley Unified School District (1974). Using funds from a federal grant under ESEA Title III, an individualized-prescriptive program called Project I.D.E.A. (Individualized Diagnostic Error Analysis) was conducted. Six elementary and junior high school project classes were formed with 345 students serving as experimental subjects and 888 as control subjects. The Stanford Achievement Test was used as a pre and post diagnostic measure. Each project class was staffed by a paid adult aide and one classroom teacher. After the child's arithmetic deficits (the major concern of this study) were fully diagnosed, the subject was then assigned to a set of materials consisting of taped instructions, state adopted texts, and individualized instruction. The latter consisted of Telor programmed learning aids and cartridges (Baldwin, 1974) covering all areas of elementary arithmetic computation. Results of this program showed an average gain in computational skill of 1.12 months per month for the subjects in the project classes, and .70 months per month for the control subjects.

Hren, et al. (1974), described the creation of a learning laboratory for the development and testing of educational techniques. They called their project Learning Village. Basically, Learning Village was a small private school operating ten hours per school day, year round. Programmed materials, e.g., Distar (Engelmann and Becker, 1969) and SRA Reading Laboratories (Parker, 1974) were used along with a token economy and an extensive self monitoring system of student progress. Scores on standardized reading tests yielded a J-shaped distribution, very much in contrast to the usual normal curve of educational development.

Another potentially efficient and successful feature of a remedial learning laboratory involves paraprofessional and peer tutoring. Hoffman (1974) stated that attempts to involve teachers in the remediation of child learning deficiencies has been unsuccessful. Hoffman suggested that this failure occurred because teachers frequently claimed that they did not have sufficient time to offer individual aid to students on a regular basis. A partial solution to this problem is to utilize paraprofessional and peer tutors in this capacity.

Research has demonstrated that nurses and hospital attendants (Allyon and Michael, 1959), parents (Zeilberger, Samper, and Sloane, 1968; Hawkins, Schweid, and Bijou, 1966) as well as many other diverse populations can be trained in a short period of time to effectively modify the behavior of others. Ulrich and Kent (1966) have suggested the use of college students as instructors for less advanced students in teaching behavior change skills. Gray, Graubard, and Resenberg (1974) have reported that junior high school students have successfully shaped the behavior of their instructors. Surratt, Ulrich, and Hawkins (1969) found that a fifth grader, serving as a behavioral engineer for four first grade students, was successful in achieving behavioral change. Fifth graders were also used to teach arithmetic to kindergarteners with successful results (Johnson and Bailey, 1974). In addition, studies indicated that paraprofessionals are desirable from a cost-efficiency viewpoint since they require little or no salary and the training they receive could be considered an additional contribution to the program (Zifferblatt and Yates, 1974).

Hamblen (1971) wrote that peer tutoring has not been effectively used by psychologists on a wide scale basis. A training program incorporating peer tutors and paraprofessional coordinators is seen by Hamblen as a valuable asset to the educational process.

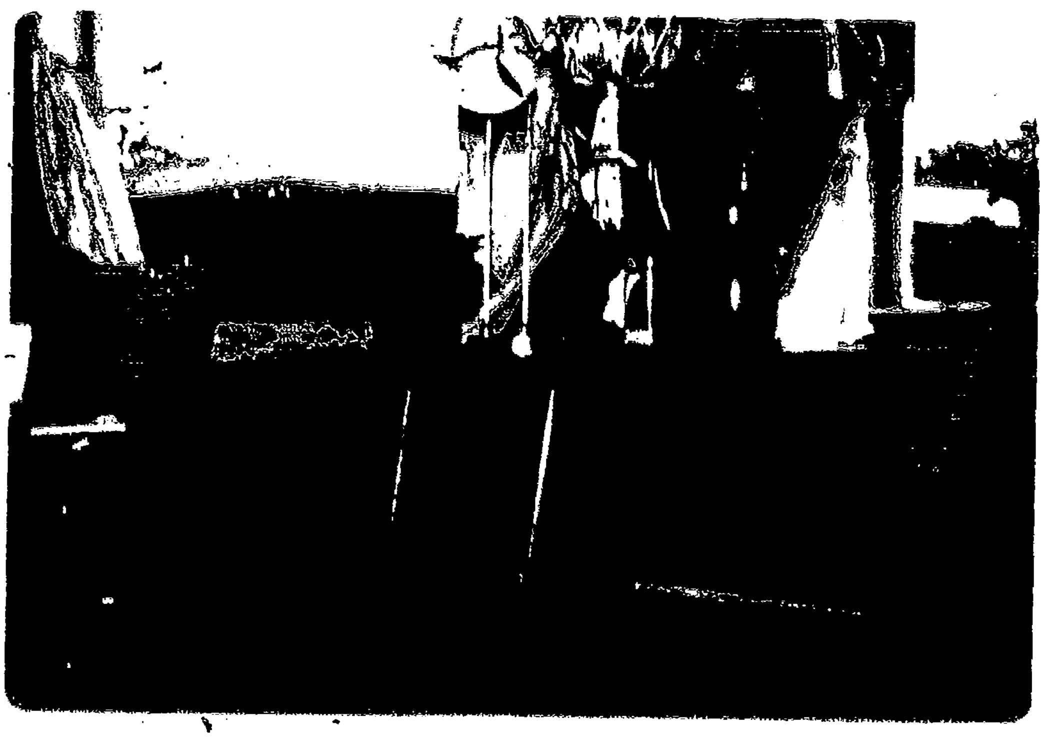
From these studies a number of factors seem to emerge as the successful components of remedial academic programs. One factor is that of individualized diagnosis and prescription. This entails the establishing of specific pretraining baselines that clearly define the deficits of each subject. Secondly, successful treatment programs employ skill-based, programmed materials which correspond to the subject's individual needs, in conjunction with immediate reinforcement (tangible, point, and social) for student accomplishments. A third component is the self monitoring of progress which provides the student with feedback at each stage of his academic development. Lastly, paraprofessional and peer tutoring appears to be a potentially powerful factor in academic remediation.

Statement of the Problem

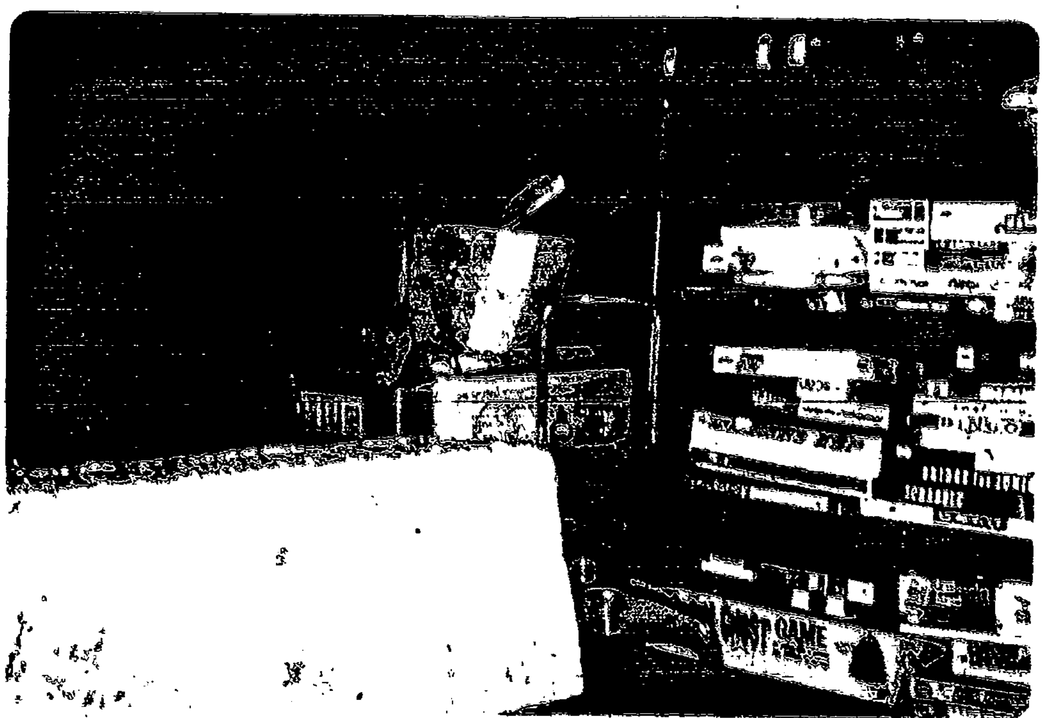
The development of a learning laboratory at Learning House was selected as the focus of this project because: 1) The educational program at Learning House was not designed to remediate the academic deficits of each child through an individualized-diagnostic-prescriptive system; 2) College tutors assessed the child's academic needs through teacher and Learning House staff recommendations. Since no standardized test scores existed for the children, diagnosis of reading and arithmetic deficits were accomplished through subjective inference. As these children exhibited severe behavioral deficits at school, it was difficult to determine the extent of their academic deficiencies which were inextricably intertwined with their maladaptive social behaviors; 3) No specified area was assigned for the tutoring process. This activity often occurred in a small, overcrowded room, utilized as an additional bedroom. The desk facility was often cluttered with excess items, stored in the surplus bedroom when not in use. Tutoring also took place in the teaching parents' bedroom, usually at a table replete with clothing, toilet articles, and other accessories. In conclusion, no physical facility associated with the tutoring process was in use prior to the initiation of the aforementioned project; 4) The tutorial program at Learning House involved the pairing of each tutor with an individual child. Since the tutors were few in number, many children progressed through the entire Learning House system without ever receiving tutorial instruction. Since the teachers and principal unequivocably agreed that most Learning House residents were sorely in need of academic remediation, tutorial instruction for each child was severely needed; 5) The paraprofessional tutors were required to design their own programs for the academic remediation of the individual child to which they were assigned. Most of these tutors were college juniors and seniors, majoring in such areas as chemistry, biology, and psychology. Few had any instruction in the development of teaching technologies or materials. Since Learning House had no remedial materials available at the facility, tutors either had to purchase their own or utilize makeshift devices. In order to avoid these routes, many tutors opted to take their charges on excursions during the tutorial periods. Although the children enjoyed these outings, they provided little remediation for those youngsters who were considerably below grade level in reading and arithmetic; 6) No peer tutoring system was utilized at Learning House. Thus a powerful resource that could be used to foster positive peer interaction, academic skills, and more responsible and mature behavior was being neglected; 7) Since Learning House is one of the few empirically based facilities in the Bay Area, it serves as a demonstration center and could accommodate a model designed to remediate both the social and academic deficits of the child. In this capacity, it could utilize a comparable paragon as a corrective agent for both (see Photograph Set 1).

Hypothesis 1: The Learning House experimental group (exposed to the learning laboratory during the 12-week summer program) will improve significantly more from baseline (mean of tests 1 and 2) to final testing than the Learning House control and the matched control groups on the following subtests of the Stanford Diagnostic Reading and Arithmetic Tests: Reading Comprehension, Vocabulary, Word Analysis (i.e., Syllabication, Sound Discrimination, and Blending), Arithmetic Conceptualization, Arithmetic Computation, and Fractions.

Hypothesis 2: The learning laboratory staff (i.e., laboratory managers and college tutors) will show a significant increase in score, from pre to post testing periods on a) Behavior Criterion Test designed to measure knowledge of behavioral principles, learning laboratory materials, and the Stanford Diagnostic Test, as well as b) a significantly more positive attitude towards behavior modification on the Attitude towards Behavior Modification Scale after the summer program.



PHOTOGRAPH SET 1. THE TUTORIAL FACILITY AND FORMAT PRIOR TO THE INITIATION OF THE LEARNING LABORATORY



CHAPTER II.

SURVEY OF RELATED LITERATURE

The following discussion will focus upon eight major areas of consideration: 1) the acquisition of reading and arithmetic responses; 2) the etiology of reading and arithmetic dysfunctions; 3) the interface between reading and arithmetic; 4) the individualized, diagnostic, prescriptive method and programmed instruction; 5) the use of reinforcement (tangible, token, and social) and self monitoring of progress as motivational factors in teaching; 6) successful features of teacher, consultation, and paraprofessional training programs; 7) remedial programs utilizing paraprofessional and peer tutors; 8) the efficacy of remedial reading and arithmetic programs which utilize the preceding techniques.

An Operant Approach to the Acquisition of Reading and Arithmetic Responses

Reading. Staats and Staats (1962), using Skinnerian terminology, defined textual behavior as a speech response that is under the control of the appropriate visually presented verbal stimuli. Textual responding requires the acquisition of fine and detailed verbal discrimination. These discriminations must incorporate whole words as well as syllabic units and single letters. New textual responses are acquired through responding successively to the letters and syllables of the stimulus word (Staats and Staats, 1962). Skinner (1975) differentiated between the beginner for whom textual behavior is predominant and the skilled reader, whose behavior in response to written verbal stimuli may be nontextual (i.e., the dropping out of the decoding phase).

Bloom (1973) postulated that there are two major operant parameters controlling reading behavior. One involved the attachment of a reading response to a particular textual cue. The second involved the reinforcement process; that is, an environmental consequence produced by a behavior which exerts a strengthening and maintaining effect upon the behavior. Staats, Staats, Schutz, and Wolf (1962) emphasized the development of a system of reinforcers (e.g., tokens which could be exchanged for trinkets and edibles), the use of a discrimination learning apparatus, and of cumulative records which would indicate the number of textual responses acquired.

Lahey, Weller, and Brown (1972-73) advocated a three-step approach in the use of applied behavioral analysis for the teaching of reading. This approach included: 1) Component analysis: the analysis of reading in terms of a composite of many components, e.g., phonics, comprehension, etc.; 2) Sequencing: teaching the components in a hierarchical sequence with each step building on the next. Each step must be fully mastered before the subsequent step is presented; 3) Manipulations: use of learning principles (i.e., reinforcement after correct responses and withholding of reinforcement after incorrect responses.)

Gagné (1970) concurred with this described analysis of the reading process. Gagné proposed that learning to read involved the acquisition of a hierarchy of increasingly complex skills, from the ability to reproduce single sounds and to reconstruct sounds from printed letters, ending with the ability to read words orally according to rules of pronunciation.

According to Gagné (197), the goal of early reading instruction is decoding, specifically mastery of the pronunciation rules for regularly spelled words. One important segment of this behavior is the testing of trial pronunciations against familiar syllabic sounds. However, since the most basic ability required is that of reproducing single letter sounds, this skill is defined as the first step of the hierarchy. Subsequent steps in the reading process are: 1) the identification of single letters by their sounds; 2) the pronunciation of consonant and vowel combinations; 3) the oral reproduction of syllables and syllabic strings; 4) the pronunciation of printed words, 5) the mastery of rules for irregularities in the pronunciation of printed words; and 6) the acquisition of comprehension skills.

Gagné (1970) stated that he did not attempt to develop the learning hierarchy for decoding as more than a demonstration of how topics of school instruction are hierarchically ordered and involve prerequisite learnings that grow progressively simpler as one works down from rules to S-R connections. Gagné further postulated that in learning to read, acquisition of word sounds and the mastery of verbal concepts are basic, if learning at the higher levels is to occur with facility. In terms of reading, this analysis entails the identification of reading skills which contribute to terminal performance. In turn, such component reading skills should serve as the focus of reading instruction in conjunction with the application of consistent and adequate reinforcement contingencies through which these behaviors may be strengthened.

Leton (1974) conducted a component analysis of the Stanford Diagnostic Reading Test I (Karlsen, Madden, and Gardner, 1968) in order to determine the hierarchical clustering and intercorrelations among the various reading skills for learning disabled (LD) subjects. Leton administered the Stanford Diagnostic Reading Test I to 166 learning disabled pupils in the elementary and intermediate school classes in the Honolulu school district. Pupils ranged in age from 9 to 15, representing grade levels 3 to 9. A consistent increase in score was found at succeeding levels only in the auditory vocabulary subtest. One hundred and ten of the 166 pupils obtained grade equivalents between 1.7 and 3.4 across grades on the reading comprehension subtest, indicating the persistance of the LD pupil's reading difficulties through the elementary grades. Intercorrelations of the 166 LD pupils were calculated and a hierarchical cluster analysis performed. The authors of the Stanford Diagnostic Reading Test had hypothesized that auditory discrimination, identification of beginning and ending sounds, syllabication, sound discrimination, and blending are hierarchically-arranged skills in word recognition and that word recognition and auditory vocabulary are subordinate to reading comprehension. This hierarchical structure bears resemblance to that postulated by Gagné (1970).

The hierarchical structure for the LD pupils tested was not in the hypothesized order. The hierarchical cluster of the subtests for the LD subjects (from simplest to most difficult) were as follows: reading comprehension, beginning and ending sounds, blending, sound discrimination, syllabication, auditory discrimination, and auditory vocabulary.

A factor analysis of the correlation matrix was performed to determine the interrelationship between the Stanford Diagnostic Reading Test subtests. Three factors were isolated. Factor I was defined as an ability to recognize words and analyze their phonetic elements. Three subtests (syllabication, blending, and sound discrimination) received high loadings on this factor. The second factor was identified as an auditory-associative ability, and was based on oral receptive skills. The subtests receiving high loadings on this factor were auditory vocabulary and auditory discrimination. The third factor was identified as visual processing and verbal mediation. The subtests receiving primary loadings on this factor were reading comprehension, blending, and beginning and ending sounds.

These three factors accounted for 55% of the total test variability. The residual 45% of the variance, however, is unreliable for an inclusive diagnosis of the LD pupil's reading skills. The Stanford Diagnostic Reading Test concentrates on the testing of word recognition, phonetic analysis, aural-receptive skills, visual processing, and oral mediation skills. Learning disabled subjects appear to have additional deficits in form perception, motor association, visual rotation, and transpositional difficulties which are not tapped by this diagnostic instrument (Leton, 1974).

Arithmetic. Skinner (1968) postulated an operant approach to the learning of arithmetic behaviors. According to Skinner, the child initially learns a large number of verbal responses consisting of speaking and writing certain words, figures, and signs which refer to numbers and arithmetic operations. Although this initial task involves the shaping of responses (i.e., enabling the child to pronounce and write these responses correctly), the primary task is to bring this behavior under many sorts of stimulus control. This process occurs as the child learns to count, to recite tables, to enumerate while "ticking off" the items in a group of objects, and to respond to spoken or written numbers by saying odd, even, or prime. The child also learns an elaborate repertoire of numerical behaviors; subsequently, he makes the complex serial arrangement of responses involved in original mathematical thinking (e.g., transposing, learning fractions, etc.) which modify the order or pattern of the original material so that the response, called a solution, is possible.

Gagné (1963) posited that the learning of mathematics initially involved the ordering of topics, segregated into distinguishable principles of knowledge, which govern the performance to be learned (i.e., as in adding integers). This topic can then be analyzed into a number of subordinate topics which must first be mastered before the final task can be accomplished. These topics, in turn, depend upon the mastery of other subordinate topics. Thus a hierarchy of subordinate knowledge is hypothesized to support the learning of each topic in the hierarchy of which it is a part. That is, mastery of the subordinate knowledge is considered to be essential to the attainment of a related, higher level topic. For example, the child must master the use of zero as the additive in verse before he can state and use the definition of addition of an integer and its additive inverse.

In constructing such a hierarchy, one begins by asking the question, "What must the learner already know how to do in order to achieve the new performance, assuming that he is to be given any instruction?" This question is applied to all terminal classes of tasks in which learning is being undertaken. The answer to this question defines one or more elements of subordinate knowledge. The question is then applied to each of these elements in turn, thus identifying the entire hierarchy. A number of unique hierarchies can be developed for each class of terminal responses. Each hierarchy should, however, depict a learning structure which must be accomplished in a proper sequence, in order to achieve the desired performance (Gagné, 1963). Gagné ordered the function of mathematics acquisition in the following manner :1) the learner must be informed of the nature of the performance to be learned; 2) new symbols or terms must be identified for the learner (when necessary); 3) the learner must be provided with relevant subordinate knowledge if not previously acquired; 4) the direction of the learner's thinking must be properly guided; 5) the learner is required to emit a response to a task example; and 6) the learner must repeat the task in other examples.

Sandura (1968) further elaborated upon the theoretical formulation for mathematics acquisition. Under this paradigm, conceptual learning is defined as the ability to give a common response to any one of a set of stimuli. To say that a subject has acquired the concept of red, for example, implies that he is able to give some common response when shown any red stimulus object, but will know not to give this response to any non-red stimulus. Similarly, a child may be said to have acquired the concept of four if he can say four to any congolmerate of four objects, but will not say four to any aggregation not containing four objects (assuming, of course, that the child is operating under the same set of principles in each case). In short, whereas an association pairs one stimulus with one response, a concept is a many-to-one relationship.

Sandura (1968) also postulated that mathematics involved neither associations nor concepts alone, but, in addition, rules which imply the ability to give the appropriate response in a class of functionally distinct stimuli. Then when it is said that a child has the concept of addition, for example, what is frequently meant is that he can give the appropriate sum when presented with any pair of numbers. Put another way, the learning involved the connection of a large class of responses. Sandura further proposed a theory of Set-Function language which contained four characteristics (the first three involving rule specification and the final, defining rule application). These determinants are: 1) the stimulus properties which control the corresponding responses; 2) the covert responses or derived stimulus properties; 3) the transform or combining operation by which the covert responses are derived; 4) higher order contextual properties which identify the rule to be applied.

The Etiology of Reading and Arithmetic Deficits

Reading. Staats and Staats (1962) postulated a variety of reasons for children's reading dysfunctions: 1) the onset of intensive training programs in reading is relatively sudden and may prove aversive, since a high rate of responses is required before reinforcement occurs; 2) there are only weak sources of reinforcement for many children in the training situation (i.e., teacher's approval may not be reinforcing for some children; learning, itself, may not be reinforcing; children are taught in groups making it impossible for the presentation of immediate reinforcement contingent upon the behavior of the individual child); 3) the reinforcers which are available (e.g., grades, special privileges, games, recess, toys, snacks, etc.) are not made immediately contingent upon the many reading responses involved; 4) if adequate reinforcement for the child is not available in the reading program, the behaviors which are prerequisite for the acquisition of reading may extinguish. If this occurs, progress in learning to read may cease.

Staats and Staats (1962) further contended that if the prerequisite behaviors of attending to and working at the acquisition of speech responses to visual, verbal stimuli are not reinforced, they will extinguish. The more intensive the training, the more aversive such training becomes. This aversiveness will act as a strong negative reinforcer and incompatible behaviors, which remove the child from the aversive situation (e.g., absenteeism, "cutting-up," daydreaming, etc.) will increase in frequency. The use of positive reinforcers immediately contingent upon the acquisition of reading could prevent the extinction of these behaviors and inhibit or reverse the learning of incompatible behaviors. Reinforcement of reading would also make the behavior itself become positively reinforcing. As a consequence of the use of reinforcement for reading, very rapid learning should occur.

The learning of verbal responses to nonvisual stimuli (speaking) and the learning of those same responses to visual, verbal stimuli (reading) is thought to involve the same principles of learning (Staats, et al., 1962). Both are essentially problems of establishing verbal responses under stimulus control. Yet virtually every neurologically intact individual acquires adequate speech behavior, albeit, there are some individuals who are seemingly unable to read. There are three differences between speech and reading acquisition: 1) the process of speech acquisition is very gradual (from early infancy over a period of years); 2) there are strong reinforcers involved (primarily reinforcers such as the administration of food when the child emits food responses and the attention and approval of people in his environment); 3) the powerful reinforcers are individually applied and are administered immediately following the speech behaviors involved (Staats and Staats, 1962).

It has further been found that repeated failure (i.e., punishment or lack of reinforcement) for reading responses causes inability to acquire reading behavior. Rozin, Poritsky, and Sotsky (1971) took over a class of inner-city children with severe reading problems. When these investigators attempted to teach them to read English, they displayed consistent failure, just as they had shown with their regular teacher. Rozin, et al., then brought in a set of Chinese characters and told the children that each one stood for a spoken English word. Within hours, these children were reading entire paragraphs in Chinese. Seligman (1975), in evaluating the results of this study, theorized that the children had learned from repeated failure that they could not read English. When written "Chinese" replaced the written English word, the children did not know they were having a reading lesson. Their natural abilities then took over as they were learning a "new task," reinforced by success.

Arithmetic. Skinner's (1968) hypothesis concerning the child's inability to acquire arithmetic responses closely approximates the rationale of the above authors concerning reading dysfunctions. Skinner's suppositions about the failure of many youngsters to acquire arithmetic behaviors are as follows: 1) educational control is aversive (i.e., the child learns to read and copy numbers, memorize tables, and perform operations in order to escape punishment, e.g., the teacher's displeasure, criticism or ridicule of classmates, etc.); 2) reinforcement for correct numerical operations is delayed; 3) the lack of skillful programs which move the child forward through a series of progressive approximations to the final, complex behavior desired; and 4) the relative infrequency of reinforcement delivered in the typical classroom.

The Interface between Reading and Arithmetic

A number of investigators (Barlow, 1967; Eagle, 1948; Earp, 1970; Hater, Kane, and Byrne, 1974; Kane, 19701 Lessenger, 1925; Pitts, 1952; Stretch, 1973; Wilson, 1922) found that improvement in arithmetic is either dependent upon or contiguous with improvement in reading.

Wilson (1922) found that specific training in reading of arithmetic problems resulted in improved performance. Lessenger (1925) analyzed errors in the Stanford Achievement Test to determine mean loss in arithmetic due to faulty reading. He found that in the case of 167 poor readers, the mean loss was 10.1 months of arithmetic age. After one year, in which emphasis was placed on instruction in specific reading skills, loss, on the average, was virtually eliminated (i.e., poor readers only showed one month's loss due to faulty reading).

Stretch (1973) found a high correlation between the ability to solve arithmetic problems and reading comprehension. Stretch compared two fifth grade groups. One group was taught special techniques in arithmetic problem solving and reading, and the other was given no special instruction. Results were highly significant, favoring the experimental group which also showed a significant increase in reading comprehension.

Eagle (1948) and Pitts (1952) both studied the relationship of reading abilities to competence in mathematics, the former using ninth grade students and the latter, eleventh grade girls. Even though they used different tests to measure reading levels and mathematics success, both sets of results indicated that reading comprehension is positively related to success in mathematics.

Barlow (1967), in an extensive study entailing the use of 1400 children, found that general reading ability had an effect upon problem solving in arithmetic.

Hater (1974) found that the skills necessary for effective reading (e.g., concentration, ordering, using the correct meaning of words, and finding the main idea) were also necessary for competency in mathematics. He suggested that the ability to combine reading skills with the actual practice of reading mathematics should be a goal of remedial instruction.

The Individualized-Diagnostic-Prescriptive Approach to the Teaching of Reading and Arithmetic

Brooks (1975) proposed the use of an individualized-diagnostic-prescriptive approach to reading, using the following elements: 1) standardized, diagnostic tests to determine the student's strengths and weaknesses in various areas; 2) a set of materials designed to remediate student deficits; 3) paraprofessional tutors to administer the program; 4) an emphasis upon phonics instruction utilizing a visual, auditory, kinesthetic, and tactile approach.

Hafner (1972-73) further elaborated upon two main steps for continuous progress in learning to read: 1) basing instruction on careful diagnosis; 2) using meaningful instructional material and pacing instruction so that the pupil masters each step. The essentials of diagnosis involve the identification of several elements: 1) the pupil's capacity level (as exemplified by auditory vocabulary); 2) the instructional level (characterized by comprehension ability); 3) the actual readability level of materials used in instruction; 4) the pupil's modal strengths; 5) the basic core of words that the student can identify instantly; 6) the pupil's visual and auditory skills;

discrimination, memory, and blending; 7) the pupil's phonic skills as manifested by the phonemic options that he identifies with each grapheme; 8) the words that the student knows which contain common phonic elements so that additional phonic elements can be taught inductively.

Meaningfulness of material is a second major factor in teaching reading responses, according to Hafner (1972-73). Hafner postulated that the instructional devices utilized in a remedial reading program should possess the following characteristics: 1) they match the pupil's listening vocabulary and comprehension levels (i.e., capacity and instructional levels; 2) they are interesting to the pupil; 3) they are presented in segments that pupils can handle; 4) they are not threatening; 5) they lend themselves to the use of positive feedback.

White (1972) defined an individualized-diagnostic-prescriptive program in mathematics as:

> a situation in which the student is matched to an instructional system such that he is working at his own speed, learning style, and ability level on appropriate materials in keeping with his goals, supported by adequate assistance in a suitable learning environment (p. 394).

White utilized the following diagnostic schemata to determine individual needs and implications for prescription: 1) verbal reading score matched to reading level of text; 2) computational skills; 3) amount and kind of remedial units needed; 4) level of quantitative thinking to discern sophistication of curriculum to be utilized; 5) general ability; 6) size of units to be assigned; 7) time and pace to be allowed for completion of units; 8) degree of structure or support needed; 9) interest (amount and kind); 10) kind and frequency of human contact needed; 11) frequency and amount of time spent in diversified activities; 12) attitude (signaling anticipated degree of behavioral control required); 13) achievement pretest (where to start the student on the material).

A hierarchical flow chart of student activities within such a system included self diagnostic testing, study agreements, administration of materials and orientation guides, study sequencing (through texts, programs, and references), administration of tests, review of tests, and evaluative feedback. Criterion levels for effective completion of units were also established in conjunction with the utilization of learning assistants. These paraprofessionals, students, and teacher trainees corrected tests from answer keys, checked out materials, tutored, and monitored the test center (White, 1972).

O'Daffer (1976), at the University of Pittsburgh, developed an Individualized-Prescriptive Program (IPI) in mathematics, similar to that constructed by White (1972). This program contained the following features: 1) the rate of speed at which the child progressed depended upon his own capacities; the child placed himself on the continuum by taking both placement tests and pretests; 2) the curriculum material was arranged in a sequential order called a continuum; the assignments were given by a prescription to fit each individual's needs (a prescription being an individualized lesson for each student each day); 3) the student's mastery of the curriculum was judged by curriculum-embedded pretests and posttests; each student was required to perform at a criterion level of 85%; 4) the child worked independently in most cases, thus building up his sense of responsibility and also his confidence in his own knowledge. The goal of the program was that the student eventually realize that learning is a process dependent upon his own participation and initiation.

O'Daffer (1976) critiqued many individualized mathematics programs on the following bases: 1) students often worked as fast as they could in order to receive the reinforcer; 2) students worked virtually in isolation from the teacher and other students; 3) little developmental work on arithmetic conceptualization is learned through such a program as improvement in conceptualization requires demonstrations, discussions, lab activities, and teaching aids; 4) paraprofessional tutors usually have had little mathematical education and fail to teach children mathematical concepts.

O'Daffer (1976) contended that individualized programs in mathematics should consider the following student needs: 1) Learning Experiences - a) involvement with manipulative materials, b) interaction with other students, c) interaction with teachers, d) involvement with audio-visual materials; 2) Content Emphasis - a) concept development exercises, b) pattern-seeking experiences, c) fact-recall experiences, d) procedural-practice training, e) attitude development preparation; and 3) Psychological Satisfaction - a) security, b) variety, c) opportunities for decision-making, d) success experiences, e) personal recognition, f) evaluative feedback.

Clark (1976) further elaborated on this schema by suggesting the use of instructional objectives via the identification and listing of a hierarchy of concepts to be taught as well as the paying of careful attention to organizational details for the effective preparation and management of the program. Clark concurred with Nelson (1974), O'Daffer (1976), Paradis and Peterson (1972), and White (1972) in advocating the use of preassessment, prescriptive instructional materials, teacher instruction to reinforce concepts, evaluative feedback in the form of posttests and immediate reinforcement for correct responses and correction of errors as they occur. The use of computerized instruction, standardized diagnostic tests, SRA and Distar type programs, fitting the teaching mode to the child, and the treating of academic and social behavior as concurrent targets have also been proposed as auxiliary components of an individualized-prescriptive-diagnostic approach (Nelson, 1974; Stevens, 1970).

Programmed Instruction as a Conjunctive Element of the Individualized-Prescriptive-Diagnostic Approach

Taber, Glaser, and Schaefer (1965) defined programmed instruction as:

> a process of constructing sequences of instructional material in a way that maximizes the rate and depth of learning, fosters understanding, and the ability to transfer knowledge to new situations, facilitates retention and enhances the motivation of the student. Programming also involves the selection and arrangement of educational content based upon what is known about human learning (p. 2).

Programmed instruction contains the following features: 1) bringing new stimuli to control the learner's behavior; 2) guiding the learner's response to subject matter stimuli; 3) arranging for reinforcing consequences of behavior; and 4) reinforcing approximations of the desired response (Taber, et al., 1965).

Skinner (1968) listed four additional components inherent in the programmed instructional format: 1) a consistent interchange between program and student as the student is alert, busy, and motorically involved; 2) a given point must be thoroughly understood, either frame-by-frame or set-by-set, before the student moves on; 3) the student is presented with just the material for which he is ready; 4) the student is immediately reinforced by every correct response. This immediate feedback not only shapes his behavior, but maintains it in strength.

One criticism of programmed instruction has been that, although it is satisfactory for the learning of factual material, it is inadequate for the teaching of concepts, principles, reasoning, etc. (Zall, 1969). However, there has now been an increase in the number of studies relating to concept formation. These studies indicate a modicum of success in developing programmed units to teach conceptual reasoning (Krauser, 125-5376); Meconi, 27-2948 A; Terkeurst, 1965).

Krauser (25-5376) investigated the possibility of using programmed instruction as a research tool in the study of the thinking of children. Geometric relationships were presented in one of three programmed forms: verbal, nonverbal, and a combination of the two. The verbal and nonverbal programs were more effective than the combinational approach. The mode of thinking exhibited by most subjects after training was relational rather than classifactory.

Meconi (27-2948 A) utilized programs designed to teach concepts used in deriving formulae for sums of numerical series. Forty-five eighth and ninth grade students completed the introductory program that taught the concepts and then were divided into three groups: rule, guided discovery, and discovery. Transfer and retention test scores indicated no significant differences among the three treatments. The discovery method proved most effective in terms of time, the rule method the least.

Terkeurst (1965) found that the intrinsic programmed method (as contrasted with linear or branching programs) was an effective instructional aid in the teaching of concepts of subject matter, not highly structured.

Several studies have utilized the diagnostic-prescriptive approach in conjunction with programmed instruction with promising results (Aaron, Muench, and Call, 1975; Lipson, 1974; Suppes and Morningstar, 1972).

Lipson (1967) presented data on the mathematical achievement of pupils using Individually-Prescribed-Instruction (IPI), a program developed by the Research and Development Center of the University of Pittsburgh. Objectives for such topics as addition and multiplication were determined and tests were developed to gauge how far into the ordered list of objectives a child could progress. Instructional materials to serve the needs of each child were prepared or purchased. IPI incorporates a cycle of activities: evaluation, prescription or assignment of work, actual work by pupils, and then further evaluation. The reported assessment of this instructional program was based on data gathered at the Oakleaf School during the initial three years of the project. On standardized achievement tests administered after one year of instruction under this program, almost all first and second grade children scored above the 80th percentile, the third and fourth grade pupils made average scores, and large numbers of students in grades five and six ranked below the 40th percentile. Lipson explained that many upper-grade pupils worked on deficiencies in understanding of material presented at earlier grade levels. They spent less time with new content and this lack of exposure to new material resulted in lower scores on the standardized tests. However, no control group or pretests of initial ability were administered, lowering the internal validity of this study.

Computer-based instruction has also been utilized within the diagnostic-prescriptive-programmed instructional paradigm. Two representative studies (Aaron, et al., 1975; Suppes, et al., 1972) utilized this mode and achieved considerable success in the academic remediation of reading and arithmetic dysfunctions.

Aaron, et al. (1965), used a computer-supported instructional management system consisting of five major components: 1) students, with teacher assistance, created their own program of study that was designed to cover a period of about two weeks; 2) each program of study consisted of teaching-learning units that listed objectives, materials, and alternatives; 3) mastery of objectives was evaluated to determine subsequent student-learning routes; 4) each student was provided with computer feedback on factors relevant to his performance, as well as on all opportunities available in planning and pursuing his educational goals; 5) paraprofessional aides, trained through the use of microteaching, modeling, and practice, utilized the computerized schemata as a support system.

Thirty-six youngsters at the Georgia Youth Development Center served as experimental subjects and 36 additional youth remained as controls. The California Achievement Tests in Reading and Arithmetic were used as the pre-post treatment evaluative measure. The mean time between pre and posttesting was 140.94 days for the control group and 120.89 days for the experimental group. However, students only had instruction on alternate days (mean of 50.34 days for the control group, 43.09 days for the experimental group). Differences between experimental and control groups were significant in comprehension, vocabulary, total reading score, problem solving, computation, and total math score.

Suppes and Morningstar (1966-68) described the use of a computer-based instructional mathematics program (called drill and practice). Fifteen hundred students in San Francisco Bay Area elementary schools and 40 students in McComb, Mississippi, were used as subjects. The program, which emphasized drill and practice, provided an intensive review of basic skills and concepts, and was utilized as a supplement to the 30-40 minute classroom instructional period. The students spent from 5 to 15 minutes per day at the computer terminal. The curriculum material for each of grades one through six was arranged sequentially in blocks to coincide approximately with the development of mathematical concepts introduced in several text series. Each concept block included a pretest, five days of drill, a posttest, and sets of review drills and posttests. The arithmetic portion of the Stanford Achievement Test was used as the pre-post treatment evaluative measure. Four California schools participated in the testing program: two experimental (grades 3-6, schools A and C) and two control schools (grades 3-6, school B, grades 4-6, school D). In each case, the control school was in the same district as the experimental school.

The results indicated that in the computation subtest, an increase in performance level from pre to posttesting for students in the experimental school was significantly greater than for students in the control school for grade 3 in school A, and for grades 4-6 in school C. In the concepts subtest, the experimental schools performed significantly better than the control schools for grade 6 in school A and grades 4 and 5 in school B. These gains in conceptualization were achieved although the program was specifically aimed at arithmetic conceptualization. On the applications subtest, the experimental classes performed significantly better than the control classes in grades 4 and 5 in school C.

During the next year, one school divided each class, with approximately half of the students serving as experimental subjects, half as controls. One school had two grades with control subjects and four grades with experimental subjects. Of the other five schools, two included experimental subjects and three included control subjects. In the second school with mixed classes, the experimental subjects gained more than the control subjects on the computation section in all four grades; the difference was significant in grades 3, 4, and 5. The performance of students in the experimental group with mixed classes was significantly better than for control subjects on the concepts section for grade 3 and on the applications section for grades 4 and 5. In schools with separated classes, the experimental subjects gained significantly more than the control subjects on the computation section in grades 2, 3, and 5, and on the applications section in grade 6.

A similar study was conducted in Mississippi, and included grades 1-6 in 12 different schools. Eight of these schools included both experimental and control subjects, three included only experimental subjects, and one included only control subjects. The performance of the experimental subjects improved significantly more than that of the control subjects in all six grades on the computation subtest. The difference between the experimental and control groups was largest in grade 1, where, in only three months, the average increase in grade placement for experimental subjects was 1.13 grades, compared with .26 grades for the controls. The performance of students in the experimental group was significantly better than that of the students in the control group on the concepts scale in grade 3, and on both concepts and applications in grade 6.

The Utilization of Reinforcement Procedures as a Motivational Device in Remedial Instruction

The consequences of an individual's actions are critical for the modification and maintenance of behavior. Behavior is acquired (or modified) under conditions in which a response produces a consequent stimulus event (such as a reward) that strengthens and maintains the response. The stimulus event which the response produces is referred to as a reinforcer or reinforcing stimulus. In strengthening the behavior, the effect of a reinforcer is on the immediately preceding behavior. Therefore, a reinforcer must immediately follow the response to be learned. If the reinforcer is delayed, the response may never be learned (although other undesirable responses may be acquired in the interim). The use of positive reinforcement in the strengthening of verbal responses has been demonstrated by Krasner (1958). In reviewing the literature, Krasner found that evaluative comments (e.g., "that's good," "you're right") may exercise strengthening effects on categories of verbal behavior.

The use of tokens as secondary reinforcers which can be exchanged for desired objects or activities has been used to develop and maintain appropriate human behavior in a variety of institutional settings (Ayllon and Azrin, 1965; Birnbrauer, Wolf, Kulder, and Tague, 1965; Cohen, Filipazah and Bes, 1965; Lent, 1965). Bloom (1973) found token reinforcement procedures to be effective for a wide range of children varying in age, IQ, and social class. Evidence further indicates that when operant reinforcement procedures are used, children evince involvement and interest in reading activities which can be maintained over several training sessions (Bloom, 1973). Staats, Minke, Finley, Wolfe, and Brook (1964) depicted the manner in which a token reinforcement system could be used in teaching reading skills. Other experiments also indicated that the rate at which subjects learn to read may be accelerated via token reinforcement with material backups (Busse and Henderson, 1972; Hamblen, Buckholdt, Ferritor, Kozloff, and Blackwell, 1971; Pfeiffer, 1961; Staats and Staats, 1963).

Heitzmann (1974), Lahey, Weller, and Brown (1972-73), and Wadsworth (1971) utilized token reinforcement with three diverse groups of subjects in an attempt to increase reading skill.

Lahey, et al. (1973-73), used four U.S. Navy recruits with reading levels of 3.2-4.7 on the Gates-McGinnite Reading Test in a repeated measures, within subject design. The subjects were initially tested on the discrimination of instances for the pronunciation of long or short vowels (e.g., hat-hate, kit-kite) representing the rule: when the final e is silent, the vowel is usually long. During the baseline period, subjects were asked to pronounce 15 words with long or short vowels. This condition was followed by the presentation of the silent e rule for pronunciation of the 15 words initially administered during baseline. At the next interval, the subjects received points for correct responding; points were exchangeable for candy bars. This procedure was continued until the subject performed two consecutive trials without error. At baseline 2, the conditions of baseline 1 were reintroduced for four subsequent trials. For five additional trials, similar word sets as well as points for correct responding were reinstated.

The total training time was 1 to 1 1/2 hours. The results indicated that: 1) subjects correctly pronounced words in set 1 approximately 50% of the time; 2) the introduction of the rule improved performance only slightly; 3) performance on set 1 improved to the criterion of two consecutive correct trials after the introduction of response consequences; 4) generalization was shown as three out of four subjects pronounced all words in the final set correctly without training trials; and 5) there was a high degree of similarity between the performance of all four within-subject replications.

Heitzman (1974) used 70 black migrant and 24 primary school pupils matriculated in a six-week summer program as subjects, randomly assigned to token and nontoken groups. Four teachers, who had received a one-day workshop dealing with how to dispense token reinforcers, conducted the treatment. The Miami Linguistic Readers were used as the instructional vehicles and the Gates MacGinite Reading Test as the pre-post measurement device. The following behaviors were most frequently reinforced: application of word attack skills, recognition of new words, satisfactory and/or improved oral reading, correct answers to comprehension questions, accurate completion of workbook exercises, relevant and fluent responses during class, attending study, and work behaviors. Tokens were exchangeable for material reinforcers, usually penny candies. The results indicated that token reinforcement significantly affected gain scores for both ethnic groups, but had a greater influence on the reading test gain scores of black than white pupils.

Wadsworth (1971) utilized ten third grade boys diagnosed as learning disabled (LD) and having severe reading difficulties, in a within-subject design composed of four stages. Stage I involved parent consultation and lasted two months. Stage II involved tutoring at a reading clinic for three 45-minute sessions per week. Stage III entailed the use of rules or social and academic behavioral expectations, reinforcement with points exchangeable for tangible items, in conjunction with praise, as well as ignoring, and time-out for rule infractions. Stage III occurred in the regular LD classroom and lasted over a four-month period. Stage IV involved the reintegration into the regular classroom, withdrawal of points and tangible reinforcers in the self contained LD room, but continuation of the token system in the resource room. Stage III lasted five months. The Slassen Oral Reading Test was used as the evaluative measure. The results showed that no significant improvement in reading level was found between Stages I and II. Significant differences were found, however, during Stages III and IV. In the three-month span of Stage III, the group gained eight months in reading performance. Between the five-month span of Stage IV, a gain of nine months in reading level was attained. Statistically significant changes in improvement of school behavior was also found between Stages I and IV.

Self Monitoring as a Mechanism for Fostering Behavioral Competence

It has been found by a number of investigators that simply keeping track of a behavior may result in changes in that behavior (Broden, Hall, and Mitts, 1971; Gottman and McFall, 1972; Johnson and White, 1971; Kazden, 1974; Mahoney, Moore, Wade, and Moura, 1973; McFall, 1970). Mahoney and Thoresen (1974) stated that the effects of self monitoring as a treatment device are both variable and short-lived. That the effects of self monitoring attenuate with time has been demonstrated by Broden, et al. (1971), Fixsen, Philips, and Wolf (1972), and Stuart (1971). Although self monitoring appears to have an initial effect on the behavior involved, that effect seems to eventually fade and the behavior returns to its premonitoring level (Mahoney and Thoresen, 1974). Numerous reports, however, have shown that self monitoring combined with other procedures such as contingent social reinforcement, punishment, nonspecific treatment effects, therapeutic instruction, and suggestions will affect the behavioral change observed (Bayer, 1972; Herbert and Baer, 1972; Kolb, Winters, and Berlew, 1968; McFall and Hammer, 1971; Rehm and Marston, 1968).

It has been found that self monitoring alone has not altered the monitored responses in a number of well-controlled and carefully executed studies (Berecz, 1972; Hale, 1972; McNamara and McDonough, 1972; Stollach, 1967). Evidence gleaned from several studies indicates that change resulting from self monitoring does not depend on accurate or reliable recording on the part of the subject (Brodin, et al., 1971; Herbert and Baer, 1972). Conversely, highly reliable self monitoring does not ensure behavior change in the absence of other contingencies (Powell and Azrin, 1968).

There is also evidence that self monitoring will result in increased socially-approved behaviors (e.g., studying and dieting), but decreased socially censured behaviors (e.g., smoking and nail biting), according to Kanfer (1971). This phenomenon may be due to the fact that natural consequences take over once the new behavior is emitted and either increase the response through positive reinforcement (e.g., social approval) or decrease the response, if punished (e.g., social criticism). Kazdin (1974) suggested that when self monitored behavior is socially desirable, self monitoring may serve as a conditioned reinforcer that bridges the delay between the behavior and the long term reinforcing consequences. Monitoring behavior can thus serve to reinforce the target response. For example, self monitoring study behavior may bring the ultimate reinforcing consequences (such as good grades), which would otherwise be delayed, closer in the response sequence Kazdin, 1974).

Maas (1968) found that reactivity or awareness, on the part of the subject, that he is being assessed can influence behavior. Thorp and Wetzel (1969) have referred to the intervention effect of assessment to note that observation alone, in behavior modification programs, may serve as an experimental intervention sufficient to produce therapeutic change.

Despite the methodological issues associated with self monitoring (e.g., unreliability, reactivity toward assessment, confounding by other behavior change procedures) self monitoring appears to be a potent addition to behavioral programs attempting to increase socially desirable behaviors (e.g., academic skills). The paramount factor in this treatment effect is that it provides the subject with a continuous measure of his progress and accomplishments.

Two representative studies (Brodin, et al., 1971; Smith, 1969) attest to the success of self monitoring in the increase of academic skills and study behaviors.

Smith (1969) investigated the effectiveness of knowledge of results (in the form of self charting of progress) as a secondary reinforcer for reading behavior in elementary school children. In this study, the number of correct reading responses involving both word recognition and comprehension was determined after each instructional session. A programmed literacy curriculum utilizing 16 books containing 17,000 tasks, scripts, and frames in conjunction with immediate feedback, self pacing, and self selection was used as the instructional device. Each of six different conditions, using a different motivational state, was evaluated. These conditions were: 1) no reinforcement; 2) work contract with teacher praise; 3) teacher praise plus work break; 4) work break with monetary consequences; 5) work contract with monetary consequences plus progress plotting; and 6) progress plotting alone. Extinction of task behavior tended to occur under conditions of no consequences and of teacher praise alone. Conditions of monetary consequences and of progress plotting resulted in significant increases in task performance (number of frames completed during each 45-minute period). The results indicated that significant increases in reading skills when compared to expected achievements as measured by the Gates Primary Word Recognition Test were attained from pre to post treatment periods.

Brodin, et al. (1971), utilized multiple baseline designs with two subjects to determine the effect of self monitoring on study skill acquisition. The first subject was an eighth grade girl enrolled in a history class in which she was performing at an exceptionally low level. The experimental conditions of the study were as follows: 1) Baseline - a record was kept for seven days before experimental procedures were initiated; 2) Self Recording - the subject was given a slip of paper on which to record her history classroom study behavior whenever she thought of it. These behaviors included facing the teacher, writing down lecture notes, facing a child who was responding, reciting when called upon by the instructor. Nonstudy behaviors (e.g., out of seat, facing the window, fingering nonacademic objects) were also delineated. The subject was to record a plus in the appropriate square when studying and a minus when engaging in nonstudy behaviors; 3) Baseline 2 - slips were not issued for five days; 4) Self Recording 2 - slips were once again issued to the subject; 5) Self Recording plus praise - the teacher was asked to attend to the subject whenever he observed her engaging in study behaviors. Self recording slips continued to be available to the subject; 6) Praise Only - no slips were issued to the subject. Teacher attention continued at a high rate; and 7) Baseline 3 -

teacher attention continued but slips were withdrawn. An observer attended each class session and recorded the teacher and subject behavior.

The results indicated that: 1) during baseline, the subject's mean rate of study behavior was 30%; 2) during self recording, the subject's average rate of study increased to 78%; 3) during baseline 2, it dropped to a mean of 2%; 4) at the time of self recording 2, her study behavior again rose to a mean of 80%; 5) during self recording and praise, study behaviors increased to a mean of 88%; 6) but decreased to a mean of 77% during praise only where these behaviors remained through baseline 3. The observer report showed great discrepancy when compared to the subject's self report. Despite this factor, the subject's study behavior remained at a high constant level.

The second subject was an eighth grade boy who constantly talked out in mathematics class. The multiple baseline design utilized consisted of the following conditions: 1) Baseline 1 - recorded for nine days before initiation of experimental procedures; 2) Self Recording 1 - the subject was given a slip of paper to record each incident of talking out without permission; 3) Baseline 2 - slips were withdrawn; and 4) Self Recording 2 - self recording was reinstated. The results indicated that during baseline the subject talked out a mean of 1.1 times per minute. During self recording (Session A), talkouts decreased to a mean of .3 times per minute. When slips were used during Session B, talkouts decreased to a mean of .5 times per minute. When slips were reissued for both Sessions A and B, talkouts were at a mean of .3 times per minute for Session A, 1.0 for

Session B. During baseline 2, talkouts increased to a mean of 1.3 times per minute during Session A, 2.3 times per minute during Session B. At the time of self recording 2, talkouts were at 1.0 times per minute for Session A, 2.2 for Session B.

Brodin, et al. (1971), noted that no contingencies were ever applied to differential rates of talking out, thus the slips lost their effectiveness. It was again found (as in the previously reported study) that the subject's self monitoring responses were not very reliable as compared with an independent observer.

Training Methods for the Acquisition of Requisite Pedagogical and Consultation Skills

The learning theory approach to the teaching of pedagogical and consultation skills involves four instructional modalities: cognitive presentation (i.e., verbal and/or written instruction), modeling, behavioral rehearsal, and evaluative feedback.

Written instructional packages have been developed and utilized in the training of a variety of behavioral competencies (Fletcher and Fawcett, 1975; Miller, Rider, Dangel, Lies and Peterson, 1975; Thomas and Miller, 1975). Standardized procedural formats have proven most effective in this task. Fletcher and Fawcett (1975) formulated a standardized instructional program to teach social interaction skills and found considerable differences between standardized and nonstandardized programs.

Thomas and Miller (1975) described the use of a standardized peer-designed curriculum manual utilized at the University of Kansas' Experimental Living Project, a behaviorally engineered, cooperative living arrangement for 30 student residents. The manual contained written instructions, a study guide, practice situations with hints, practice situations without hints, and a terminal frame designed to give the student an opportunity to demonstrate skill mastery. Two sophomore psychology majors were used as subjects in a multiple baseline design. Each subject worked through the manual designed to teach the writing of instructional programs. After each unit, a generalization test was administered. This test sampled the acquisition of each of the requisite behaviors necessary for construction of the instructional manual.

The experimental conditions consisted of: 1) baseline; 2) introduction of written instructions; 3) introduction of study guide; 4) introduction of practice situations with and without hints; 5) introduction of terminal frame. All conditions were three sessions in length. Each subject was also asked to write a complete instructional program before and after the training procedures. The results indicated that prior to the introduction of the written instructions unit, the mean written instructions baseline was 0%. Following the introduction of the written instructions unit, the mean percentage of correct written instructions increased to 8.79. Before the presentation of the study guide unit, the mean percentage of correct study guide responses was 42%. This score increased to 98% after the initiation of the study guide unit. Prior to the introduction of the terminal frame, subjects completed 83% of the terminal frame responses correctly; after initiation of the terminal frame units, subjects completed 91%

correctly. The instructional programs written during the pretest period averaged 6% of the requisite standardized instructional program behaviors, while the posttest averaged 95%. Each subject also rated his instructional program writing confidence on a 7-point scale following each session of the multiple baseline. All ratings for both subjects before the introduction of the manual were averaged and compared with the posttreatment scores. The result was an average increase in confidence ratings from 4.6 to 6.4, or from fairly confident to quite confident.

A second study, designed to demonstrate that the instructional program manual developed in the preceding experiment could be used to teach the desired standardized format, was also conducted. Four university students enrolled in an introductory course in behavioral analysis served as subjects. Each subject completed the programs designed in the previous experiment (i.e., training the credit recorder to compute and log work credits earned each week by project members). The subjects were initially administered a nonstandardized instructional format consisting of simulated inputs for the job, required forms for work performance, and a brief outline of steps to follow. Before and after the administration of the above package, the subjects were asked to work the jobs. The subjects were then given the standardized instructional format completed in experiment 1.

The results indicated that all subjects increased from a mean of 83% correct responses with the nonstandardized format to 95% with the standardized format. Previous credit recorders were then asked to rate each job performance along the following dimension: how smoothly would the Experimental Living Project continue to function if the credit recorder did his job at this level of competence? Ratings were determined from a seven-point Likert-type scale. The average rating of the non-standardized training performance was 4.3, which increased to 6.0 with the standardized training performance, or from fairly smoothly to quite smoothly. Thus the 12% average difference in job performance noted above was sufficient to produce a 1.7-point change on a 7-point scale when evaluated, by individuals familiar with both the job and its importance to an existing system.

Using a similar written cognitive presentation of instructional competencies, Miller, et al. (1975), designed a program to teach journal writing behaviors to five graduate students enrolled in a course intended to promote these skills. All subjects were provided with a manual entitled Reinforcing Research Behavior to assist them in learning to write journal articles. The manual consisted of 14 lessons containing: 1) a textual discussion of the topic; 2) a self quiz; 3) answers at the back of the book; 4) a program consisting of descriptions of four fictionalized experiments requiring overt responding, initially with prompts, subsequently without prompts. At the beginning of the study, subjects were asked to write a complete manuscript for submission to the Journal of Applied Behavior Analysis. This was designed as an overall pretest of the subject's behavior. The manual was divided into units and the subject was required to pass a quiz at the end of each unit before progressing to the next. A generalization test was also required at four different points in the manual: introduction, method, results, and conclusions. Each test served as a baseline for the subsequent unit.

The results indicated that the average score increased from 42% correct responding before training to 91% after training. The multiple baseline data showed that the increase for each baseline occurred immediately after the introduction of the corresponding section of the manual. The manuscripts were also judged for acceptability and readability by three frequent reviewers of the Journal of Applied Behavior Analysis. The mean rating for the pretest articles was 3.5, while the mean rating for the posttest manuscripts was 4.5 (on a 7-point scale). Of the 36 pairs of before and after ratings, 21 ratings showed an increase in posttest scores, seven showed no change, and eight showed a reversal of one point. A further set of data was gathered on the attitudes of the students toward the teaching technique used. Students' confidence about writing each section of the paper increased from a mean rating of 2.0 to a rating of 6.5 on a seven-point scale. The students also enthusiastically recommended that others should learn to write journal articles the same way (6.5 mean rating). The attitudinal data further indicated that this teaching modality was evaluated in favorable terms, would be recommended to friends, and would be used as an instructional technique by the subjects themselves.

In conjunction with standardized, programmed instructional manuals, the use of modeling has also been found to be an effective teaching methodology. Rose (1973) stated that a major means of acquiring new behaviors is through the observation of the behavior and its consequences. Bandura (1963) cited extensive research demonstrating that one can acquire intricate motor responses and emotional reactions or extinguish fearful or avoidant responses through such observation. These response classes include desensitization of phobic responses (Bandura, 1971), acquisition of moral judgements (Bandura and McDonald, 1963), the learning of rule governed behaviors (Zimmerman and Rosenthal, 1972) and interpersonal affective responses (Brody and Zimmerman, 1975). This form of learning involves an observer and a model. A modeling procedure is a set of teaching activities designed to increase the observer's probability of matching behavior (Rose, 1975).

Having observed the model, the subject must imitate his behavior. But before he attempts to utilize a complex sequence of responses in the target situation, he must rehearse these modeled behaviors in a supportive environment. Here, other subjects play the role of significant others, while the given subject plays his own role (Rose, 1975).

Behavioral rehearsal is usually preceded by a simple description of what the subject should do in a given situation and subsequently, model presentation. The advantages of behavioral rehearsal as a training technique have been discussed by Sturm (1965) who suggested that behavioral rehearsal in comparison to other techniques has a far greater potential to:

1) generate vivid, life-like behavior and cues thereby maximizing the utility of response and stimulus generalization;

2) condition a total behavioral response - physiological, motoric, and ideational, rather than one merely verbal; and

3) dispense the powerful reinforcing of enacted models and other characters who in real life or in fantasy have already dispensed reinforcement (p. 57).

Underwood and Schultz (1960) stated that:

> other things equal; therefore, the more frequently a verbal unit has been experienced, the more quickly this will become a response in a new association connection (p. 86).

Researchers have found that behavioral rehearsal aided in the acquisition of social and interpersonal skills (Lazarus, 1966), paired with reinforcement, resulted in an increase in the expression of anger among mildly inhibited hospital patients (Wagner, 1968), and increased the assertiveness of nonassertive subjects when behavioral rehearsal and feedback were utilized (McFall and Marston, 1970).

Both microcounseling and microteaching (Ivey, 1971), incorporate videotaped feedback in a multistep process designed to present verbal and behavioral models of specific interviewer or teaching skills and to reinforce these behaviors as they are emitted by the learner. It has been suggested (Ivey, Mormington, Miller, Morill, and Haas, 1968) that the microcounseling and microteaching processes owe their potency to several sources such as the identification of specific target behaviors, the exposure to expert verbal and behavioral models, practice and supervisory experience, and differential reinforcement of appropriate learner behavior. The use of this technique as an effective teaching modality has been suggested by Catterall, 1970; Goodwin, 1971; Ivey, 1973, 1974, and Kurpuis, 1974.

A number of investigators have utilized the microcounseling and microteaching models in training subjects from diverse populations in requisite pedagogical and consultation competencies (Boyd, 1972; Clark, Macrae, Ida, and Smith, 1975; Kirigen, Ayala, Braukman, Brown, Minken, Phillips, Fixsen, and Wolf, 1975; Madsen, Madsen, Saudargas, and Edgar, 1970; Lauver and Brody, 1975a, b; Mathews and Fawcett, 1975; Rutherford, 1973).

Boyd (1972) assessed the effectiveness of two microcounseling models and a no training control group in teaching a counseling-like verbal response set to 20 introductory guidance students. Micromodel 1 consisted of assigned reading of a Counselor Verbal Response Manual, 75 minutes simulation experience, and 75 minutes counseling supervision. The last step divided half the group into a recall-integration session and half into a behavioral supervisory, roleplaying, feedback group. Micromodel 2 consisted of giving trainees a practice interview and 48 hours learning integration time. The results indicated that the greatest gains occurred in micromodel 1 with behavioral supervision, although micromodels 1 and 2 did not produce a significantly different effect.

Lauver and Broden (1975a) investigated the use of microconsultation, self modeling and a no treatment control in fostering verbal interviewer skills. Thirty graduate students enrolled in a beginning counseling and guidance course were used as subjects. The general procedure for all three groups involved a five-minute videotaped interview in which the subject was instructed to "get to know the person," a 30-minute instructional period for the microcounseling and self modeling groups; control subjects were told to return in half an hour, and a final five-minute videotaped follow-up interview a week later. The microcounseling group received an attending skills manual which focused on basic interviewer skills. The subjects then viewed (with supervision) a videotaped model of an expert and the subject's own initial interview. The self modeling procedure required each subject to conduct a second interview with a different interviewee immediately after the first interview. The subject was then told "to get to know this next person." The subject was subsequently instructed to wear earphones in which verbal responses to the interviewee's statements were administered at an expert level. He was then told to use just those verbal statements that were heard through the earphones. This videotape of the subject as an expert model was then reviewed and commented upon by the supervisor. Lastly, the subject conducted a final five-minute interview. The four dependent measures were: duration of pauses preceding interviewee utterances, proportion of open versus closed interviewer questions, frequency of interviewer utterances, and introduction of new topics into the dialogue. Interrater reliabilities across three to five judges ranged from 83-98 percent agreement.

The results indicated that both modeling-based instructional procedures were significantly more effective than the control group in acquisition of the response patterns measured. Post-hoc analyses indicated that the microcounseling procedure was slightly more potent than the self modeling condition. The retention levels of the two treatment groups did not differ significantly from either the level of performance attained during acquisition or from the initial baseline levels of performance.

Lauver and Broden (1975b) also conducted a similar study utilizing four counselor training models:microcounseling, self modeling, and verbal modeling. The same four dependent measures as the previous study were used. Thirty-two graduate students enrolled in a beginning counseling and guidance course were used as subjects. All treatment procedures were equally effective in causing significant changes in the dependent variables from pre to posttesting periods.

The experimental conditions in the three studies just described were too similar for differential effectiveness to be readily discernable. However, the effectiveness of the microcounseling model in its multiple forms can be clearly seen from these investigations.

Kirigin, <u>et al</u>. (1975), described a training package for teaching parents at Achievement Place, a family-style, residential treatment center located in Kansas. The residents at the treatment facility include predelinquent, dependent-neglected, or emotionally disturbed adolescents. Six couples who had applied for the position of teaching parents, the sole staff of the treatment center, responsible for the retraining of the youngsters in more acceptable behavior patterns, were used as subjects. Four of the couples (the experimental group) attended the initial five-day workshop designed to teach the skills needed to become successful teaching parents. They were also given a packet of reading materials (e.g., the Teaching Family Handbook, a study guide for the handbook, and The Achievement Place Book). The two control couples received the reading material, but no formal initial training. Pre, mid, and posttraining evaluation consisted of five role-playing situations (i.e., greeting an adult, a good school report, cleaning a table, swearing, arguing and fighting between a teaching parent and youngster).

The training involved an initial workshop consisting of five days (50 hours of intensive training) in the basic skills needed by the teaching parents. These skills included: 1) the giving of initial praise for appropriate behavior; 2) the giving of a description of the inappropriate behavior; 3) the giving of a rationale for learning the new appropriate behavior; 4) the solicitation of a request for acknowledgement or verbal feedback from the youth, indicating that he understands the instructions; and 5) giving the youth final praise for performance of the appropriate behavior. The teaching of these skills consisted of the following instructional components: 1) a brief introduction to behavior modification, detailed descriptions of the major components of the program, management of the motivational system, implementation of the self government procedures, teaching the youth more appropriate behavior, and working with parents, teachers, and community agencies; 2) the teaching of the interaction skills mentioned above through modeling and rehearsal, a description of the behavioral components and the viewing of videotapes of correct and incorrect interactions; 3) practicing of teaching interaction skills through the role-playing of typical situations, utilizing a graduate student trained to play the youth, the trainee, and an evaluator who provided feedback to the trainee as to his performance; 4) a practicum experience in either the Achievement Place home for boys or girls which consisted of observation of the current teaching parents, interactions with the youth, trainee role-playing in preplanned situational interactions with the youth, and feedback from both the current teaching parents and the youths on their performance; 5) pre and posttraining criterion measures.

The results indicated that prior to training all six couples displayed comparable skills. They engaged in 30% of the teaching interaction objectives. After the workshop, the trained couples' skills increased to 70%, while the untrained couples' skills remained at 30% of criterion level. The teaching interaction behaviors, practice, and feedback reached the 100% level for the trained couples, while rationale and request for acknowledgement were consistently emitted from both pre and post situational performances, at the 30% level for this group.

Rutherford (1973) tested the effects of several model and videotape variables on training teachers in the use of positive feedback responses to children's behavior. The results suggested a trend favoring the combined model and feedback tape intervention. A significantly greater increase in the rate per minute of positive feedback responses from pre to posttesting was demonstrated by this "combined" group over teachers who viewed either the model tape, the feedback tape alone, or the control teachers who viewed a commercial television show. The teachers who viewed the model tape alone showed a greater increase in the rate of positive feedback responses than did either teachers who received the feedback tape alone or the control teachers.

In a similar study, Rutherford (1973) studied the effects of four levels of videotape training on a specific class of teacher behavior. The experiment analyzed the effects of: 1) a combined model and feedback tape intervention; 2) a model tape intervention; 3) a feedback tape intervention; and 4) a control condition upon the amount of positive feedback used by 20 teachers in the training of a block design task to preschoolers. The results indicated that the combined model and feedback videotape technique and the model videotape technique alone were effective, while the feedback videotape intervention was ineffective in training the requisite pedagogical response.

Madsen, et al. (1970), described a study in which 32 elementary teachers in Florida attended a two-week preschool inservice workshop designed to teach the use and application of behavioral principles. Role-playing, videotaping, and feedback were utilized to teach the use of rules, approval (i.e., 80% positive teacher verbalizations, 20% negative verbalizations), ignoring inappropriate behavior, and disapproving of high rate disruptive behavior. A comparison between trained and untrained teachers indicated that trained teachers decreased the inappropriate behaviors of their students, increased their amount of approval to students, and decreased to zero the number of inappropriate approval and disapproval behaviors.

Clark's, et al. (1975), study involved the training of six undergraduate students from Appalacia State University in the classroom teaching of educably retarded pupils. Each intern participated in 11 one-half hour training sessions over a six-week period. During each teacher training session similar forms of teaching skills as described in the experiment by Madsen, et al. (1970) were taught and recorded by nonparticipant observers. A teacher training package including written instructions, modeling by the teacher in the actual classroom setting, rehearsal, and verbal and graphic feedback was utilized. The percentage of occurrence of teaching skills was graphically recorded and raised from baseline by small increments depending upon subject acquisition. Grades of A through D were given for reaching approximations of the criterion percentage level. Written quizzes, covering study guide questions, which had to be passed at 90% accuracy, were also administered. A multiple baseline analysis for all six subjects indicated that the interns acquired the teaching skills taught and also increased the amount of praise emitted. The contingencies (graphic feedback, grades, and quizzes) utilized for acquisition of skills appeared to be necessary for the teaching of some skills, but not others.

Mathews and Fawcett (1975) developed an instructional package for the training of paraprofessional trainers in the administration of written instructional systems to other paraprofessionals. The subjects were two low-income community volunteers from Penn House, a neighborhood service center designed as a training site for the U.S. Department of Labor's Work Incentive Program. Instructional training packages were devised to teach specific skills (e.g., how to arrange transportation services, how to greet clients, how to answer the telephone, how to take donations, etc.) to the paraprofessional staff. Thirty-six individual instructional packages were developed. Each package consisted of the following standardized elements: a set of written instructions, a study guide, a situational examples with and without hints, answer keys, criterion test, a behavioral checklist, and a target behavior's definition section.

The standardized instructional package format required a trainer to administer each of the sections of an instructional package to the trainee, while providing feedback on performance. A paraprofessional trainer's manual was developed to teach the trainer how to administer each element of the standardized package format. The manual was comprised of a series of programmed sections for each of the categories of trainer behaviors (e.g., how to administer the quizzes, how to run role-playing, evaluation sessions, and how to run behavior rehearsal sessions). Behavioral rehearsal consisted of an opportunity to practice the trainer behaviors associated with administering the instructional package, followed by feedback on trainer performance. The material associated with the behavioral rehearsal component comprised sample instructional packages, scripted confederate trainee statements (containing the correct and incorrect trainer responses) and behavioral checklists (allowing for the scoring of specific trainee behaviors).

Treatment evaluation was determined through the presentation of instructional packages designed to train a confederate trainee by the paraprofessional trainer. Two independent observers used a checklist to score the occurrence or nonoccurrence of each of the trainee target behaviors for all trainer evaluation sessions. A staggered, multiple baseline design containing the following conditions was utilized: 1) baseline - the trainer was asked to administer the standardized instructional package (no training had been given); 2) written instructions baseline - the trainer read the written instructional manual and study guide; 3) the trainer was administered the instructional package for administering written instruction and quizzes; 4) the trainer was administered the entire instructional package for how to run role-playing evaluation sessions; 5) the trainer was administered the instructional package for how to run behavioral rehearsal sessions. After each training session, the trainer was asked to administer an instructional package. Two generalization tests were also presented to the subjects to measure the effectiveness of the procedures under different stimulus conditions. The first generalization test was designed to examine generalization of trainer behavior to a novel instructional package. The second generalization test was designed to test for the generalization of trainer behavior to actual, unsimulated trainer sessions.

The results of the study were that the overall mean data for the two subjects showed that the combination of all trainer behavior averaged 7% during request only sessions, 17% during written instructions only, and 89% during the sessions after completion of the entire trainer instructional package. In the first generalization test, the overall mean occurrence of all specified trainer behaviors was 3% before training and 94% after completion of the trainer instructional package. In the second generalization test, the overall mean occurrence of all specified trainer behaviors for both trainers was 11% before training and 90% after completion of the trainer instructional package.

A second study (Mathews and Fawcett, 1975) was designed to indicate the efficacy of trained trainers in teaching skills to other paraprofessionals. Two additional low income Penn House volunteers were used as trainers and two others were utilized as trainees. The trainers were trained in the same manner as those in the previous study, and required a mean total of 4.5 hours to complete the instructional training package. Scripted role-playing with confederate trainees set the framework for the observation and evaluation of standardized interaction situations by two independent observers. The actual administration of the instructional package to the trainees served as the evaluative measure of trainer performance. The trainers were asked to administer one of the packages prior to training and one package following training. Thus the experimental design utilized was of the simple pre-posttest variety counterbalanced to control for order and instructional package difficulty (i.e., two different tasks were taught). Each trainee was administered an instructional package by an untrained trainer for one task and a trained trainer for the subsequent task.

The results indicated that for the instructional packages administered by trained trainees, there was an increase in trainee performance from a pretraining mean of 17% to a posttraining mean of 42%. After the trainees completed the trainer instructional package, trainee performance increased from a pretraining mean of 12% to a posttraining mean of 100%.

Trainer performance was also observed during these training sessions. The mean percentage of occurrence of specified trainer behavior for untrained trainers was 20%. For trained trainers, the mean percentage of tfainer behavior was 95%.

A trainer rating scale was administered to the paraprofessionals in the above study. Each trainer was asked to rate how confident he was as a trainer on a 7-point Likert-type scale. The rating data showed an increase from a pretraining mean of 3.0 (slightly confident) to a posttraining mean of 6.5 (between moderately and very confident). Consumer satisfaction measures were also obtained. After completion of the trainer instructional program, each trainer was asked how happy he was with the training program. All staff members indicated that they were very-happy with the trainer instructional package (7.0 on a 7-point scale).

These instructional packages (Mathews and Fawcett, 1975) are consistent with Thorp and Wetzel's (1969) triadic model of behavioral intervention. According to the triadic model, a trained researcher teaches a mediator to implement intervention procedures with the client. The mediator has usually been someone from the client's natural environment. Mediators have been trained as "peer behavior managers" to supervise small study groups in programmed mathematics (Greenwood, Sloane, and Basken, 1970), peer behavior managers to consequate the behavior of peers in a home for predelinquent boys (Phillips, Phillips, Wolf, and Fixsen, 1973), student proctors to administer instructional material in a university level Personalized System of Instruction (PSI) course (Weaver and Miller, 1975), and paraprofessional trainers to teach public speaking skills to low income paraprofessionals (Fawcett and Miller, 1975).

<u>The Use of Paraprofessional and Peer Tutors for Remedial Instructional Programs</u>

The efficacy of the utilization of paraprofessional and peer tutors for remedial instruction has been supported by a number of investigators (Allen and Feldman, 1973; Cloward, 1967; Frelow, Charry, and Frelish, 1974; Grice and Wolfe, 1972; Horan, Giralomo, Hill, and Shute, 1974; Herzig, 1974; Levenkran, Santagrossi, and O'Leary, 1974; Renfro, 1975; Shaver and Nuhn, 1971).

Levenkran, *et al.* (1974), studied the effect of contingent tutoring on mathematics improvement. Sixteen second grade students deemed in need of remedial math instruction were used as subjects. These youngsters were matched on the concepts and computation subtests of the *California Achievement Test* and divided into two groups. Group 1 was tutored in sight recognition and Group 2 was tutored in mathematics concepts. Eight undergraduate students received academic credit for the administration of tutorial instruction. Task performance included simple one- and two-digit addition and subtraction problems requiring neither carrying nor borrowing. Each tutor was assigned to work with a group of four subjects, two mornings a week, for three hours. A multiple baseline design containing the following experimental conditions was utilized: 1) Baseline 1 - subjects were given test materials and told to complete as many problems as possible; immediate feedback for correctness of responding was administered. The tutors, however, worked alone on some nondistracting activity (e.g., reading) during this period. This procedure lasted for eight days; 2) Contingent tutoring - during this condition each subject was informed that if he could correctly complete a predetermined number of problems (his criterion level), he then could do something special afterwards (i.e., receive tutoring). The criterion level was based upon the mean number of problems completed during baseline and was subsequently raised each day if criterion was met. All subjects who reached their criterion level engaged in tutoring activities for 10 minutes, while those who did not, immediately returned to their classroom. This procedure lasted for 10 days; 3) Reversal - return to baseline conditions (i.e., no contingent tutoring was available). This procedure lasted for 10 days.

The results indicated that Group 1 subjects' total mean number of problems correctly completed during baseline increased from 36 to 49 during the contingent tutoring phase. A decrease in number of problems correctly completed was observed during reversal. In Group 2, performance increased from a mean of 32 correct problems to a mean of 44 problems from baseline to the contingency period. A decrease in number of problems correct was also seen during the reversal period. Combining the data from both groups, it was seen that 15 of 16 subjects increased in number of correct problems during the experimental period. It is important to note that access to tutoring alone (both verbal and arithmetic) seemed to be responsible for improvement in correctness of responding even though the tutoring itself did not relate to the task items.

Frelow, et al. (1974), operated a Title 1 project at the Greenburgh New York Central school district which assigned paraprofessional aides to first, second, and third grade teachers with the objective of facilitating individual attention to low achieving children. Data on 76 second graders and 57 third graders were used to test the significance of differences in reading and mathematics achievement during pre and post-intervention periods. An analysis of Metropolitan Achievement Test data indicated that first, second, and third grade students in the lowest quartile made significant progress in reading and arithmetic skills compared to previous expectations after the introduction of paraprofessional assistants. No control group was utilized in this study lowering the internal validity of its findings.

Renfro (1975) described a student services program in which high school students assisted in primary grade classrooms under the guidance of the regular classroom teacher. Responsibilities included tutoring a primary student using commercial materials, supervising children in interest centers, helping with seatwork, providing small group instruction with materials prepared by the teacher, helping students read orally, or reading a story to a group of students or to the entire class. Renfro stated that the program is in its fourth year of operation and has been successful in its endeavor. However, evaluative measures and a control group should have been utilized by this investigator to provide stronger support for his program's effectiveness.

Grice and Wolfe (1972) studied the effects of peer correction of reading worksheets on increases in reading skills as measured by the Primary K Reading Profiles, Level I. Experimental and control groups were each composed of 72 first graders from a suburban elementary school, matched on variables of reading ability, Metropolitan Test scores, and sex. For purposes of the experiment, the children were either designated as high or low ability. For a three-week period, the teacher continued to correct and return the reading worksheets of the control group, while the experimental students corrected papers for one another. The Primary Reading Profiles, Level I Test was administered at the conclusion of treatment.

The results indicated significant differences between experimental and control groups on reading test scores for word recognition and word attack skills. The groups did not differ significantly in reading comprehension. When the treatment effects were compared between high and low ability groups, the low ability students appeared to be more affected by the treatment of peer correction than the high ability groups. No significant differences were apparent between high ability children in either group. The results of this study may indicate that low ability subjects are more sensitive to peer approval and thus will achieve at a higher level in order to receive this type of social reinforcement.

Herzig (1974) described a junior high school mathematics laboratory utilizing 30 eighth and ninth grade students to assist seventh graders. Herzig stated that the program was successful in fostering greater mathematical skill as well as the responsibility and maturity of the peer tutors. Notwithstanding, no standardized tests were utilized to gauge student performance, weakening the experimental evidence herein offered.

Horan, et al. (1974), demonstrated that peer participant modeling could be effective in improving student mathematics ability. Forty eighth grade students who had failed math during the third quarter of the academic year were randomly assigned to experimental and control conditions. Twenty twelfth grade math tutors were trained in participant modeling and were assigned to assist the experimental subjects. The tutors were expected to perform in class, had the subjects attempt to duplicate the skills and provided feedback on the student responses. The experimental group met with the tutors for 45-minute periods twice a week for the last six weeks of the nine-week final quarter. The results demonstrated a significant improvement in teacher assigned grades, teacher determined ratings of pupil attitudes and behavior, and mathematics achievement (as determined from experimenter constructed tests). No significant differences in student attitudes toward mathematics or toward school in general was seen.

Shaver and Nuhn (1971) conducted a study to determine the short and long term effects of tutoring on underachievers at three different grade levels. Forty-six underachieving students from fourth, seventh, and tenth grades were used as experimental subjects, while twenty students were utilized as controls. Underachievers were identified on the basis of discrepancies between their performance on the <u>Sequential Tests of Educational Progress</u> (STEP) and their expectancy scores on the <u>California Test of Mental Maturity</u>. Tutoring was arranged on a one-to-one or one-to-three basis and was conducted one hour per day for an entire school year. Control subjects remained in their regular classes while tutoring occurred. The tutors were in the same grade level as the tutees and were selected on their own STEP performance and other criterion. They were provided with a two-week training workshop before the tutorial period was initiated. Data was collected from the STEP tests that were administered before and after tutoring as well as after a two-year follow-up period. Grade point averages were also monitored during these periods. Mean scores favored the tutored group at all three levels, and were sustained two years later for the subjects tutored at the seventh and tenth grades. At all three levels, the experimental subjects attained significantly higher frequencies of students who reached their predicted potential or better than did the controls. This difference was sustained two years later.

Studies also indicate that peer tutoring not only increased the achievement level of the tutee, but was also effective in assisting the tutor in bettering his own academic accomplishments (Allen and Feldman, 1973; Cloward, 1973).

Cloward (1967) found that over a seven-month period, tenth and eleventh graders who had tutored younger children showed a significantly greater increase in reading achievement scores than a comparable control group. Furthermore, the tutor's gain in reading scores was even greater than the tutee's improvement.

Allen and Feldman (1973) conducted a study to determine the effect of tutoring on both the tutor and tutee. Ten low achieving fifth graders whose reading scores were at least one year below grade level were utilized as tutors. The tutees were 10 randomly selected third graders. Both tutors and tutees participated for 10 consecutive weekdays over a two-week period. On alternate days, the fifth graders either taught the same third grade tutee for 20 minutes (the tutoring condition) or spent an equivalent period of time studying the material alone (study alone condition). Both groups of subjects learned the same material which was adapted from texts and workbooks at the third and fourth grade levels. Each day, both tutees and tutors were administered a 10-minute objective test on the day's lesson.

The results indicated that at the end of the two-week period, tutoring resulted in significantly better performance than studying alone for the fifth grade low achievers. For the third graders, no significant differences were found between scores during the study alone or tutoring conditions. This study indicated the beneficial effect of tutoring especially on the enhancement of academic achievement for the tutor. It is also important to note that the third graders serving as tutees were average performing students, who, ~~it~~ is seen, could function well under multiple learning conditions.

From this investigation and others previously mentioned (e.g., Grice and Wolfe, 1972; Shaver and Nuhn, 1971), it appears that tutoring by peers and paraprofessionals is a potent instructional modality for low achieving students who have difficulty learning through other means.

Combinational Programs Utilizing Diagnostic-Prescriptive Instruction, Programmed Materials, Paraprofessional and Peer Tutoring, Student Folders, Reinforcement, and Self Monitoring of Progress.

A number of remedial programs have used the aforementioned instructional modalities in various combinations and have reported significant results in remediating reading and arithmetic deficits (Baumann and Carter, 1976; Ellson, Barber, Engle, and Kampwerth, 1965; Feshback and Adelman, 1974; Gormly and Nittali, 1971; Hamblin and Hamblin, 1972; List, 1970; Staats and Butterfield, 1965; Symula, 1975; Weber, 1971).

Ellson, et al. (1965), described 10 experiments in which "programmed tutoring" was administered by college tutors and retarded peers in the teaching of comprehension, vocabulary, and word analysis skills. Programmed reading material was used, in conjunction with teaching machines which provided immediate correction units for incorrect responses with each section of frames. The tutor dispensed reinforcement in the form of a light flash and verbal approval. The results of these experiments indicated that programmed tutoring was significantly more effective than a control condition in teaching reading vocabulary; 2) that retarded children could teach vocabulary skills effectively utilizing this approach; 3) that contextual reading could be taught to slow learners through this instructional technique; 4) that programmed tutoring was most effective in the classroom when used alternately with regular classroom instruction; and 5) that 400 children tutored with this method learned sight reading and comprehension skills.

Symula (1975) utilized an individualized assessment program, programmed materials, and paraprofessional tutors in the teaching of reading skills to slow learners. The SPACHE Diagnostic Reading Scales was used in conjunction with the Random House Criterion Reading Program, an individualized-diagnostic-prescriptive program which is performance based and criterion referenced. The program consisted of a hierarchy of approximately 450 reading skills and was designed to identify the basic abilities that the child needed to acquire or strengthen. The children also utilized such instructional methodologies as oral reading, tutor-made materials, games, and reading in the content areas. Paraprofessional tutors organized and instituted the tutorial program.

From 1973-74 (after nine months of instructions from 1/2-1 hour per day five days a week), the average growth of 250 children was 1.4 years with a maximum growth of two years. Again, the experimenters employed no control group in this study, allowing for the possibility of maturity alone as being responsible for the reading gain achieved.

Baumann and Carter (1976) described the use of a 36-week individualized Mathematics program which included programmed and teacher designed materials in conjunction with peer tutoring. Baumann and Carter's program utilized 14 projects to cover the basic Mathematics areas (e.g., fundamental arithmetic operations, geometry, and practical applications--normally taught in ninth grade general mathematics courses). The materials utilized were homemade kits (with catalogs, maps, and tax forms), workbooks, varied texts, SRA kits, and practice drill sheets. Student assistants corrected assignments and provided immediate feedback to the subjects involved. Team teaching in the laboratory was also utilized. No evaluative measures of student progress had been established. However, lab supervisors' subjective impressions indicated that disciplinary problems decreased while classroom grades had noticeably improved. The internal and external validity of this study is methodologically unsound, albeit, it does describe an instructional paradigm that is supported in its efficacy by more scientifically valid research.

Hamblin and Hamblin (1972) studied the independent and combined effects of token reinforcement and peer tutoring in accelerating reading skills with inner city black and white preschoolers. Of the children testable by the <u>California Mental</u>

Maturity Test, the testable children learned to read more quickly than the untestable ones. High and medium IQ children read to criterion over the eight-week period (an average of 1.4 books) when reinforced for attending and when tutored by adults. When these children were tutored by peers, their reading achievement rose to a mean of 3.0 books. If administered tokens for reading (with adult tutors), their reading increased to a mean of 4.15 books. However, the high to medium IQ children's reading performance increased to 5.5 when involved with peer tutoring and given tokens for reading. The low IQ children with adult tutoring and with tokens for attending read no books to criterion level. However, they did read a mean of 1.39 and 1.1 books respectively if peer tutoring or if administered tokens for reading. If these subjects received peer tutoring as well as tokens for reading, the number of books read increased to 1.69.

Gormly and Nittali (1971) conducted a study utilizing structured self instruction, high interest material, and reduction in opportunity for failure (i.e., success experiences) to increase reading achievement in adolescent delinquents. The subjects were 20 boys between the ages of 14.6 and 16.6 who were committed to the New Jersey State Home for Boys for antisocial behavioral repertoires. These boys had a mean IQ (on the Wechsler Intelligence Scale for Children of 86. The 20 boys were nominated by teachers within the institution as needing remedial instruction. The Gates McGinnite Reading Test was utilized as the pre-post treatment evaluative measure. Subjects were then assigned to the Reading Attainment System according to the grade levels attained on this test. The Reading Attainment System contains a set of high interest, graded reading selections to be used in conjunction with comprehension and skill cards, progress charts, and self correction answer keys. The boys were told that they would be acting as their own instructors and could not fail because only success was being recorded. The boys were free to choose their own stories within each unit. Each boy also determined when to take the test assessing his understanding of the story. All boys kept a record of the stories they read and their performance on the tests. In addition, a progress chart was kept on the wall in the classroom. Students had to complete five stories within each unit with 70% correct responses on the reading comprehension check before they could advance to the next unit. The students completed an average of 24 fifty-minute sessions. Significant differences were found between pre and posttesting on the vocabulary, accuracy, and speed subtests of the Gates McGinnite Reading instrument. The differences were 1.04, 1.55, and 1.73 grades respectively. No significant differences in comprehension were found. Since no control group was utilized, Gormly and Nittali suggested that a novelty effect may have been instrumental in producing the experimental outcomes. It was also found that reading improvement was not related to IQ scores, indicating that IQ is another indicant of academic achievement, not capacity. This study also illustrates that academic success can be used as a reinforcer for academic behavior.

Staats and Butterfield (1965) reported a case study in which programmed materials, token and tangible reinforcers, and self-monitoring of progress were intermixed in a program designed to remediate reading deficits of a 14 year old Mexican American boy. This youth had a long history of school failure and delinquency, and was reading on a second grade level. The program consisted of 140 hours of remedial reading instruction extended over a 4-1/2 month period. The investigators selected material from the Science Research Associates (SRA) reading kits which consisted of stories developed for and grouped into grade levels. Each story included a series of questions which assessed the reader's comprehension of the selection. The instructor placed vocabulary words from each story on 3x5 cards, abridged paragraphs, silent reading, and comprehension questions (consisting of the entire story and its questions) on 8-1/2"x13" sheets of paper. A probation officer, utilized as the instructor, presented each of these reading segments to the subject, who received tokens exchangeable for tangible reinforcers for correct oral responding, attending to the material, and correct written responses to comprehension questions. The number of tokens earned by the subject was charted each day so that he would be made aware of his progress. At the end of training, the subject had made 6400 reading responses, learned and retained 430 new words, increased his reading achievement to 4.3, passed all his courses for the first time, and decreased his school misbehavior to zero.

List's (1970) study is noted for its use of pupil folders to monitor each student's academic progress. List assigned 112 subjects from first through seventh grade, diagnosed as needing remedial or corrective reading instruction, to a clinic activity program lasting 3-1/2 hours per day, five days per week, for four weeks. Twenty-eight teachers and four aides were involved in the program, designed to develop reading skills, provide gross motor outlets, and to offer recreational stimuli. Each teacher taught three one-hour periods each day, having three or four pupils. A folder was kept for each child. It consisted of test materials, daily lesson plans, supervisor evaluation of lesson plans, and a final progress report. The aides and teachers utilized manipulative materials, e.g., typewriters, chalk boards, spelling games, etc., as their major teaching devices. Pre and post instructional levels were determined by the <u>SPACHE Informal Reading Inventory</u>. A mean gain of six months was shown from pre to posttesting. Again, the lack of a control group weakens the internal validity of this study.

Weber (1974) conducted a study in which he sought nonselective inner city, Title 1 public schools in which reading achievement in the early grades was at the national average or higher. Weber used an independent evaluation of reading achievement which he developed from <u>Cohen's Basic Test of Reading Comprehension</u>. Scores were standardized and equated to national norms. All third grade children from 17 big city schools were tested. Four schools met the criteria for study inclusion. The factors that seemed to account for the success of the four schools were strong leadership, high expectations, "good" atmosphere, strong emphasis on reading, additional reading personnel (e.g., paraprofessionals), use of phonics and programmed materials (e.g., SRA Reading Laboratories, the Sullivan Reading Series, etc.), individualized instruction, and careful evaluation of pupil progress. The age of initiation of the four reading programs ranged from 3-9 years, indicating that many of the subjects tested had been in the program from kindergarten through third grade. This factor also indicated the greater amount of time necessary for a reading program to develop successful instructional components. Some characteristics often thought of as important to school improvement were not essential to the success of the four schools (i.e., small class size, achievement grouping, high quality of teaching, school personnel of the same ethnic background as the pupils, preschool education, and outstanding physical facilities).

Feshback and Adelman (1974) described a well designed study utilizing two treatment modalities and a control condition to examine the effects of remedial instruction on advantaged and disadvantaged learning-disabled youngsters. The subjects consisted of male elementary and junior high school students, of at least average intelligence, who were 1-1/2 years or more below grade level in basic school skills. The disadvantaged subjects had family incomes below $3,000 per year and approximately 90% were black. The advantaged subjects were all selected from the tuition paying clients enrolled at the Fernald School, a facility of the Psychology Department at the University of California, Los Angeles, utilized as a research and training laboratory for the treatment of learning disabilities. All advantaged subjects were middle and upper class whites. During the first academic year, 30 elementary and 30 junior high disadvantaged subjects participated in the study; during the subsequent year, 50 elementary and 30 junior high disadvantaged subjects participated. The subjects were matched for age, IQ, rate, and severity of learning deficit. One disadvantaged group was assigned to the Fernald School, another was assigned to the home school enrichment program, and the third was assigned to a control condition. A fourth matched group (i.e., advantaged subjects) from the Fernald School was also selected.

The two remedial programs were the Fernald School and the enrichment program. The Fernald School had a highly individualized program, extra classroom supports, relatively low pupil-to-teacher ratio, an atmosphere of experimentation, positive reinforcement, and reduction of school anxieties through success experiences. The school enrichment program was a compensatory intervention program focusing on reading and language arts skills for three to five mornings per week. A number of evaluative measures were utilized, but emphasis will be placed here on the California Achievement Test and the Wechsler Intelligence Scale for Children (WISC). The results indicated that at both the elementary and junior high school level, for both advantaged and disadvantaged subjects, the increase in grade placement was about a year or more in reading achievement on the California Achievement Test which was significantly greater than for both the enriched and control groups. This pattern of findings held for many of the subtests on the overall achievement scale. However, the difference in reading achievement was largely due to the great gains made by the Fernald children in reading comprehension. No significant gains in reading vocabulary, as measured by the California Achievement Test, was shown. The teachers stated that this subtest tended to sample middle class rather than lower class linguistic terminology. This bias bould be particularly acute in this study because the individualized method used for reading vocabulary included the words employed in the child's speech and story writing.

The experimental groups made the least gain in spelling, but the increments in the other groups were not significantly larger.

With reference to arithmetic achievement totals, there were very little differences at the elementary level between the Fernald disadvantaged group and the other two groups in changes on the arithmetic reasoning subtest, while differences in arithmetic fundamentals were large and consistent with the overall trend. At the junior high school level, the gain in arithmetic fundamentals in the enrichment and control groups were negligible and significantly smaller than the Fernald disadvantaged which showed a year's growth. The change in arithmetic reasoning for the Fernald disadvantaged group was significantly greater than the advantaged, enrichment, and control groups, mean improvement score of 1.3 as opposed to .9, .7, and .6 grades respectively. Since higher conceptual order is required in arithmetic reasoning than in rote learning, this change is of special significance. However, the enriched group did not receive special training in arithmetic.

On the vocabulary subtest of the WISC, the advantaged subjects performed significantly better than the disadvantaged subjects on the pretest. On the posttest, vocabulary fluctuations were very variable and no significant differences were found. In this study both advantaged and disadvantaged subjects showed the same learning disabilities; however, the advantaged group performed significantly higher in this area. The possible cultural bias of the vocabulary scale may make it relatively insensitive to vocabulary increments in disadvantaged populations. On the arithmetic subtest of the WISC, the Fernald disadvantaged subjects increased significantly over the other three groups. Despite the elaborate attempts at the creation of a valid experimental design, different teachers in the experimental conditions (i.e., the Fernald School and the enrichment program) may have manifested differential skill in teaching which could conceivably have accounted for the changes observed. However, the results of this study are comparable with those of previously reported studies, substantiating the veritability of its results.

Many of the experimental studies reported in this review have numerous defects in experimental design. These include: absence of statistical analyses, lack of control groups, confounding of teacher and school or method of instruction, no evaluative measure, failure to test for significance of results, weak designs or almost a lack of design in some cases, and failure to control for many intervening variables. Johnson (1974) contended that these design flaws are relatively common in reading (and arithmetic) research. However, a large body of research has been accumulated and most indicate the efficacy of the aforementioned instructional components. The study to be described, although containing a very small sample size, is not faulted with many of the above mentioned methodological difficulties.

Another factor on which the following study differs from the research previously described is that it combines all of the features previously mentioned (i.e., the individualized-diagnostic-prescriptive approach, programmed and experimenter designed materials, a microteaching model in tutor training, peer and paraprofessional aides, point and tangible reinforcers, pupil folders, and self monitoring of progress). No other study to date has combined all of the above features in a remedial learning package designed for school and institutional settings.

CHAPTER III

METHOD

Subjects

The experimental subjects were five youngsters between the ages of 10 and 13 (grades 3-6) who resided at Learning House during the 12-week summer session of the learning laboratory's initiation. The Learning House control subjects consisted of four youngsters, matched to the experimental subjects by age and grade, who had previously been Learning House residents but had left (replaced by the experimental subjects) before the initiation of the learning laboratory. The second control group consisted of four youngsters matched to the experimental subjects by grade and score on the Lorge Thorndike Intelligence Test (Lorge, Thorndike, and Hagen, 1964). These subjects also attended the same local elementary school as the experimental group. The mean grade level for all three groups was the same, allowing for comparability of gain scores across groups. All subjects resided in the bay area during the 12-week treatment period. Two control subjects (one from the Learning House control group and one from the matched control group) were deleted from the study due to the fact that their initial test scores on the Reading Comprehension subtest of the Stanford Diagnostic Reading Test (Karlsen, Madden, and Gardner, 1966) fell at stanine 7 or above. Since the authors of the test stated that as a diagnostic instrument, the test is designed to gauge below average performance, scores of stanine 7 or above are unreliable due to the scarcity of items at the upper range of ability. Thus, scores at this level may rise and fall randomly if the child is retested.

The parents of the Learning House control subjects were contacted and orally agreed to allow their children to be tested during each of the three examination periods. The parents of the matched control group signed a written agreement volunteering to allow their children to participate in the aforementioned study. (See Appendix 10 for letter of permission sent to each matched control subject's parent.) Parents were told that at the conclusion of the testing periods, they would receive their children's scores, interpretations of results, and recommendations for remediation. They were also informed that their children would receive a bite-sized candy after each subtest and a small toy at the completion of each testing session.

This matched group design provided more stringent controls than that of a random group design, which was impossible to conduct because subjects are preassigned to Learning House. The matched group design weighs more heavily in favor of the control groups showing greater academic improvement than the experimental group. The reasons for this are as follows: 1) the Learning House control group had returned to their own or foster homes and thus a remediation of their social deficits (as indicated by progression up the promotion ladder and a higher frequency of appropriate behavior will have occurred; 2) Schuster and Sanborn (1969) stated that children with behavior problems are usually more academically handicapped than "normal" children, indicating that the behavioral problems of the Learning House experimental group would be more inhibiting to the learning of new academic skills than the control groups (who do not display such academic deficits); 3) the Learning House control group had undergone an intensive program of academic and social remediation in the school as well as at Learning House. The liaison between the Learning House staff and teachers at the local elementary school was designed to facilitate an increase in scholastic achievement and appropriate social behavior. The only academic remediation for the experimental Learning House group during the treatment period was the learning laboratory; 4) the small number of subjects (five, four, and four) in each group weighed heavily in favor of differences between groups not proving statistically significant.

The matched group design presupposes an extremely powerful treatment effect, which, if not present, will prevent the results from achieving statistical significance. This attempt to design a valid experimental procedure is also the rationale for the use of a combination of effective teaching components, rather than just one, which, if shown to be successful, can later be analyzed for relative efficacy.

Learning Laboratory Staff

The staff delineation consisted of one project director, five laboratory managers, four college tutors, four teaching parent supervisors, a reading specialist, and a statistical consultant.

The project director (the author of this paper) was a graduate student at San Jose State University who already possessed a Masters degree in counseling psychology and was also a candidate for a Masters degree in general psychology. She has had considerable experience with applied psychology, experimental design, and statistical analysis.

The four laboratory managers who were instrumental in the construction, development, and maintenance of the learning laboratory, consisted of two graduate students in psychology (one in counseling, one in general) at San Jose State and Santa Clara Universities, and two undergraduates (both majors in psychology) from Stanford University. The combined skills of these staff members consisted of experience in child development, curriculum design, teaching, programmed instruction, peer and paraprofessional training, and an extensive knowledge of the Learning House program gleened through at least three quarters of participation in the student involvement course.

The four part-time college tutor positions were held by undergraduate students at San Jose State and Stanford Universities, majoring in such diverse areas as chemistry, philosophy, industrial and general psychology. Each student had spent one quarter in participation as a Learning House observer or was assigned to the observational system for his first five weeks of the summer program. In order to be chosen as a college tutor, these participants were obliged to sign a contract stating that they would continue in the learning lab program through the

Fall Quarter. Since the primary purpose of these staff members was to receive training in learning laboratory procedures and to take over the manning of the lab during the fall, this stipulation was deemed necessary.

The reading specialist, who served as a part-time curriculum advisor, received her Masters degree in remedial reading from Santa Clara University. She also possessed a broad background in behavior change skills and self-management techniques. The reading specialist assisted in curricula planning, especially in the area of phonetic skills, and was instrumental in the construction of the word blending and syllabication exercises.

The Teaching Parent supervisors participated in the physical construction of the learning laboratory, in assuring regular child attendance, in reading observer reports of child behavioral functioning, and in making suggestions for child behavioral improvement.

The statistical consultant, who possessed a doctorate in psychology (with emphasis on experimental design and statistics) assisted in the use of appropriate statistical techniques and in the coding of data for computer analysis. (See Table 1 on the following page for list of salaries received by learning lab staff.)

Table 1

Salaries Received by Learning Lab Staff

for 12-Week Summer Session

Position	Total Summer Salary
Project Director (full-time)	Stipend - $960
Laboratory Managers (full-time)	Stipend - $960
College Tutors (part-time)	Salary - $480
Reading Specialist (part-time)	Salary - $272
Teaching Parents - Couple 1 (part-time)	Salary - $300
Teaching Parents - Couple 2 (part-time)	Salary - $600
Statistical Consultant (part-time)	Salary - $85

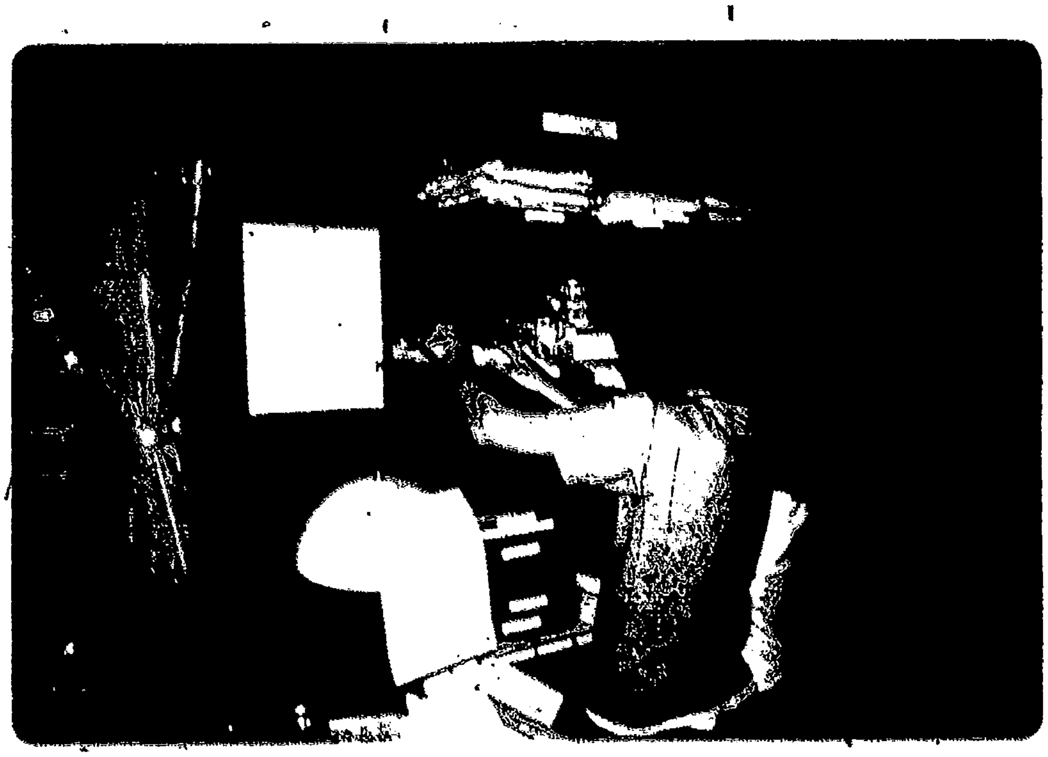
Learning Laboratory Physical Facility

The learning lab's physical facility was an 8 foot by 8 foot room, previously utilized as the surplus bedroom. All storage items were removed and the room was carpeted, curtained, air conditioned, and covered with posters. Two double study carrels, two student desks, four bulletin boards, and a teacher's desk were installed. Reading and arithmetic areas, containing materials covering these disciplines, were designated at two adjacent corners of the room. (See Photograph Set 2.)

Materials

a) The Stanford Diagnostic Tests in Reading (Karlsen, Madden, and Gardner, 1966) and Arithmetic (Beatty, Madden, and Gardner, 1966) served as the evaluation instrument. Both tests are available in two levels and in alternate forms. Level I encompasses grades 2.5 to 4.5 and Level II encompasses grades

PHOTOGRAPH SET 2. THE LEARNING LABORATORY TUTORIAL FACILITY AND FORMAT



4.5 to 8.5. The reading test yields separate scores in comprehension (literal and inferential for level II only), vocabulary, and word recognition skills including syllabication, sound discrimination, and blending, as well as a subtest for rate of reading (Level I only). Level II contains two additional subtests: auditory discrimination and beginning and ending sounds. The arithmetic test yields scores in number concepts, computation, and number facts. Scores on both the reading and arithmetic tests are interpreted in terms of within-grade stanines and grade equivalents. Subtest reliabilities for the Stanford Diagnostic Test are generally satisfactory. Split half reliabilities within single-grade groups cluster in the high .80s and .90s. The median intercorrelations of subtests are in the .40s and .50s. When considered together with the reliability coefficients, these intercorrelations indicate that the subtests should discriminate reasonably well among the individual's reading and arithmetic skills. This feature indicates that the test permits effective prescriptive programming to be achieved through its use.

In the standardization program, the Stanford Diagnostic Tests, in reading and arithmetic were administered to approximately 12,000 children in six school systems, who also took the reading and arithmetic subtests of the Stanford Achievement Test. The normative sample was also selected in terms of the latter scores which was representative of the standardization sample of the Stanford Achievement Test (Anastasi, 1966) (see Appendix 3 for test samples) (see Appendix 4, Guide to Learning Laboratory Materials for further information concerning all kits to be described and Table 2 for price list of standardized kits).

Table 2

Price List for Standardized Kits

Kit	School Price
Distar Reading II	$99.75
Complete set of student material	$12.10
Grolier Reading Attainment System I & II	$199.00
SRA Reading Lab 3A	$94.50
Student Record Book	.69
SRA Vocabulab	$89.00
Student Record Book	.85
Enrich Consonants and Vowels Kit	$148.00
Telor Class Pack (Blank Button Learning Aids)	$23.70
SRA Spelling Lab 2b	$92.85
Student Record Book	.59
SRA Spelling Lab 2c	$92.85
Student Record Book	.59
SRA Spelling Lab 3a	$92.85
Student Record Book	.59
Enrich Arithmetic Involvement Series	$138.00
Enrich Basic Math Concepts	$48.00
Enrich Understanding Decimals	$35.00
Enrich Mathemagic	$20.00
Telor Class Pack (ABCD Button model)	$23.70
SRA Computational Skills Development Kit	$93.85
Student Record Book	.64
Sullivan Mathematics Series	$ 5.60

b) Distar Reading II (Engelmann and Bruner, 1974): 1) designed for youngsters in kindergarten through second grade; 2) stresses comprehension, following directions, and word attack skills; 3) contents: Teacher's Guide, Teacher Presentation Books, Student's Take Home Book, Teacher's Take Home Book, and four readers.

c) Reading Attainment System (Crowell and Mosenfeld, 1974): 1) System I designed for grade levels 3.0-4.5; System II designed for grade levels 4.6-6.5; 2) each system contains: 120 graded reading selections, a ten-question multiple choice reading comprehension check following each reading selection, 120 skill cards testing vocabulary and word attack skills, answer keys for reading comprehension and skill cards, an instructor's manual containing full information on the use of the system, a reading shelf with compartments and color keyed dividers for storage of all the above material, a classroom set of Reader Record Books, containing pages on which a child enters his answers to the reading check and skill card exercises, and a Progress Plotter chart that records a student's progress in the Reading Attainment System.

d) Enrich Sports Series - Motivations to Read (Blanchard and Ball, 1974): 1) for students reading at grade levels 3-4; 2) contents: visual cartridges detailing basic facts about football, baseball, soccer, track, or field; 3) the kit motivates students to improve such reading skills as word recognition, vocabulary, word attack, and use of visual and context cues.

e) SRA Reading Laboratory 3A (Parker, 1973): 1) designed for youngsters in grades 7-9, but contains color coded reading levels from 3.5-11.0; 2) contents: 150 power builders which are illustrated stories that provide practice in reading, comprehension, vocabulary, and creative expression; power builder key cards; 150 rate builder booklets designed to help students read faster and with greater concentration; rate builder key cards; student record books containing record pages, a starting level guide and graphs to start the student's progress; a teacher's handbook, and colored pencils.

f) SRA Vocabulab (Parker and Walker, 1973): 1) designed for youngsters in grades 7-9, but contains graded material at levels 4-9; 2) contents: 60 vocabubuilders for ten interest areas, each vocabubuilder contains a story and accompanying word building exercises; a teacher's handbook; 16 key booklets; one phonograph record; student record booklets containing a starting and ending level guide, record pages, and a program pattern chart for recording progress; explorawheels, which are manipulative devices that enable the student to put together word parts to form whole words.

g) Telor Phonics Multi-Media Reading Lab (Niemann, 1974): 1) designed for grade levels 1-3; 2) this complete audio-visual kinesthetic program provides an approach to reading through phonics. It provides recorded cassettes and visual cartridges, as well as performance checks on duplicating masters. The complete lab consists of a consonants and vowels sounds kit.

h) Cassette Player

i) SRA Spelling Word Power Laboratory 2b, 2c, 3a: 1) designed for grade levels 4-9 (2b - levels 4-5, 2c - level 6, 3a - levels 7-9); 2) contents: a student record book containing a placement guide, program chart, spaces for the recording of responses, alphabetization and word usage exercises; 60 different learning wheels divided among 11 color coded levels - each wheel presents specific spelling problems, elements of phonics, and word analysis skills; check tests which are taken by the student after completion of a color level; check test key cards; and spelling achievement surveys (forms X, Y, and Z) - designed to examine acquisition of spelling rules covering all 11 ability levels in kit.

j) Word Blending Exercises: 1) experimenter-designed skill cards utilizing words from the Reading Attainment Systems I and II; 2) the student must blend the sound of a word after it has been divided into meaningful elements and the sound of each element has been determined. The child must find the elements of the word within the distractors without verbal cues.

Example: b ou th
d au bt

k) Syllabication Worksheet: 1) experimenter-designed, semi-programmed worksheet illustrating elementary principles of syllabication, providing sample exercises in their use, and examining the acquisition of rules through final test of all principles presented (included in Appendix 5).

l) Arithmetic Involvement System (Baldwin, 1974): 1) designed for grade levels 1-9; 2) presents basic arithmetic facts and methods in a manner designed to encourage participation and practice; 3) series is composed of 70 visual cartridges, student activities, posttests and a teacher's manual; cartridges consist of addition, subtraction, multiplication, division, fractions, decimals conceptualization, and mathemagic (beginning algebra).

m) Computational Skills Development Kit (Proctor and Johnson, 1973): 1) designed for grade levels 2-9; 2) helps students discover weaknesses and strengthens skills in addition, subtraction, multiplication, and division of whole numbers, fractions, decimals, and percents; 3) survey tests reveal student's problem areas and direct him to diagnostic tests that lead to specific exercise cards and provided progress tests are used to evaluate skill mastery.

n) Sullivan Mathematics Series (Sullivan, 1970): 1) designed for grade levels 1-9; 2) contents: programmed workbooks in the following areas of mathematics: a) basic addition, b) advanced addition, c) subtraction, d) multiplication, e) division, f) fractions, g) decimals, h) measurement.

o) Commercially Sold Flashcards - addition, subtraction, multiplication, and division.

p) Conceptualization Worksheets: 1) experimenter-designed worksheets that correspond to the Arithmetic Involvement Conceptualization units and contain additional exercise in use of the number line, abacus, mixed operations, number systems, and decimal place value in a semi-programmed format (included in Appendix 6).

q) Four bulletin boards

r) Graph paper

s) Two double-individual study cubicles, two student desks, teacher's desk

t) Shelves for storage of material

u) Bite-sized candy reinforcers (e.g., chocolate, licorice, peanuts, and cookies)

v) Air conditioner

w) Attitudes toward Behavior Modification Scale (Musgrove, 1974). This scale assessed the participant's pre to posttreatment attitudes towards the major theoretical framework under which they functioned. This test is designed as a 20-item Likert type scale indicating level of agreement with statements relating to behavior modification. The scores range from 20 (negative) to 100 (positive) with a score of 60 depicting a neutral attitude. The standardization sample for the scale consisted of 280 teachers from the central Florida county public school system, representing 35 of the 49 elementary schools. Breakdown of subject demographic data by sex, indicated that there were 256 females, 24 males, by age, evidenced a span from 21-66 years and by educational level, connotated a range from the Bachelors degree to 15 units beyond the Masters degree. This sample yielded a mean of 64.281 and a standard deviation of 13.308. The standard error of measurement was 3.252, the Kuder Richardson reliability coefficient was .94, and the inter-item correlation was .441. These data indicated that the scale discriminated varying attitudes and showed a high degree of internal consistency. An item analysis of the individual statements on the scale was attained by comparing the scores of the top 27% with those of the lowest 27% of the sample. Each item showed discrimination between the two groups at a highly significant level ($p < .001$). (This scale is included in Appendix 7.)

x) Behavioral Criterion Test of Requisite Learning Lab Skills. This instrument was utilized as a pre-post evaluation measure which tested the efficacy of paraprofessional training on the acquisition of behavior management principles, concepts necessary for the administration and utilization of the Stanford Diagnostic Tests, and knowledge of Learning laboratory materials. The items concerning behavioral principles were adapted from an adjunctive workbook by Mallott (1973) and a text by Becker (1971). These items were previously utilized as portions of a criterion reference test for a graduate course in fundamental behavioral consultation skills at San Jose State University. Three parallel forms of this test were constructed and students had to perform at criterion level on this instrument in order to pass the course. The items concerning the Stanford Diagnostic Tests and the learning laboratory materials were taken from the respective manuals associated with these devices, and the questions themselves, were designed by the project director. Parallel forms of this instrument were constructed for use during pre and post testing periods. All items were multiple choice and included three distractors and one correct answer (pre and post test forms are included in Appendix 8).

y) Participant Training Materials. A set of written training materials was designed by the project director. It included: 1) Learning Laboratory Rules; 2) Teaching Interaction components (Kirigen, Ayalla, Braukman, Brown, Minken, Phillips, Fixsen, and Wolf, 1975); 3) vignettes concerning potential child misbehaviors; 4) an outline of task responsibilities for two levels of summer participants; 5) a description of the Stanford Diagnostic Tests taken directly from the test manuals; 6) a compendium of multiple choice items concerning behavioral principles abstracted from the criterion reference test mentioned above; 7) a guide to the learning laboratory materials which contained a listing of the content, procedure, and behavioral criterion to be utilized with each kit in the learning lab. (Participant Training Materials are included in Appendices 3 and 9).

z) Parent Consent Forms for Matched Control Subjects (included in Appendix 10).

zz) Contract for College Tutors stating that they would continue in the Learning Laboratory program during the Fall Quarter (included in Appendix 11).

Procedure

Training of Laboratory Staff. All project participants attended an initial three-hour presession briefing workshop. At this time, the format of the summer program was introduced, the Behavioral Criterion Test of Requisite Learning Lab Skills and the Attitudes toward Behavior Modification Scale (Musgrove, 1974) was administered and all required forms for National Science Foundation (NSF) participation were completed.

A subsequent three-day workshop was conducted for all full-time personnel (the project director and laboratory managers) prior to the initiation of the summer tutoring session. At this time the participant training materials were disseminated, providing these personnel with a cognitive presentation of all requisite laboratory procedures. These materials consisted of: Learning Laboratory Rules, Teaching Interaction Components (Kirigen, et al., 1975), which instructed the participants as to how to use praise and correction procedures in child management, vignettes concerning potential child misbehaviors, an outline of task responsibilities for the two levels of summer participants, a description of the Stanford Diagnostic Tests taken directly from the manual, a compendium of multiple choice items concerning behavioral principles, and a guide to the learning laboratory materials (included in Appendix 4). Each staff member rehearsed methods of handling potential child misbehavior and received feedback on his performance. Alternate techniques for managing these behaviors were then role-played by other staff members. The Teaching Interaction Components (Kirigen, et al., 1975) were also modeled by the project director, then role-played and evaluated by the participants. The two kits to be used initially: the Reading Attainment System (Crowell and Mosenfeld, 1974) and the Arithmetic Involvement Series (Baldwin, 1974) were also modeled by the project director. The laboratory managers then role-played these skills and were evaluated using a behavioral checklist, in order to determine the degree of acquisition of requisite skills. All participants role-played the procedures for the aforementioned kits until 100% criterion level was reached. The second day of the workshop entailed the use of the project director as model in demonstrating the use of the aforementioned kits with the children. On the third day, the laboratory managers rehearsed the use of the kits with the children and received evaluative feedback from the other staff members.

Subsequently, a 90-minute meeting was held each week for the purpose of discussion and reinforcement of the use of behavior management skills; introduction of additional learning laboratory materials through a cognitive presentation which elucidated the content, procedure, and behavioral criterion for each kit, modeling, role-playing, and evaluation; discussion and modification of general laboratory procedures; review of learning laboratory methodology; training of college tutors; and posttesting of participants. See Table 3, on the following page, for project meeting addendum. During weeks 1-4, college tutors attended a separate one-hour meeting each week for the introduction and discussion of the observational system. These meetings were conducted by one of the laboratory managers who was to assume the role of Student Involvement Director during the Fall Quarter.

Table 3

Addendum of Topics Covered at Project Meetings

during 12-Week Summer Session

Week	Attendees	Time	Topics
Pretutoring 1	Project Director Lab Managers College Tutors	3 hrs	Intro. to summer program. Completion of requisite forms for National Science Foundation. Administration of attitude questionnaire and behavioral criterion tests.
Pretutoring 2	Project Director Lab Managers	8 hrs	Intro. of learning lab rules, teaching-interaction components, and learning lab folders. Role-playing of vignettes of potential child misbehaviors. Modeling, role-playing, and feedback of initial lab kits utilized: Reading Attainment System and Arithmetic Involvement Series.
Pretutoring 3	Project Director Lab Managers	6 hrs	Modeling by project director of behavior management skills, kits, and procedures with subjects.
Pretutoring 4	Project Director Lab Managers	6 hrs	Role-playing and feedback of behavior management skills, kits, and procedures by lab managers with subjects.
Week 1	Project Director Lab Managers College Tutors	1 1/2 hours	Intro. to observational system for college tutors. Lecture by project director: the use of behavioral consultation with a TMR teacher and microcephalic child.

Week	Attendees	Time	Topics
Week 2	Project Director Lab Manager College Tutors	1 1/2 hours	Discussion of general lab procedure and weekly problems. Lecture by project director: principles of operant and respondent conditioning
Week 3	Project Director Lab Managers	1 1/2 hours	Discussion of general lab procedure and weekly problems. Intro. of kits: Enrich Consonants and Vowels SRA Spelling Lab through cognitive presentation, modeling, role-playing, and feedback.
Week 4	Project Director Lab Managers	1 1/2 hours	Discussion of general lab procedure and weekly problems. Intro. of kits: SRA Computational Skills Development kit through cognitive presentation, modeling, role-playing, and feedback.
Week 5	Project Director Lab Managers College Tutors	1 1/2 hours	Discussion of general lab procedures and weekly problems. Intro. of kit: SRA Reading LABORATORY AND SRA Vocabulab through cognitive presentation, modeling, role-playing, and feedback. Intro. of blending exercises.
Week 6	Project Director Lab Managers College Tutors	1 1/2 hours	Discussion of general lab procedure and weekly problems. Intro. of Reading Attainment Series kit: through cognitive presentation, modeling, role-playing, and feedback by lab manager.

Week	Attendees	Time	Topics
Week 7	Project Director Lab Managers College Tutors	1 1/2 hours	Discussion of general lab procedure and weekly problems. Intro. to peer monitoring. Intro. of kit: Arithmetic Involvement Series, by Lab Manager.
Week 8	Project Director Lab Managers College Tutors	1 1/2 hours	Discussion of general lab procedure and weekly problems. Intro. of kit: Enrich Consonants and Vowels, and SRA Spelling Lab, by Lab Managers. Intro. to conceptualization worksheets.
Week 9	Lab Managers College Tutors	1 1/2 hours	Discussion of general lab procedures and weekly problems. Lecture by laboratory manager: the use of self management skills in modifying exercise behavior.
Week 10	Project Director Lab Managers College Tutors	1 1/2 hours	Discussion of general lab procedures and weekly problems. Review of behavioral principles, Stanford Diagnostic Test, and learning lab materials. Intro. of syllabication worksheet.
Week 11	Project Director Lab Managers College Tutors	1 1/2 hours	Discussion of general lab procedures and weekly problems. Role-playing of all kits by college tutors. Evaluation by project director and lab managers.
Week 12	Project Director Lab Managers College Tutors	1 1/2 hours	Completion of final student participant forms for NSF. Administration of posttreatment attitude scale and behavioral criterion test.

The college tutors were initiated into the learning lab program through an initial observation program. All college tutors spent weeks 1-3 observing the general Learning House treatment procedure. This entailed the observance of one child per session for two 60-minute blocks of time per week. The observation forms consisted of frequency data concerning target behaviors as well as Antecedent-Behavior-Consequents (ABC) information (observation forms are included in Appendix 9). The two college tutors who were new to the Learning House Student Involvement System spent an additional two weeks observing in this capacity. The three college tutors who had previously spent one quarter as Learning House observers began their observation of the learning laboratory beginning at week 4. They were again assigned two 60-minute blocks per week of observation and were instructed to record the ABCs of the subject-tutor interactions. A modified semantic differential scale was also utilized to rate the child's behavior from "excellent" to "poor" as compared to previous observations of the given child. (Observation forms are included in Appendix 9.) These observation forms were also used to provide the tutors with feedback as to their performance with given youngsters. The new college tutors began similar observations in the learning laboratory from weeks 6-7.

During weeks 6-7 the three "experienced" college tutors were assigned to assist the laboratory managers in their task of manning the learning lab. The laboratory managers modeled the requisite skills and progressively allowed the college tutors to take more responsibility in assuming the learning lab tasks. By week 8, each of the college tutors were assigned to time blocks with a lab manager and each worked with an individual child during these intervals. The new college tutors began their observation of the learning lab during weeks 6 and 7, assisted in the laboratory through guided participation during weeks 8 and 9, and assumed full responsibility for laboratory tasks beginning at week 10 (see Table 4, below).

Table 4

College Tutor's Initiation into

Learning Laboratory Program

Weeks	"Experienced" College Tutors (One Prior Qtr. at Learning House)	Weeks	"Inexperienced" College Tutor (No Prior Work at Learning House)
1-3	Observation of general Learning House program	1-5	Observation of general Learning House program
4-5	Observation at Learning Laboratory	6-7	Observation at Learning Laboratory
6-7	Guided participation in Learning Laboratory	8-9	Guided participation in Learning Laboratory
8-12	Full assumption of Learning Lab responsibilities	10-12	Full assumption of Learning Lab responsibilities

<u>Administration of Stanford Diagnostic Tests</u>. All subjects received alternate forms of the <u>Stanford Diagnostic Test in Reading and Arithmetic</u> during three time periods. The mean time interval between tests 1 and 2, and 2 and 3, were two

months and three months respectively. The mean time period between the combined baseline (Tests 1 and 2) and final testing was 3.5 months. Utilizing two pretreatment testings provided the examiner with a more stable baseline score. This testing procedure was necessitated by the mood swings and environmental conditions that often affect the achievement of comparable samples of youngsters with severe social deficits. The test administrations occurred at Learning House, at school, and in the children's homes, as the study transpired during the summer months and it was impossible (due to logistic considerations) to test all children at one location, and at the same point in time. The project director administered the tests to all subjects.

Each child received a bite-sized chocolate after each subtest and a small toy at the end of each testing session. One foster mother of a Learning House control subject insisted that the toy was not an appropriate reinforcer for her preadolescent son. Thus, after the first testing session, the boy received a five dollar bill for each subsequent testing session.

Subjects were administered all subtests contained in both the Stanford Diagnostic Tests in Reading and Arithmetic. However, only eight of the subtests were utilized as dependent measures. These included: Reading Comprehension, Vocabulary, Word Analysis (combination of Syllabication, Sound Discrimination, and Blending), Sound Discrimination, Syllabication, and Blending, Arithmetic Conceptualization, and Common Fractions (see Table 5 for description of subtests and Appendix 3 for samples of Stanford Diagnostic Tests).

Table 5

Subtests of Stanford Diagnostic Test in Reading and Arithmetic Utilized as Dependent Measures

Subtest: Reading Comprehension

Levels I & II

Description (taken from Test Manual)

> This test establishes the general reading level (instructional level) of the pupil in terms of his ability to understand the printed word as a form of communication. The paragraph contains a wide variety of subject matter content including science, social studies, health, etc. The questions require understanding of stated content, perception of important details, or drawing reasonable inferences from the paragraph. In level II, literal and inferential comprehension are examined. The subject is required to provide an appropriate closure statement for given sentences to be chosen from one correct item and four distractors.

Subtest: Vocabulary

Levels I & II

Description (taken from Test Manual)

> The items of the vocabulary test are taken from a variety of subject matters. The items include sentences and four choices to be read to the pupil, one of which is correct. Thus the test examines auditory vocabulary. The (capacity level) items assess common meanings of each word tested and the distractors are judged to be of equal or lesser difficulty than the correct word.

Subtest: Syllabication

Levels I & II

Description (taken from Test Manual)

> Syllabication refers to the ability to see the component syllables or parts of words. It is tested here by asking the pupil to find the first syllable (out of a choice of four possible choices) in each word.

Subtest: Sound Discrimination

Levels I & II

Description (taken from Test Manual)

This test assesses the pupil's ability to determine the more fundamental units of sounds formed by a letter or combination of letters within words, and his knowledge of the common and variant spellings of these sounds. It is tested here by having one sound in a sample word underlined and asking the pupil to choose one word out of four which contains the same sound as the one underlined.

Subtest: Blending

Levels I & II

Description (taken from Test Manual)

Blending refers to the ability to blend the sounds of a word after the word has been divided into meaningful elements and the sound of each element has been determined. Since it requires both the skill to divide the word in a useful way and the phonic skill of knowing how each element sounds, it is one of the most complex of the word recognition skills. In level I, the child is read the word and must mark the elements of the word given within the distractors. In level II, the child must find the elements of the word within the distractors without verbal cues.

Subtest: Concepts of Numbers and Numerals

Level I

Description (taken from Test Manual)

Part A: Number Systems and Counting - measures ability to identify the cardinal numbers of sets of dots and write appropriate numerals; to complete counting sequences, and write the numerals, to associate whole and fractional numbers with points on the number line.

Part B: Operations - measures ability to use properties of the whole numbers in the operations of addition, subtraction, multiplication, and division.

Part C: Decimal Place Value - measures ability to apply the principles of decimal-place value numeration in reading, interpreting, and writing numerals. Both fill-in and multiple choice items are utilized.

Subtest: Concepts of Numbers and Numerals

Level II

Description (taken from Test Manual)

Part A: Number Systems and Operations - measures ability to associate whole and fractional numbers with points on the number line and to write appropriate numerals, to associate numbers with plane regions, to use structural properties of numbers in the operations of addition, subtraction, multiplication, and division, and to interpret number sentences.

Part B: Decimal Place Value - measures ability to apply principles of decimal place notation in reading, interpreting, and writing numerals. The use of exponents in notation is included. Both fill-in and multiple choice items are utilized.

Subtest: Computation

Level I

Description (taken from Test Manual)

Part A: Addition - includes examples with and without renaming (regrouping, carrying), column addition, and copying numerals in ragged columns and completing the sums. Zero appears in different positions in the examples.

Part B: Subtraction - includes examples without renaming (regrouping, borrowing), without zero, and with zero in different positions.

Part C: Multiplication - includes examples with and without zero, and with zero in different positions. The examples increase in complexity from the type

$\begin{array}{r} a \\ \underline{xb} \end{array}$ to the type $\begin{array}{r} abc \\ \underline{x\ de} \end{array}$

Part D: Division - includes examples with and without zeros and with zeros in different positions. The examples increase in complexity from the type a÷b to ab÷def.

Subtest: Computation with Whole Numbers

Level II

Description (taken from Test Manual)

Part A: Addition and Subtraction - includes examples of the various types that are sources of difficulty for pupils; for example, renaming (regrouping, carrying, and borrowing), ragged columns, and zero in different positions are included.

Part B: Multiplication - includes examples that increase in complexity from multiplying by a single digit to multiplying by a number expressed as a three place numeral. Renaming (regrouping, carrying) is required in various positions and ability to handle zero is measured.

Part C: Division - includes examples with one, two, and three digit divisors, with and without remainders, and with zero in different positions in dividents and quotients.

Subtest: Common Fractions

Level II

Description (taken from Test Manual)

Part A: Understanding - measures ability to associate fractional numbers with fractional parts of regions and of sets of objects and with the number line.

Part B: Computation - includes examples in addition, subtraction, multiplication, and division of fractional numbers.

Two third grade subjects, from the experimental and Learning House control groups, were 10 years old and had previously repeated a grade. Thus they were initially administered the level II form of the Stanford Diagnostic Tests. Both subjects floored on most of the subtests and it appeared that this level was too difficult to tap their actual abilities. They were thus administered the level I form for their subsequent testings.

General Learning Laboratory Procedures. After the experimental subjects were administered the baseline Stanford Diagnostic Tests, they were assigned to an appropriate set of materials corresponding to subtest areas requiring remediation. The materials chosen as corrective agents were specifically correlated with the subtests of the Stanford Diagnostic Tests. Thus a curriculum plan, in which diverse scorings on the evaluation instrument could be paired with materials that corresponded with each ability level attained, was devised (see Tables 6 and 7, below, for Curriculum Prescription).

The materials consisted of standardized, programmed kits which contained the following features: graded ability levels which allowed the child to progress at his own pace, programming of small increments, the mastery of material prior to proceeding to the next step, appropriate sequencing to provide success experiences, high interest presentations, immediate feedback regarding the adequacy of response, and posttests to designate learning acquisition (see Guide to Learning Laboratory Materials for further elaboration of kits utilized, Appendix 4). Makeshift

Table 6

Curriculum Prescription

Reading Comprehension and Vocabulary

I). Distar Reading II

A) Kindergarten through second grade youngsters

B) Subjects scoring at grade equivalents below 1.0-2.0 on Reading Comprehension subtest of Stanford Diagnostic Reading Test (SDRT)

II) Reading Attainment System I

A) Subjects scoring between 3.0 and 4.5 on Reading Comprehension subtest of SDRT

B) Above third grade subjects scoring between 2.0 and 3.0 on Reading Comprehension subtest of SDRT

III) Enrich Sports Series - Motivations to Read

A) Supplementary series for subjects scoring between 3.0 and 4.0 an Reading Comprehension subtest of SDRT

IV) Reading Attainment System II

A) Subjects scoring between 4.6-6.5 on Reading Comprehension subtest of SDRT

V) SRA Reading Lab 3A

A) Subjects scoring above 6.5 in Reading Comprehension subtest of SDRT

VI) SRA Vocabulab

A) Subjects scoring above 6.5 in Reading Comprehension subtest of SDRT

Word Analysis

VII) Telor Phonics Multi-Media Reading Laboratory

A) Subjects in grades 1-3 receiving a mean stanine score of 1-5 in Word Analysis (Syllabication, Sound Discrimination, and Blending) subtests of SDRT

B) Subjects in grades 4-5 receiving a mean combined stanine score of 1-3 in Word Analysis subtests of SDRT

VIII) SRA Spelling Lab 2A

A) Subjects in grades 4-5 receiving a mean stanine score of 4-6 in Word Analysis subtests of SDRT

IX) B) Subjects in grades 2-3 receiving a mean stanine score of 6 and above in Word Analysis subtests of SDRT

C) Subjects in grades 6 and above receiving a mean stanine score of 3 or below in Word Analysis subtests of SDRT

IX) SRA Spelling Lab 2B

A) Subjects in grade 6 receiving a mean stanine score of 3-6 in Word Analysis subtests of SDRT

B) Subjects in grades 4-5 receiving a mean stanine score of 7 and above in Word Analysis subtests of SDRT

C) Subjects in grades 7 and above receiving a mean stanine score of 3 or below in Word Analysis subtests of SDRT

X) SRA Reading Lab 3A

A) Subjects in grades ~~7-9~~ receiving a mean stanine score of 4 and above in Word Analysis subtests of SDRT

B) Subjects in grade 6 receiving a mean stanine score of 7 and above in Word Analysis subtests of SDRT

XI) Word Blending Exercises and Syllabication Worksheet

A) Subjects in grades 3-6 receiving a mean stanine score of 5 and below in Word Analysis subtests of SDRT

Arithmetic

XII) Arithmetic Involvement Series

A) Addition and Subtraction

1) Subjects in grades 1-3 receiving a stanine score of 3 and below in Addition and Subtraction subtest of Stanford Diagnostic Test in Arithmetic (SDAT)

B) Multiplication

1) Subjects in grades 3-9 receiving a stanine score of 4 or below in Multiplication subtest of SDAT

C) Division

1) Subjects in grades 5-9 receiving a stanine score of 4 or below in Division subtest of SDAT

D) Fractions

1) Subjects in grades 5 and above receiving stanine scores of 5 and above in Multiplication and Division subtests of SDAT

2) Subjects in grades 5 and above receiving a stanine score of 4-7 in Fractions subtest of SDAT

E) Decimals

1) Subjects in grades 5 and above receiving stanine scores of 6-7 in Multiplication, Division, Fractions, and Decimals subtest of SDAT

F) Conceptulization

1) Subjects in grades 3-9 receiving stanine scores of 6 and below in Conceptualization subtest of SDAT

G) Mathemagic

1) Subjects in grades 7 and above receiving Computation and Conceptualization grade equivalents of 8.0 and above in SDAT

XIII) Computational Skills Development Kit

A) Addition and Subtraction

1) Subjects in grades 4 and above receiving a stanine score below 4 in Addition and Subtraction subtest of SDAT

B) Multiplication

1) Subjects in grades 3-9 receiving a stanine score of 5-7 in Multiplication subtest of SDAT

C) Division

1) Subjects in grades 3-9 receiving a stanine score of 5-7 in Division subtest of SDAT

D) Fractions

1) Subjects in grades 5 and above receiving a stanine score of 8 and above in Fractions subtest of SDAT

E) Decimals

1) Subjects in grades 5 and above receiving stanine scores of 8 and above in Fractions and Decimals subtest of SDAT

F) Percentage

1) subjects in grades 5 and above receiving stanine scores of 7 and above in Fractions, Decimals, and Decimal Fractions, and Percentage subtests of SDAT

XIV) Sullivan Mathematics Series

A) Supplementary series for subjects in all grades receiving stanine scores of 4 and below in Addition, Subtraction, Multiplication, Division, Fractions, and Decimals subtests of SDAT

XV) Flashcards

A) Supplementary series for subjects in all grades receiving stanine scores of 4 and below in Addition, Subtraction, Multiplication, and Division subtests of SDAT

XVI) Conceptualization Worksheet

A) Subjects in grades 3-9 receiving stanine scores of 6 and below in conceptualization subtests of SDAT

Table 7

Individual Programs

(Dave)
Subject 1 - Grade 3
<u>Reading Comprehension and Vocabulary</u>
Reading Attainment System I & II
<u>Word Analysis</u>
Telor Multi-Media Phonics Reading Laboratory
SRA Spelling Lab 2A
Syllabication Worksheet and Word Blending Exercises
<u>Arithmetic</u>
Arithmetic Involvement Series - Addition, Subtraction, and Multiplication
Computational Skills Development Kit - Addition, Subtraction, and Multiplication
Arithmetic Involvement Series - Conceptualization
Conceptualization Worksheets

(Maria)
Subject 2 - Grade 5
<u>Reading Comprehension and Vocabulary</u>
Reading Attainment System I and II
<u>Word Analysis</u>
SRA Spelling Lab 2A
Syllabication Worksheet and Word Blending Exercises
<u>Arithmetic</u>
Arithmetic Involvement Series - Multiplication, Division, and Fractions
Computational Skills Development Kit - Addition, Subtraction, Multiplication, and Division
Arithmetic Involvement Series - Conceptualization
Conceptualization Worksheet

(Chris)
Subject 3 - Grade 5
<u>Reading Comprehension and Vocabulary</u>
Reading Attainment System I and II
<u>Word Analysis</u>
Telor Phonics Multi-Media Reading Laboratory
SRA Spelling Lab 2A
Syllabication Worksheet and Word Blanding Exercises
<u>Arithmetic</u>
Arithmetic Involvement Series - Multiplication, Division, and Fractions
Computational Skills Development Kit - Multiplication and Division
Arithmetic Involvement Series - Conceptualization
Conceptualization Worksheet

(Brian)
Subject 4 - Grade 6

Reading Comprehension and Vocabulary
- Reading Attainment System II
- SRA Reading Lab 3A
- SRA Vocabulab

Word Analysis
- SRA Spelling Lab
- Syllabication Worksheet and Word Blending Exercises

Arithmetic
- Arithmetic Involvement Series - Multiplication, Division, and Fractions
- Computational Skills Development Kit - Addition, Subtraction, Multiplication, and Division.
- Arithmetic Involvement Series - Conceptualization
- Conceptualization Worksheet

(Tammy)
Subject 5 - Grade 6

Reading Comprehension and Vocabulary
- Reading Attainment System II
- SRA Reading Lab 3A
- SRA Vocabulab

Word Analysis
- SRA Spelling Lab 2B
- Syllabication Worksheet and Word Blending Exercises

Arithmetic
- Arithmetic Involvement Series - Multiplication, Division, and Fractions
- Computational Skills Development Kit - Addition, Subtraction, Multiplication, Division, and Fractions
- Arithmetic Involvement Series - Conceptualization
- Conceptualization Worksheet

materials in word blending, syllabication, and arithmetic conceptualization were constructed in order to provide more concentrated exercise in these areas. (See Appendix 5 and 6 for samples of these materials.)

The children received social reinforcement, 1500 points for completion of work, and an additional 1000 points for reaching 90% criterion level on the assigned posttest. Edible reinforcers were also paired with the administration of points and verbal reinforcers. However, these consummables were gradually decreased throughout the summer session. Thus, from weeks 1-6, an edible was administered each time the child completed his task and reached criterion on the posttest. From weeks 7-8, the child only received an edible reinforcer for reaching 90% criterion level. Starting at week 9, the child received peanuts, licorice, or a cookie reinforcer for reaching criterion level at three out of his four daily sessions. Chocolate reinforcers (which had previously been used and were highly desirable) were administered randomly during the third or fourth session per day if the child reached the 90% criterion level. Since the program was structured to insure that the children would be successful (i.e., reach criterion), they almost always received the chocolate reinforcer. This use of verbal, point, and edible reinforcers, first continuously, then holding verbal and point reinforcers constant, but varying the edible reinforcers (in kind and amount), conditioned a high, stable rate of work behavior.

In order to increase the probability that the children would be successful in their task endeavors, an additional correction procedure was instituted. Thus, after correction of work, if criterion level was not reached, the child was given a second chance to rectify his error and achieve criterion level on his next attempt. The lab manager or college tutor assisted the child, when necessary, in providing pronunciations of difficult words, explanations of assignments, procedural formats for attacking problems, and a rationale for correct answers.

A sequence of steps, analogous to a modified branching program, was utilized to further locate the child within the curriculum materials, after his initial placement. Thus, when posttests were passed at criterion level, the child proceeded to more advanced ability levels within the specific kit assigned. However, when criterion level was not reached, the child either redid the previous exercise, remained within the same ability level, or completed alternate exercises containing similar components as the unsuccessfully completed unit. Which of these steps were taken depended on the correction procedures within the kit being utilized.

Some of the kits (e.g., the SRA Computational Skills Development Kit and the SRA Spelling Word Power Laboratories) contained their own diagnostic and progress tests which directly determined the child's placement, remediation, and advancement. In these cases, the built-in branching system was utilized, while in other kits (e.g., the Enrich Arithmetic Involvement Series and the Enrich Consonants and Vowels Kit), the child's placement, remediation, and advancement were artificially determined.

A branching system was also formulated to allow for progression from one kit to another (see Table 8, on the following pages). Thus, after completing, at criterion level, a given number of exercises within a kit, the child would proceed to a more advanced kit within the given curricular area.

In order to provide the child with an awareness of his progress as well as to arrange a public display of his successes, each youngster charted his percentage correct on each posttest, on a bulletin board under his name.

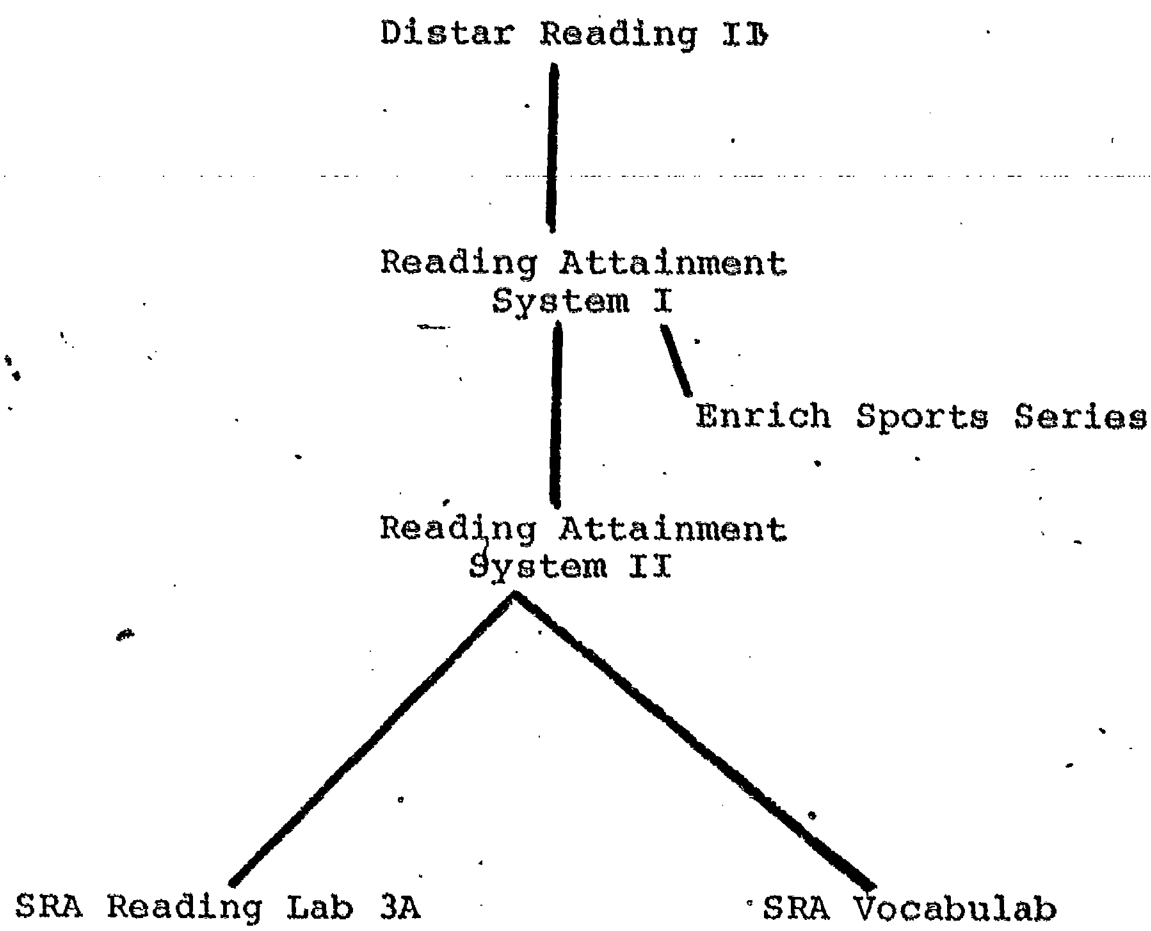
The children were instructed by a different tutor at each session, thus exposing them to varying styles and personal characteristics of adult supervisors. This procedure also set a precedent for subsequent quarters when fewer tutors than children might be available.

Folders were kept for each child and contained a sheet detailing his scores on the Stanford Diagnostic Tests as well as the initial materials to which he was assigned. These folders also contained daily reporting sheets on which the lab manager or college tutor recorded the following information after each tutoring session: date, session number, time, length of session, materials, task completed (yes or no), score, number of points received, academic and social behavior, and further programming. The project director utilized this data in constructing the children's programs for the following week. Besides being utilized for curricula planning, the daily reporting sheets provided feedback to each tutor concerning the child's performance at each session (see Appendix 11 for samples of curriculum prescription and daily reporting sheets).

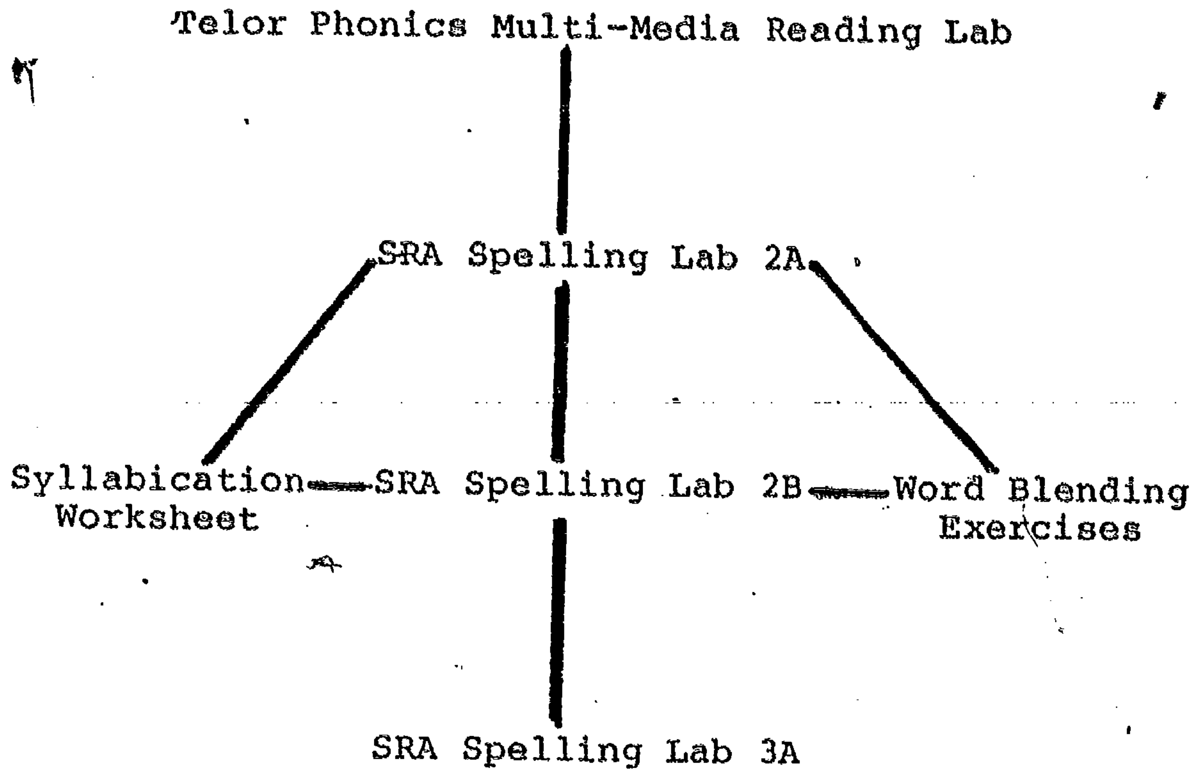
Table 8

Curriculum Branching

Reading Comprehension and Vocabulary



Word Analysis



Arithmetic

Arithmetic Involvement Series
(Basic Skills)
Addition, Subtraction, Multiplication,
Division, Fractions, Decimals

Sullivan Series

Flashcards

Computational Skills Development Kit
(Advanced Skills)
Addition, Subtraction, Multiplication,
Division, Fractions, Decimals, Percentage

Arithmetic Involvement Series
(Conceptualization)

Conceptualization Worksheets

Mathemagic
(Beginning Algebra)

There were three types of assignments available for each child: reading, word analysis, and arithmetic. During weeks 1 and 2, each child received one reading and one arithmetic assignment per day. From weeks 3-6, each child was assigned one reading, word analysis, and arithmetic exercise each day. From weeks 7-10, each child received one reading, one word analysis, one arithmetic exercise plus an additional word analysis or arithmetic task depending on the child's progress and needs in these areas. For example, a child who was very slow in completing his arithmetic assignments would receive half of his assignment during one session and the other half during the next session. Or, a child who had severe deficits in phonetic skills would be assigned to two word analysis exercises per day. During weeks 10-12, emphasis was placed on the gaining of arithmetic conceptual skills and the majority of sessions were geared to the completion of the conceptualization units of the Telor Arithmetic Involvement Series and the conceptualization worksheets (see Appendix 6).

Peer Monitoring. During the eighth week of instruction, peer monitoring was instituted. Three steps were entailed in the peer monitoring process. From the second week of the summer session, two children were instructed in the learning lab at any one time. The first step in the peer monitoring process involved having each child observe while the lab manager or college tutor corrected and charted another child's work. This observation occurred during each tutorial session over a two-day period. This process included an explanation as to how to correct the exercises and an illustration of the manner in which the child was given a chance to rectify his errors if he did not reach 90% criterion level on the first try. Since the children were extremely familiar with the learning lab materials and procedures by this time, these skills were easily acquired.

The second step entailed allowing the child duals to correct each other's work while the lab manager or college tutor carefully observed the peer monitor's accuracy. If the child did not reach criterion, he went back and corrected his work (the child being tutored was not allowed to see the answers to his test while it was being corrected). The lab manager or college tutor provided a rationale for the correct answer if the child was unable to deduce it himself. The peer monitor again corrected the child's work, then assisted in charting the child's percentage correct. The lab manager or college tutor usually aided in computing percentages. The third step consisted of the administration of praise, 500 additional points, and a chocolate to the peer monitor. Starting at week 10, the chocolate was eliminated as a reinforcer for this task. (See Photograph Set 2.)

Amount of Time Subjects Spent in Learning Laboratory. During weeks 1 and 2, the children spent two 30-minute blocks of time per day in the learning laboratory; this increased to two 45-minute blocks per day during weeks 3 and 4. Subsequently, during weeks 5 and 6, three 30-minute blocks of time per day were utilized. Starting from week 7, each child spent four

30-minute blocks of time in the learning lab which continued through the end of week 12. At the termination of the treatment period, each child had 92 hours of tutorial instruction. The spacing of tutorial blocks and the use of rest periods between sessions reflected the research that indicated that spaced rather than massed practice provided for more efficient learning (Lorge, 1930).

Some children missed varying numbers of sessions due to scheduling conflicts between the tutorial program and the general Learning House treatment procedure. These sessions were made up at times convenient for the child, but entailed the use of larger scheduling blocks than were otherwise hoped for (see Table 9, below).

Table 9

Schedule of Time Spent in Tutorial Instruction for 12-Week Period

Week	Dates	Number of Blocks per Day	Amount of Time in Each Block	Amount of Time per Day	Total Amount of Time for Week
1	6/11-6/13	2	30-min. blocks	60 min.	3 hours
2	6/16-6/20	2	30-min. blocks	60 min.	5 hours
3	6/23-6/27	2	45-min. blocks	90 min.	7 1/2 hrs
4	6/30-7/4	2	45-min. blocks	90 min.	7 1/2 hrs
5	7/7 -7/11	3	30-min. blocks	90 min.	7 1/2 hrs
6	7/14-7/18	3	30-min. blocks	90 min.	7 1/2 hrs
7	7/21-7/25	4	30-min. blocks	120 min.	10 hours
8	7/28-8/1	4	30-min. blocks	120 min.	10 hours
9	8/4 -8/8	4	30-min. blocks	120 min.	10 hours
10	8/1 -8/15	4	30-min. blocks	120 min.	10 hours
11	8/18-8/22	4	30-min. blocks	120 min.	10 hours
12	9/2 -9/3	4	30-min. blocks	120 min.	4 hours
				Total:	92 hours of Tutorial Instruction

CHAPTER IV

RESULTS

The results of the difference scores between baseline and final testing indicated substantial gains on most subtests for the experimental group. Scanning the improvement scores on the Stanford Diagnostic Test in Reading, one can see that in Reading Comprehension, the experimental group improved a mean of 1.64 grades as compared to the control groups which improved .56 and .33 grades. In Vocabulary, the experimental group improved a mean of 1.0 stanines, while the control groups improved .63 and 1.1. In Word Analysis, the experimental group improved a mean of 1.7 stanines, the control group improved .42 and .75. Appraising each of the word analysis skills separately, it is seen that in syllabication, the experimental group improved a mean of 1.4 stanines, the control group .63 and 1.74. In Sound Discrimination, the experimental group improved a mean of 1.2 stanines, the control groups 0 and .75. In Blending, the experimental group improved a mean of 2.5 stanines, the control groups improved .63 and .5.

In Arithmetic, even larger gains for the experimental group were observed. In Conceptualization, the experimental group improved a mean of 3.1 grades while the control groups improved .76 and .51. In Computation, the experimental group improved an average of 1.61 grades while the control groups improved .2 and .3. Upon assessment of the Fractions subtest, it should be noted that the two third grade subjects (one from the experimental group and one from the Learning House control group) were deleted, since the lower level of the Stanford Diagnostic Test in Arithmetic, which they received, did not contain a Fractions subtest. In Fractions, the experimental group improved 1.75 stanines, while one control group improved .33 and the other decreased -.25. (See Table 10 for individual subject data and means for all testings.)

A simple one-way analysis of covariance was performed on the baseline scores (mean of tests 1 and 2) and the adjusted final test scores for all groups and each subtest. This analysis statistically controlled for the initial differences in learning ability through an adjustment of the dependent variable. Four subtests showed significant differences between groups via this analysis. These were: Blending - $F(2,9) = 4.348$, $p < .05$; Arithmetic Conceptualization - $F(2,9) = 20.612$, $p < .001$; Arithmetic Computation - $F(2,9) = 9.33$, $p < .01$; and Fractions - $F(2,7) = 8.969$, $p < .025$. (See Table 11 for summary of Analysis of Covariance computations.)

Table 10

Descriptive Data for Comparison of Experimental and Control Groups on Nine Subtests of Stanford Diagnostic Test in Reading and Arithmetic

Reading Comprehension

(Grade Equivalents)

EXPERIMENTAL GROUP

	Grade Level	Subjects	Testings 1	2	3	Base	Final	Difference Scores
	6	Tammy	6.2	4.3	9.0	5.25	9.0	3.75
	6	Brian	5.0	4.6	5.8	4.80	5.8	1.00
	5	Maria	3.2	3.1	5.1	3.15	5.1	1.95
	3	David	2.0*	2.1	2.9	2.05	2.9	.85
	5	Chris	3.2	2.3	3.9	3.25	3.9	.65
means	5.0		3.92	3.28	5.34	3.700	5.34	1.64

*Below 2.0

LEARNING HOUSE CONTROL GROUP

	Grade Level	Subjects	Testings 1	2	3	Base	Final	Difference Scores
	3	Tom	3.1	3.0	3.2	3.05	3.2	.15
	5	Roy	7.2	6.0	6.9	6.60	6.9	.30
	6	David V.	8.2	6.0	7.5	7.10	7.5	.40
	6	Lester	3.1	3.1	4.5	3.10	4.5	1.40
means	5.0		5.4	4.525	5.525	4.963	5.525	.563

MATCHED CONTROL GROUP

	Grade Level	Subjects	Testings 1	2	3	Base	Final	Difference Scores
	5	Theresa	6.0	5.7	4.6	5.85	4.6	-1.25
	6	Hector	3.8	4.6	4.3	4.20	4.3	.10
	6	John	4.2	4.8	6.9	4.50	6.9	2.40
	5	Eric	6.0	5.5	5.8	5.75	5.8	.05
means	5.5		5.0	5.15	5.40	5.075	5.400	.325

Arithmetic Conceptualization

(Grade Equivalents)

EXPERIMENTAL GROUP

	Grade Level	Subjects	Testings 1	2	3	Base	Final	Difference Score
	6	Tammy	2.0	4.2	6.7	3.10	6.70	3.60
	6	Brian	6.6	6.7	8.6	6.65	8.60	1.95
	5	Maria	2.3	2.5	6.0	2.40	6.00	3.60
	3	David	2.0*	2.3	4.5	2.15	4.50	2.35
	5	Chris	3.3	2.5	6.9	2.90	6.90	4.00
means	5.0		3.24	3.64	6.54	3.44	6.54	3.10

*Below 2.0

LEARNING HOUSE CONTROL GROUP

	Grade Level	Subjects	Testings 1	2	3	Base	Final	Difference Score
	3	Tom	2.0*	1.9	2.7	1.95	2.70	.75
	5	Roy	5.3	5.4	6.3	5.35	6.30	.95
	6	David V.	4.3	4.0	4.8	4.15	4.80	.65
	6	Lester	4.5	4.3	5.1	4.40	5.10	.70
means	5.0		4.025	3.90	4.725	3.963	4.725	.763

*Below 2.0

MATCHED CONTROL GROUP

	Grade Level	Subjects	1	2	3	Base	Final	Difference Score
	5	Theresa	2.9	3.1	3.8	3.0	3.8	.80
	6	Hector	3.8	4.5	5.4	4.15	5.4	1.25
	6	John	6.7	6.0	6.4	6.35	6.4	.05
	5	Eric	6.1	5.2	5.6	5.65	5.6	-.05
means	5.5		4.875	4.70	5.30	4.787	5.300	.513

Arithmetic Computation

(Grade Equivalents)

EXPERIMENTAL GROUP

Grade Level	Subjects	Testings 1	2	3	Base	Final	Difference Scores
6	Tammy	4.40	3.40	6.10	3.90	6.10	2.20
6	Brian	5.00	4.70	6.70	4.85	6.70	1.85
5	Maria	4.80	4.00	5.30	4.40	5.30	.90
3	David	*	2.10	3.40	2.10	3.40	1.30
5	Chris	4.00	5.00	6.30	4.50	6.30	1.80
means 5.0		4.55	3.84	5.56	3.95	5.56	1.61

*Below 3.0 unscorable

LEARNING HOUSE CONTROL GROUP

Grade Level	Subjects	Testings 1	2	3	Base	Final	Difference Scores
3	Tom	3.0	2.70	3.10	2.85	3.10	.25
5	Roy	4.10	4.30	4.30	4.20	4.30	.10
6	David V.	5.60	4.80	5.40	5.20	5.40	.20
6	Lester	5.10	4.80	5.20	4.95	5.20	.25
means 5.0		4.45	4.15	4.50	4.30	4.50	.20

MATCHED CONTROL GROUP

Grade Level	Subjects	1	2	3	Base	Final	Difference Scores
5	Theresa	4.20	3.90	4.50	4.05	4.50	.45
6	Hector	5.30	4.60	5.10	4.95	5.10	.15
6	John	6.90	5.80	5.90	6.35	5.90	-.45
5	Eric	3.70	3.90	5.00	3.80	5.00	1.20
means 5.5		5.025	4.55	5.125	4.787	5.125	.338

Fractions

(Stanines)

EXPERIMENTAL GROUP

	Grade Level	Subject	Testings 1	2	3	Base	Final	Difference Score
	6	Tammy	1	1	2	1	2	1
	6	Brian	2	2	4	2	4	2
	5	Maria	0	0	2	0	2	2
	5	Chris	0	0	2	0	2	2
	3*	David*						
means	5.5		.75	.75	2.5	.755	2.5	1.75

*Subject deleted as Level I of SDAT does not have Fractions subtest.

LEARNING HOUSE CONTROL GROUP

	Grade Level	Subject	1	2	3	Base	Final	Difference Score
	5	Roy	1	1	2	1	2	1
	6	David V.	2	2	2	2	2	0
	6	Lester	1	1	1	1	1	0
	3*	Tom*						
means	5.67		1.33	1.33	1.67	1.333	1.667	.333

*Subject deleted as Level I of SDAT does not have Fractions subtest.

MATCHED CONTROL GROUP

	Grade Level	Subject	1	2	3	Base	Final	Difference Score
	5	Theresa	1	1	0	1	0	-1.0
	6	Hector	2	1	1	1.5	1	-.5
	6	John	3	3	3	3	3	0
	5	Eric	0	1	1	.5	1	.5
means	5.5		1.5	1.5	1.25	1.50	1.253	-.250

Vocabulary

(Stanines)

EXPERIMENTAL GROUP

	Grade Level	Subjects	1	2	3	Base	Final	Difference Scores
	6	Tammy	4	5	4	4.5	4.0	-.5
	6	Brian	3	4	4	3.5	4.0	.5
	5	Maria	4	1	4	2.5	4.0	1.5
	3	David	1	2	5	1.5	5.0	3.5
	5	Chris	1	1	1	1.0	1.0	0
means	5.0		2.6	2.6	3.6	2.6	3.6	1.0

LEARNING HOUSE CONTROL GROUP

	Grade Level	Subjects	1	2	3	Base	Final	Difference Scores
	3	Tom	1	4	5	2.5	5.0	2.5
	5	Roy	5	4	4	4.5	4.0	-.5
	6	David V.	3	4	4	3.5	4.0	.5
	6	Lester	2	2	2	2.0	2.0	0
means	5.0		2.75	3.5	3.75	3.125	3.75	.63

MATCHED CONTROL GROUP

	Grade Level	Subjects	1	2	3	Base	Final	Difference Scores
	5	Theresa	3	3	6	3.0	6.0	3.0
	6	Hector	3	2	3	2.5	3.0	.5
	6	John	2	3	4	2.5	4.0	1.5
	5	Eric	5	6	5	5.5	5.0	-.5
means	5.5		3.25	3.5	4.5	3.375	4.500	1.13

Word Analysis

Syllabication, Sound Discrimination, and Blending (Stanines)

EXPERIMENTAL GROUP

	Grade Level	Subjects	Base	Final	Difference Score
	6	Tammy	4.00	5.33	1.33
	6	Brian	3.50	5.67	2.17
	5	Maria	3.33	5.00	1.67
	3	David	2.00	4.33	2.33
	5	Chris	1.67	2.67	1.00
means	5.0		2.90	4.60	1.70

LEARNING HOUSE CONTROL GROUP

	Grade Level	Subjects	Base	Final	Difference Score
	3	Tom	2.17	3.67	1.50
	5	Roy	3.83	4.33	.50
	6	David V.	3.83	3.67	-.16
	6	Lester	3.50	3.33	-.17
means	5.0		3.332	3.750	.418

MATCHED CONTROL GROUP

	Grade Level	Subjects	Base	Final	Difference Score
	5	Theresa	3.33	4.00	.67
	6	Hector	2.33	3.00	.67
	6	John	3.83	6.00	2.17
	5	Eric	3.50	3.00	-.50
means	5.5		3.247	4.00	.753

Syllabication

(Stanines)

EXPERIMENTAL GROUP

	Grade Level	Subjects	Testings 1	2	3	Base	Final	Difference Score
	6	Tammy	3	3	5	3	5	2
	6	Brian	2	2	5	2	5	3
	5	Maria	5	3	6	4	6	2
	~~3~~	~~David~~	~~1~~	~~3~~	~~2~~	~~2~~	~~2~~	~~0~~
	5	Chris	2	2	2	2	2	0
means	5.0		2.6	2.6	4.0	2.600	4.00	1.4

LEARNING HOUSE CONTROL GROUP

	Grade Level	Subjects	Testings 1	2	3	Base	Final	Difference Score
	3	Tom	2	1	3	1.5	3.0	1.5
	5	Roy	2	3	4	2.5	4.0	1.5
	6	David V.	4	3	3	3.5	3.0	-.5
	6	Lester	3	3	3	3.0	3.0	0
means	5.0		2.75	2.5	3.25	2.625	3.250	.63

MATCHED CONTROL GROUP

	Grade Level	Subjects	Testings 1	2	3	Base	Final	Difference Score
	5	Theresa	1	2	2	1.5	2.0	.5
	6	Hector	2	1	2	1.5	2.0	.5
	6	John	1	3	7	2.0	7.0	5.0
	5	Eric	2	2	3	2.0	3.0	1.0
means	5.5		1.5	2.0	3.5	1.750	3.500	1.75

Sound Discrimination

(Stanines)

EXPERIMENTAL GROUP

Grade Level	Subjects	Testings 1	2	3	Base	Final	Difference Score
6	Tammy	5	8	7	6.5	7.0	.5
6	Brian	5	6	6	5.5	6.0	.5
5	Maria	3	4	4	3.5	4.0	.5
3	David	3	1	5	2.0	5.0	3.0
5	Chris	1	2	3	1.5	3.0	1.5
means 5.0		3.0	4.2	5.0	3.80	5.00	1.2

LEARNING HOUSE CONTROL GROUP

Grade Level	Subjects	Testings 1	2	3	Base	Final	Difference Score
3	Tom	4	1	5	2.5	5.0	2.5
5	Roy	5	4	4	4.5	4.0	-.5
6	David V.	4	4	4	4.0	4.0	0
6	Lester	3	5	2	4.0	2.0	-2.0
means 5.0		4.0	3.5	3.75	-3.75	3.75	0

MATCHED CONTROL GROUP

Grade Level	Subjects	Testings 1	2	3	Base	Final	Difference Score
5	Theresa	4	6	6	5.0	6.0	1.0
6	Hector	3	4	4	3.5	4.0	.5
6	John	4	6	6	5.0	6.0	1.0
5	Eric	3	6	5	4.5	5.0	.5
means 5.5		3.5	5.5	5.25	4.50	5.25	.75

Blending

(Stanines)

EXPERIMENTAL GROUP

Grade Level	Subjects	Testings 1	2	3	Base	Final	Difference Scores
6	Tammy	2	3	4	2.5	4.0	1.5
6	Brian	3	3	6	3.0	6.0	3.0
5	Maria	2	3	5	2.5	5.0	2.5
3	David	1	3	6	2.0	6.0	4.0
5	Chris	1	2	3	1.5	3.0	1.5
means 5.0		1.8	2.8	4.8	2.30	4.80	2.5

LEARNING HOUSE CONTROL GROUP

Grade Level	Subjects	Testings 1	2	3	Base	Final	Difference Scores
3	Tom	2	3	3	2.5	3.0	.5
5	Roy	5	4	5	4.5	5.0	.5
6	David V.	4	4	4	4.0	4.0	0
6	Lester	3	4	4	3.5	5.0	1.5
means 5.0		3.5	3.75	4.25	3.625	4.250	.625

MATCHED CONTROL GROUP

Grade Level	Subjects	Testings 1	2	3	Base	Final	Difference Scores
5	Theresa	3	4	4	3.5	4.0	.5
6	Hector	3	1	3	2.0	3.0	1.0
6	John	4	5	5	4.5	5.0	.5
5	Eric	5	3	4	4.0	4.0	0
means 5.5		3.75	3.25	4.00	3.50	4.00	.5

Table 11

Analysis of Covariance Table for

Nine Subtests of Stanford Diagnostic Test

in Reading and Arithmetic

Reading Comprehension

(Grade Equivalents)

Group	N	Mean X	SD X	Mean Y	SD Y	Mean Y Adj.
Experimental	5	3.700	1.308	5.340	2.329	6.158
Learning House Control	4	4.963	2.189	5.525	2.021	5.070
Matched Control	4	5.075	.847	5.400	1.192	4.832

Source	SS	MS	DF	F-Ratios
Between Treatments	3.745	1.872	2	1.167 n.s.
Within Treatments	14.440	1.604	9	

Test for Homogeneity of Slope

Df (Num.) = 2 Df (Denom.) = 7 F = 2.065*

*p < .25

Vocabulary

(Stanines)

Group	N	Mean X	SD X	Mean Y	SD Y	Mean Y Adj.
Experimental	5	2.600	1.432	3.600	1.517	3.768
Learning House Control	4	3.125	1.109	3.750	1.258	3.698
Matched Control	4	3.375	1.436	4.500	1.291	4.343

Source	SS	MS	Df	F-ratio
Between Treatments	.994	.497	2	.283 n.s.
Within Treatments	15.775	1.753	9	

Test for Homogeneity of Slope

Df (Num.) = 2 Df (Deno-.) = 7 F = .0065 n.s.

Word Analysis

Syllabication, Sound Discrimination, and Blending

(Stanines)

Group	N	Mean X	SD X	Mean Y	SD Y	Mean Y Adj.
Experimental	5	2.900	1.010	4.600	1.187	4.811
Learning House Control	4	3.332	.790	3.750	.419	3.581
Matched Control	4	3.247	.646	4.000	1.414	3.905

	SS	MS	Df	F-ratio
Between Treatments	3.488	1.744	2	2.382 n.s.
Within Treatments	6.590	.732	9	

Test for Homogeneity of Slope

Df (Num.) = 2 Df (Denom.) = 7 F = 1.0668 n.s.

Syllabication

(Stanines)

Group	N	Mean X	SD X	Mean Y	SD Y	Mean Y Adj.
Experimental	5	2.600	.894	4.000	1.871	3.713
Learning House Control	4	2.625	.854	3.250	.500	2.935
Matched Control	4	1.750	.289	3.500	2.380	4.174

Source	SS	MS	Df	F-ratio
Between Treatments	2.646	1.323	2	.485 n.s.
Within Treatments	24.541	2.727	9	

Test for Homogeneity of Slope

Df (Num.) = 2 Df (Denom.) = 7 F = 2.2529*

*p < .25

Sound Discrimination

(Stanines)

Group	N	Mean X	SD X	Mean Y	SD Y	Mean Y Adj.
Experimental	5	3.800	2.168	5.000	1.581	5.109
Learning House Control	4	3.750	.866	3.750	1.258	3.886
Matched Control	4	4.500	.707	5.250	.957	4.978

Source	SS	MS	Df	F-ratio
Between Treatments	3.757	1.879	2	1.559 n.s.
Within Treatments	10.845	1.205	9	

Test for Homogeneity of Slope

Df (Num.) = 2 Df (Denom.) = 7 F = 3.0304*

*p < .25

Blending

(Stanines)

Group	N	Mean X	SD X	Mean Y	SD Y	Mean Y Adj.
Experimental	5	2.300	.570	4.800	1.304	5.487
Learning House Control	4	3.625	.854	4.250	.957	3.766
Matched Control	4	3.500	1.080	4.000	.816	3.626

Source	SS	MS	Df	F-ratio
Between Treatments	5.888	2.944	2	4.348*
Within Treatments	6.093	.677	9	

*p < .05

Test for Homogeneity of Slope

Df (Num.) = 2   Df (Denom.) = 7   F = .2646 n.s.

Arithmetic Conceptualization

(Grade Equivalents)

Group	N	Mean X	SD X	Mean Y	SD Y	Mean Y Adj.
Experimental	5	3.440	1.834	6.540	1.488	6.988
Learning House Control	4	3.963	1.438	4.725	1.497	4.766
Matched Control	4	4.787	1.504	5.300	1.089	4.699

Source	SS	MS	Df	F-ratio
Between Treatments	14.234	7.117	2	20.612*
Within Treatments	3.107	.345	9	

* $p < .001$

Test for Homogeneity of Slope

Df (Num.) = 2 Df (Denom.) = 7 F = .7542 n.s.

Arithmetic Computation

(Grade Equivalents)

Group	N	Mean X	SD X	Mean Y	SD Y	Mean Y Adj.
Experimental	5	3.950	1.089	5.560	1.311	5.875
Learning House Control	4	4.300	1.056	4.500	1.049	4.513
Matched Control	4	4.787	1.153	5.125	.580	4.719

Source	SS	MS	Df	F-ratio
Between Treatments	4.635	2.318	2	9.333*
Within Treatments	2.235	.248	9	

*p < .01

Test for Homogeneity of Slope

Df (Num.) = 2   Df (Denom.) = 7   F = 3.0360*

*p < .25

Fractions

(Stanines)

Group	N	Mean X	SD X	Mean Y	SD Y	Mean Y Adj.
Experimental	4	.755	.952	2.500	1.000	2.893
Learning House Control	3	1.333	.577	1.667	.577	1.529
Matched Control	4	1.500	1.080	1.253	1.255	.962

Source	SS	MS	Df	F-ratio
Between Treatments	6.649	3.325	2	8.969*
Within Treatments	2.595	.371	7	

*p < .025

Test for Homogeneity of Slope

Df (Num.) = 2 Df (Denom.) = 5 F = .1417 n.s.

Table 12

Sign Test* for Related Pairs for Nine Subtests

of Stanford Diagnostic Test

in Reading and Arithmetic

Subtest	n	X	(Number of Fewer Signs)
Reading Comprehension	8	1	$p < .035$
Vocabulary**	7	3	n.s.
Word Analysis	8	1	$p < .035$
Syllabication	8	3	n.s.
Sound**	6	1	n.s.
Discrimination Blending	8	0	$p < .004$
Arithmetic Conceptualization	8	0	$p < .004$
Arithmetic Computation	8	1	$p < .035$
Fractions	7	0	$p < .008$

*Control groups were combined for Sign Test analysis.
**In some cases, no direction of difference occurred, and pairs were dropped from the analysis.

Due to the small sample size, the fact that four subtests (Reading Comprehension, Syllabication, Sound Discrimination, and Arithmetic Computation) did not meet the assumption of homogeneity of slope ($p < .25$), and the large within and between subject variability, a nonparametric statistic (the sign test for related pairs) was utilized to confirm or disconfirm the covariance analysis. Using this statistic, two additional subtests reached statistical significance: Reading Comprehension ($x = 1$, $n = 8$, $p < .035$) and Word Analysis ($x = 1$, $n = 8$, $p < .035$). The sign test also confirmed that the differences between groups on the four aforementioned subtests (which proved to be statistically significant via the covariance analyses, were also statistically significant as indicated by this latter analysis. Only one of the subtests not satisfying the assumption of homogeneity of slope (Reading Comprehension), differed in results from the covariance statistic. Because of the factors previously mentioned, the nonparametric test may have been a more appropriate statistic to measure differences between groups on this subtest. Both statistical tests confirmed that no significant differences between groups were indicated on the Vocabulary, Syllabication, and Sound Discrimination subtests. (See Table 12, on the previous page, for sign test results.

Maginnus (1970) suggested that reading and arithmetic gains could be evaluated by determining typical pupil gains prior to the beginning of remedial teaching made over comparable intervals of time as the treatment period. One method of arriving at an estimate of a student's typical performance is to divide his grade placement score (on a standardized test instrument) by the number of years he had been in school. The resulting figure would indicate the student's average gain per year since he entered the educational milieu. The figure thus attained could be divided by 12 to find the student's average gain per month. This analysis was performed on the aforementioned subject's grade equivalents in Reading Comprehension, Arithmetic Conceptualization, and Computation, and a depiction of these results is seen in Tables 12, 13, and 14, and Figures 1, 2, and 3. The tables and figures basically speak for themselves. Some variability exists in scoring on the reading comprehension subtests for the experimental and control groups, yet considering the expected gain scores as compared to the actual gain scores as a whole, the experimental group is seen to have made ample gains as compared to the two control groups.

Table 13

Comparison of Typical Student Performance

in Reading Comprehension

with Performance after Treatment Period

for Experimental and Control Subjects

Subject	Years in School	Average Gain per Month	Average Gain for 3 Months (Grades)	Gain after 12-Week Treatment Period (Grades)
Experimental Group				
Tammy*	7	.063	.19	3.75
Brian	6	.067	.20	1.00
Maria	5	.053	.15	1.95
David*	4	.043	.13	.85
Chris*	6	.045	.14	.65
Learning House Control Group				
Tom*	4	.064	.19	.15
Roy	5	.11	.33	.30
David V.*	7	.085	.25	.40
Lester	6	.043	.13	1.40
Matched Control Group				
Theresa	5	.098	.29	-1.25
Hector	6	.058	.17	.10
John	6	.063	.19	2.40
Eric	5	.096	.29	..05

*Had previously repeated a grade.

Table 14

Comparison of Typical Student Performance

in Arithmetic Conceptualization

with Performance after Treatment Period

for Experimental and Control Subjects

Subject	Years in School	Average Gain per Month	Average Gain for 3 Months (Grades)	Gain after 12-Week Treatment Period (Grades)
Experimental Group				
Tammy*	7	.04	.11	3.60
Brian	6	.09	.28	1.95
Maria	5	.04	.12	3.60
David*	4	.04	.13	2.35
Chris*	6	.04	.12	4.00
Learning House Control Group				
Tom*	4	.04	.12	.75
Roy	5	.09	.26	.95
David V.*	7	.05	.15	.65
Lester	6	.06	.18	.70
Matched Control Group				
Theresa	5	.05	.15	.80
Hector	6	.06	.17	1.25
John	6	.09	.26	.05
Eric	5	.09	.28	-.05

*Had previously repeated a grade.

Table 15

Comparison of Typical Sutdent Performance

in Arithmetic Computation

with Performance after Treatment Period

for Experimental and Control Subjects

Subject	Years in School	Average Gain per Month	Average Gain for 3 Months (Grades)	Gain after 12-Week Treatment Period (Grades)
Experimental Group				
Tammy*	7	.05	.14	2.20
Brian	6	.06	.20	1.85
Maria	5	.07	.22	.90
David*	4	.04	.13	1.30
Chris*	6	.06	.18	1.80
Learning House Control Group				
Tom*	4	.05	.18	.25
Roy	5	.07	.21	.10
David V.*	7	.06	.19	.20
Lester	6	.06	.21	.25
Matched Control Group				
Theresa	5	.07	.20	.45
Hector	6	.07	.21	.15
John	6	.09	.26	-.45
Eric	5	.06	.19	1.20

*Had previously repeated a grade.

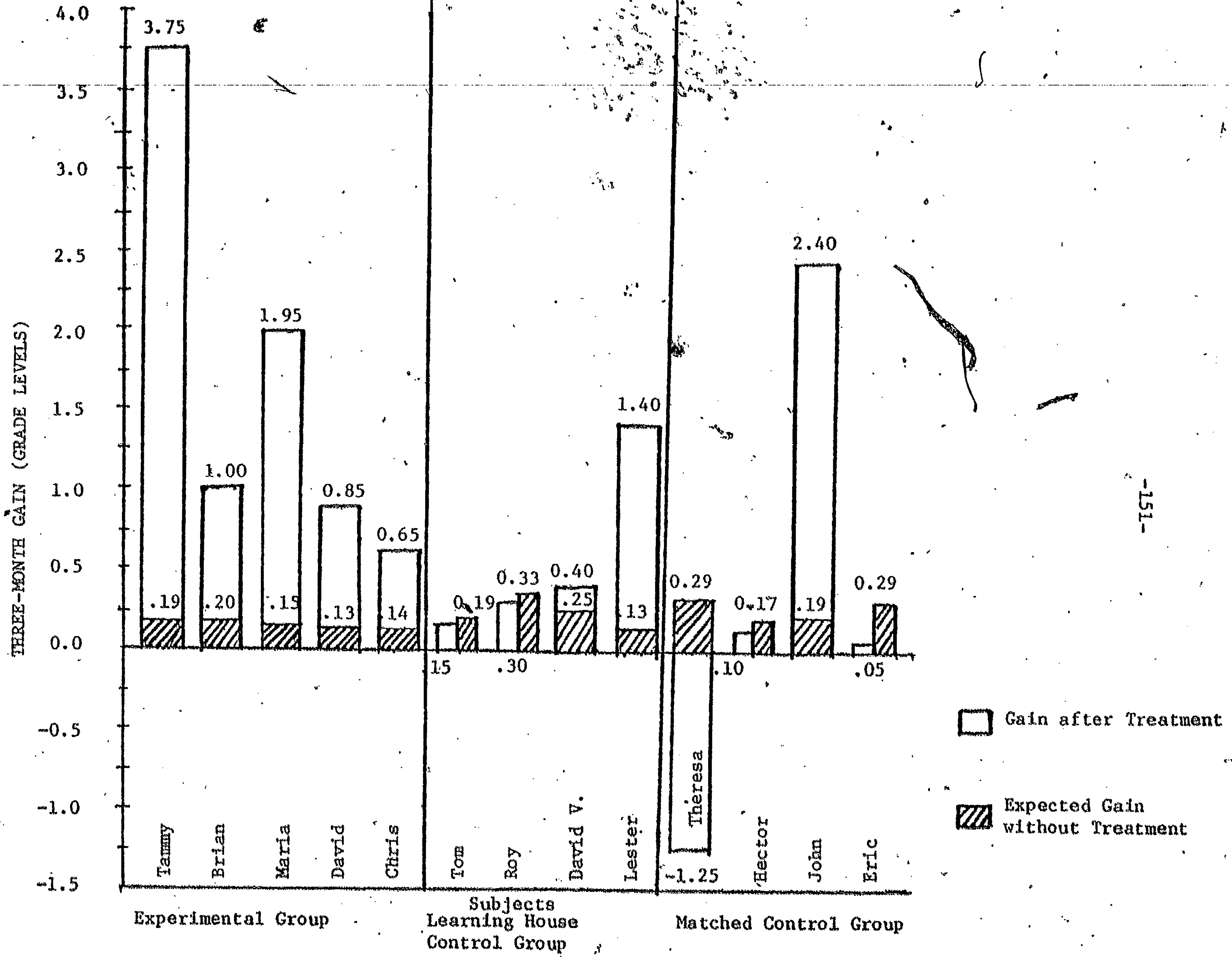


Figure 1. Comparison of Subject Gain Scores in Reading Comprehension

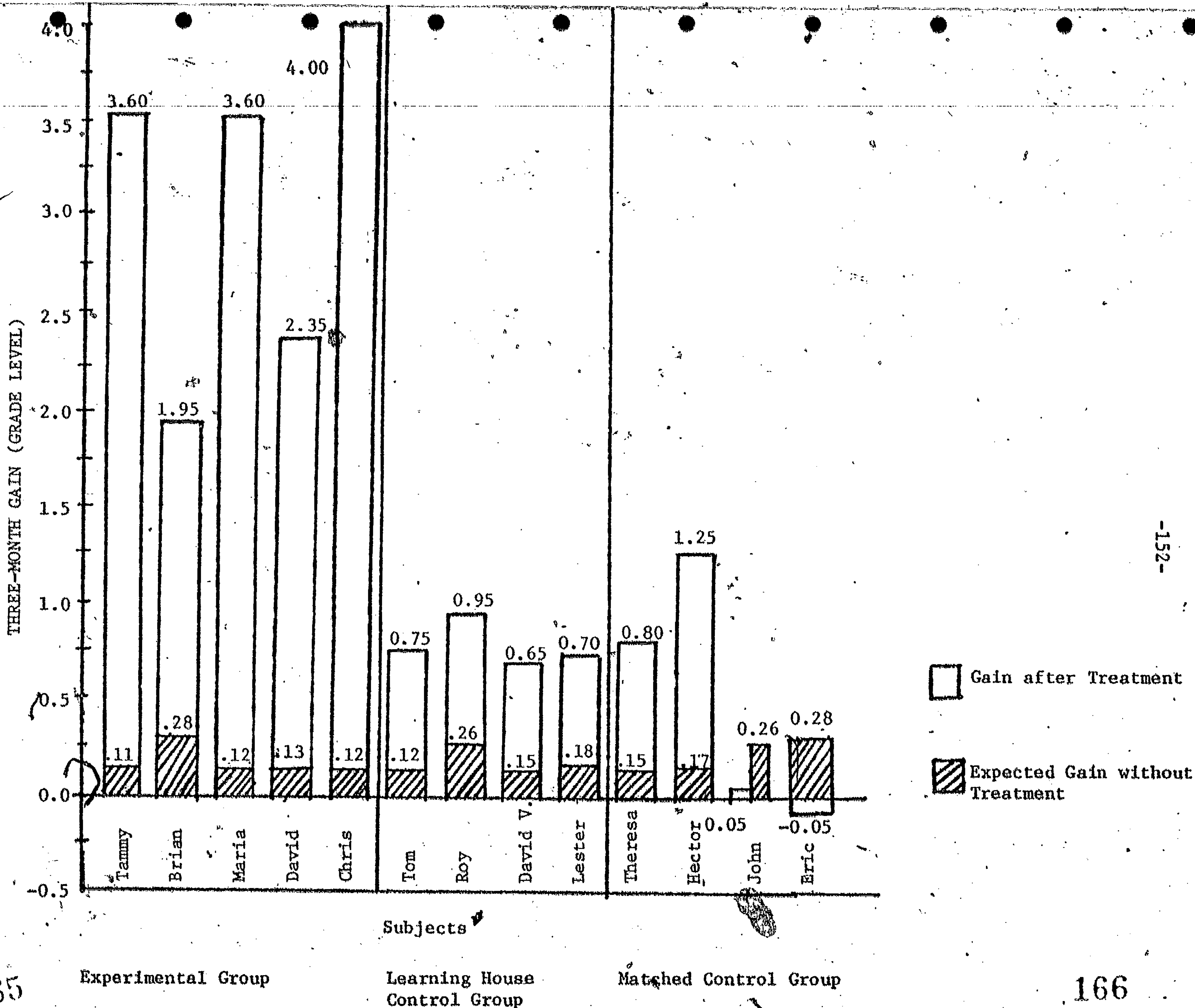


Figure 2. Comparison of Subject Gain Scores in Arithmetic Conceptualization

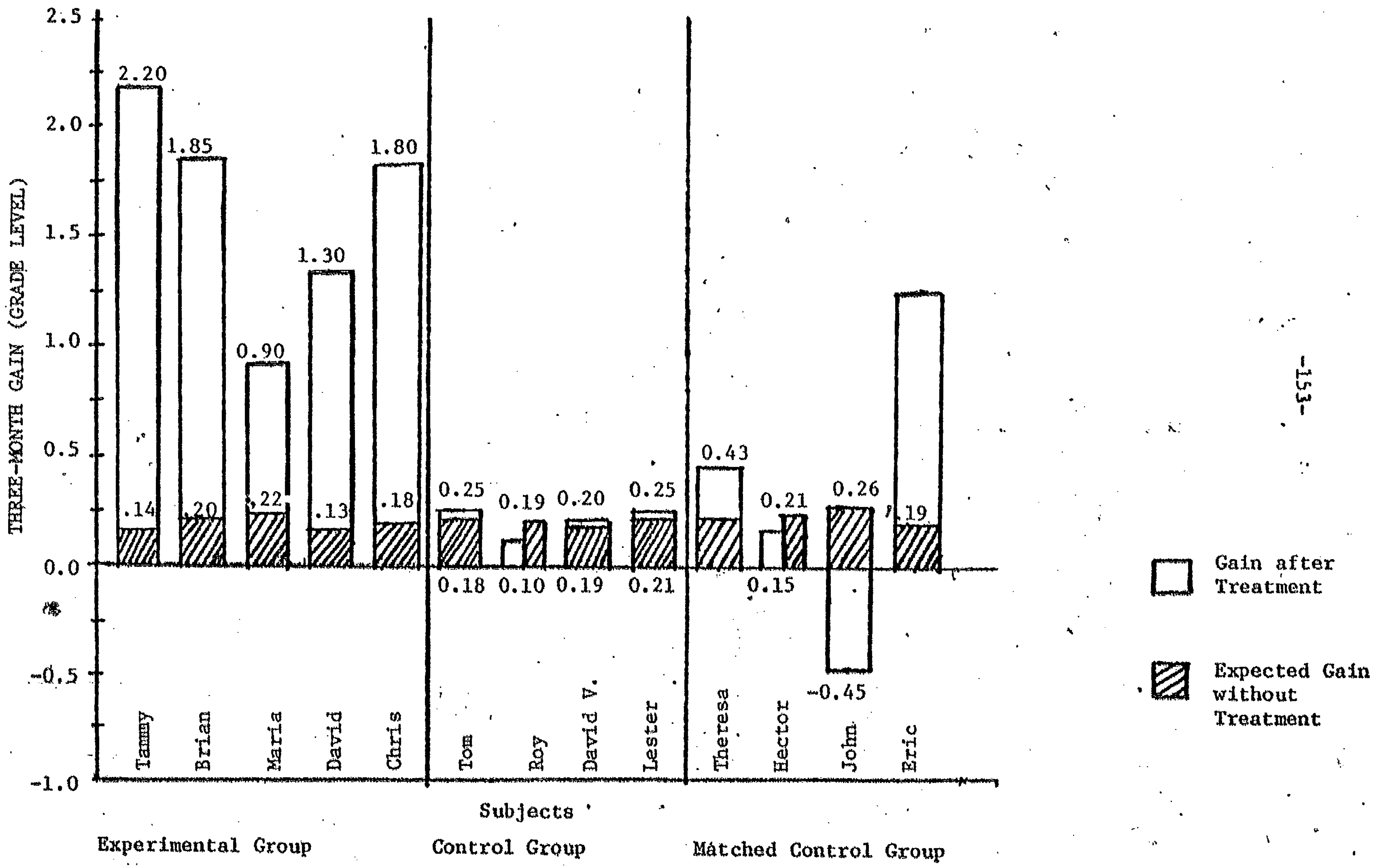


Figure 3. Comparison of Subject Gain Scores in Arithmetic Computation

In order to depict the degree to which the student participants were trained in the learning lab procedures, three criterion measures were utilized. First, a written test of behavioral principles, use of learning laboratory kits and knowledge of the Stanford Diagnostic Test, was administered as a pre and posttreatment measure. Alternate forms of the test were utilized and a one-tailed T-test for dependent means performed on the number of items correctly answered. The pretest mean was 12.44, while the posttest mean was 21.33. The results indicated that $+(8) = 6.52$, $p < .01$. Thus a significant increase in score was obtained from pre to posttesting. The Attitudes toward Behavior Modification Scale (Musgrove, 1974) was also administered as a pre-post evaluation measure. The test is designed as a 20-item Likert-type scale indicating level of agreement with statements relating to behavior modification. The scores ranged from 20 (negative) to 100 (positive), with a score of 60 depicting a neutral attitude. The results indicated a mean pretest score of 76.55 and a posttest score of 73.55. A one-tailed T-test for dependent means indicated that $+(8) = .619$, n.s. Thus a significant increase in positive attitudes toward behavior modification was not obtained, after staff members had participated in the summer program. In fact, the standard error of measurement for the scale is 3.3, and the difference between pre and posttesting was 3.0, indicating that the diversity between test periods was clearly due to chance factors.

The third measure, designed to gleen the efficacy of staff training, was a behavioral criterion test in which the participants role-played the specific responses desired. This test was designed to examine the staff's ability to utilize the kits and materials available at the learning laboratory. Due to time constraints and the fact that all participants were totally unfamiliar with these materials before the initiation of the project, no pretest evaluation was performed. The laboratory managers were given an oral and written presentation of the content and procedure of each kit, which was subsequently followed by modeling, rehearsal, and feedback (conducted by the project director). The laboratory managers were then required to reach criterion on a set of behavioral measures designed to test the subject's ability to effectively utilize the kit in question. All laboratory managers reached criterion (100% correct responding) on all kits. The lab managers then trained the college tutors, utilizing the procedures specified above. Each college tutor performed a series of specific behavioral tasks until the project director and lab managers had determined that 100% criterion had been met.

CHAPTER V

DISCUSSION

The project results indicated that considerable gains were achieved by the experimental group in reading and arithmetic as compared to the control groups. However, although improvement occurred in both of the above areas, less gain was shown on the reading subtests (i.e., vocabulary, syllabication, and sound discrimination), indicating that the program was not particularly effective in the remediation of these skill deficits for the experimental subjects.

There may be several reasons for these results. Leton's (1974) analysis of the Stanford Diagnostic Reading Test (Karlsen, Madden, and Gardner, 1968) with learning disabled youngsters indicated that the reading skills tapped by this instrument were not arranged in the hierarchal structure of difficulty suggested by Gagné (1970) and Karlsèn, et al. (1966). These skills were arranged as follows (from simplest to acquire to most difficult): auditory discrimination, beginning and ending sounds, syllabication, sound discrimination, blending, vocabulary, and reading comprehension. The hierarchal structure found by Leton indicated that reading comprehension and blending skills were easier to acquire than decoding skills (i.e., sound discrimination and syllabication) and auditory vocabulary for learning disabled youth. Also, the reading subtests of the Stanford Diagnostic Test clustered into three factors which accounted for only 55% of the total test variance. Thus, 45% of the variability was unaccounted for according to Leton's analysis. These results indicate that youngsters diagnosed as learning disabled may have perceptual deficits in reading not covered by the Stanford Diagnostic Reading Test.

Although attending regular classes at the local elementary schools, Learning House experimental subjects achieved scores similar to that of learning disabled youth (e.g., two years or more below grade level in reading and arithmetic), indicating that the Learning House youngsters may possess visual and auditory perceptual difficulties which were not appropriately tapped by the Stanford Diagnostic Reading Test. Also, the materials utilized to remediate reading skill deficits during the treatment period may not have been the correct rectification for long standing perceptual problems.

Another consideration for the lesser effectiveness of this program in reading remediation entails the length of time utilized for the project's elapsement. Since reading requires a complex set of skills, which, if not acquired during the early years, necessitates much relearning as well as unlearning of poor reading habits and mispronunciations, the 12-week summer session, which intermeshed the learning of both reading and arithmetic deficits, left too short a time for this highly elaborate skill to be totally accomplished. Keppel and Smith (1975) suggested the use of longitudinal studies to determine the effect of experimental reading programs as compared to traditional, control conditions. Keppel and Smith postulated that gains be tapped after students had been in the program from 1-6 years. Weber's (1971) findings also indicated that successful inner-city school reading programs had been in operation from 3-9 years, denoting that many children had been in the intensive reading program offered by the schools in question throughout their early academic careers (i.e., up to four years).

A number of difficulties inherent in the vocabulary subtest and in the instruction received by the experimental subjects in this area seem to account for the relatively small gain achieved.

Milner (1951) postulated that there is limited language facility in the slum child since lower class life, both in the home and in the community, fosters the development of a linguistic code which is different from that of the middle class culture. The acquisition of a limited linguistic code provides the child with a language structure which militates against the development of an extensive vocabulary.

Other investigators (Packer, 1969; Peterson, 1974; Packer, 1969) have suggested the use of an experience-based approach to the teaching of vocabulary to the disadvantaged student.

Peterson (1974) simulated the child's process of learning to read by teaching adults to associate Chinese characters with spoken words. When subjects chose the words to be learned, learning was significantly more rapid than when words were selected by the experimenter from a basal reader. From this study, Peterson concluded that meaningfulness and applicability were extremely important in vocabulary development.

Stauffer (1970) found that the best way to introduce children to functional skills was to use words that had been selected from their own speaking-meaning vocabularies. Stauffer suggested the use of the Ashton-Warner experience-based language approach (Packer, 1969) in teaching vocabulary to the disadvantaged.

As all Learning House experimental subjects would be classified as disadvantaged (i.e., lower class or welfare), it appears that from the aforestated research, they would have benefited considerably more, as far as vocabulary instruction was concerned, from an experienced-based approach. Since comprehension and word analysis skills were stressed during the summer program, vocabulary remained to be learned incidentally. A more concentrated effort to teach the child lexical items related to his daily life experiences would have eventuated in greater vocabulary acquisition.

There is also some question as to the appropriateness of the vocabulary subtest for the given population of youngsters. Feshbach and Adelman (1974) found that although both advantaged and disadvantaged subjects displayed the same degree of learning disability, the disadvantaged subjects performed better on both the vocabulary subtest of the <u>California Achievement Test</u> and the <u>Wechsler Intelligence Scale for Children</u>. No significant changes were seen on the vocabulary subtests for either group after treatment. Feshbach and Adelman concluded that the linguistic terminology required on the standardized tests utilized were biased towards middle class living, rendering the scales insensitive to gains achieved by lower class youngsters. The results of the present study indicate that the matched control subjects who were from middle and upper class homes performed better in vocabulary (but not significantly) before and after treatment than both the Learning House experimental and control subjects (who came from similar familial environments as the former group). These results are interesting to note since the matched control group did not perform better than the other two groups on most of the other subtests either before or after treatment.

Some experimental evidence suggested that redundancy is necessary for the teaching of sight vocabulary to slow learners (Blake, 1975; Deckle, 1975; Hosford, 1975).

Blake (1975) found that sight vocabulary involved a discriminative response. Discrimination, in turn, was learned through the practice of redundancy.

Hosford (1975) studied the effect of redundancy on the acquisition of sight vocabulary by normal and learning disabled subjects. Learning disabled subjects were defined as youngsters in special classes, reading two or more years below their expected grade placement, and below average on the Wechsler Intelligence Scale for Children sequence triad, i.e., Digit Span, Picture Arrangement, and Coding. Hosford found that normal subjects exceeded the performance of the learning disabled on all trials. Both groups, however, showed significant progress over trials and both groups showed a higher degree of learning under medial redundancy.

Deckle (1975) studied the relationship of amount of practice for learning of synonyms between disabled and normal learners. He found that learning disabled pupils, after receiving the most practice, performed similarly to normal subjects after receiving the least amount of practice. Deckle stated that this study illustrated the importance of drill, practice, and of reduction in size of task for learning disabled pupils.

In the present study, the experimental subjects were initially introduced to new vocabulary through their comprehension selections. However, after reading each selection, they moved on to another (either from the same level of ability or a higher level, if criterion was met) and every selection introduced a relatively new set of vocabulary. Thus, no redundancy, drill, or practice was utilized as a teaching technique in this area.

Regarding the results in reading comprehension, it is interesting to note the great inter and intra group on this subtest. The experimental group improved over a year more than the control groups during the three-month treatment period. However, the gains attained by the experimental group ranged from .65-3.75 grades. The gains attained by the Learning House control group spanned from .15-1.40 grades, and for the matched control group ranged from -1.25-2.40 grades. The motivational state of the subject appears to have some effect on the comprehension score achieved. This phenomenon was indicated by the fact that one Learning House control subject initially scored 3.1 on both baseline subtests, one taken at Learning

House, the other taken in a cell at Juvenile Hall. The last test was taken by the subject in his brother's home. At this time, he scored 4.5, a 1.40 grade difference in a 2-month period. The second control subject achieving a large gain between baseline and posttesting was a matched control subject who reported to the experimenter at the last testing that his mother had threatened to administer corporal punishment if he did not perform well on the examination. This subject's score in reading comprehension increased 2.4 grade levels in the 2-month testing interval. He also showed great increases on the other reading subtests, but far lesser increases in arithmetic (which is an area more sensitive to subject anxiety responses). Because of the small sample size utilized and the large inter and intra group variability, the sizable differences achieved by the experimental group were nonetheless prohibited from achieving statistical significance on the covariance analysis. However, the sign test, which is basically a ranking statistic, did show significantly greater improvement for the experimental subjects on the comprehension subtest.

It is also of interest to consider the blending subtest in which the experimental group showed much improvement over the control groups. Large, homogeneous gains were made by the experimental group in this area (from 1.5-4 stanines), while the control groups showed relatively small improvements (from 0-1.5 stanines). The experimenter-designed blending exercises appeared to be responsible for the experimental group's gain in this area. This outcome indicated that noncommercial materials for some academic skills, can be comparable to or better than expensive commercially sold products in providing academic remediation.

Another important factor to consider is that reading comprehension and blending appeared to be the less difficult reading skills for learning disabled pupils to acquire as compared to the auditory associative and oral receptive skills, according to Leton's (1974) study. Feshbach and Adelman (1974) found similar results as obtained in the present study as his learning disabled, experimental subjects significantly improved in reading comprehension, yet no significant difference was found in spelling (a phonetic, auditory, associative skill).

Concerning the arithmetic areas, significant differences were found on all subtests, clearly in favor of the experimental group. A number of factors may account for this improvement. One involves the research indicating that reading instruction fosters the attainment of arithmetic (especially conceptualization) skills (Barlow, 1967; Eagle, 1948; Earp, 1970; Hater, 1974; Kane, 1970; Lessenger, Kane, and Byine, 1925; Pitts, 1952; Stretch, 1973; Wilson, 1922). Since the experimental subjects received intensive reading instruction in conjunction with arithmetic instruction, the former learning may have been facilitive of the latter. The extremely large posttreatment gains in arithmetic conceptualization may have been particularly sensitive to this effect. Also facilitating this gain in arithmetic conceptualization may have been the use of multiple tutors, each reinforcing the children's conceptual skills in a different manner, providing many instances and noninstances of given conceptual events. The utilization of programmed commercial and makeshift materials which previous investigators have shown to be effective in increasing conceptual abilities (Krauser, Dissertation Abstracts, 25-5376; Mecorni, Dissertation Abstracts, 27-2948-A; Terkeurst, 1965) also strengthened this effect. These results, indicating large gains in arithmetic conceptualization for the experimental group, supported the findings of previous researchers using similar teaching methodologies (Suppes and Morningstar, 1966-68; Feshbach, et al. 1974).

Another supposition for the high degree of success achieved in arithmetic involves the hierarchal structure inherent in arithmetic acquisition. Yeager and Lindvall (1967) investigated selected measures of rate of learning in an individually prescribed curriculum in reading and mathematics utilized with elementary school subjects. Yeager and Lindvall (1967) found that when rate (time to complete given units) in addition was correlated with rate in subtraction, a significant negative correlation (-.60) was found. Pupils who had completed two successive levels in addition as well as the same two successive levels in subtraction were then identified. A significant negative correlation was again found. Yeager and Lindvall (1967) postulated that students who spent considerable time on addition mastered number combinations and relationships so well that this knowledge was easily transferred to mastery of subtraction. Hence, little time was needed to master the latter skill. Gagné

(1963) and Sandura (1968) also predicted this hierarchal structure of arithmetic rule acquisition. The aforementioned factor may account for the hefty differences found with all experimental subjects in both computation and conceptualization (as well as fractions) as compared to the much smaller differences obtained from the control groups.

A number of investigators (Howell, 1972; O'Daffer, 1976; Schnell and Klein, 1974) postulated that the use of manipulatives (e.g., cuisinnaire rods, abaci, blocks, etc.) was necessary for the acquisition of conceptual skills in arithmetic. This present study as well as the research reported by Suppes and Morningstar, 1966-68, and Feshbach and Adelman, 1974, which indicated that the operant approach to mathematics instruction previously described may be as effective or more so than the manipulative approach. Studies comparing these two methodologies should be conducted in order to determine the relative efficacy of these techniques.

Several comments concerning the project's overall functioning should be mentioned here. It had been found that two hours per day of tutoring instruction was too long a period for this sample of youngsters. The optimal time period as stated by the project participants and children themselves was 45 minutes per day. Fatigue, restlessness, and habituation to the tutoring format, reinforcers, and lab materials had developed by the end of the summer. However, all children completed the entire set of materials to which they were assigned and considerable progression within each of the programmed units was attained.

In consideration of the Attitudes toward Behavior Modification Scale (Musgrove, 1974) utilized, increased positive attitudes toward this methodology was not attained. The difference between periods was extremely small (3 points) in the negative direction. This outcome may have been due to the fact that participants had already functioned within a behavioral framework before the initiation of the project and thus showed a fairly consistent positive attitude toward this approach. It also appears that the scale is designed to measure divergent attitudes toward behavior modification rather than relatively small consistent changes between already existing beliefs. A number of investigators (Mathews and Fawcett, 1975; Thomas and Miller, 1975) had found changes in attitudes after training using crude Likert-type scales. More sensitive instruments devised to measure differences in attitudes toward a therapeutic technology such as behavior modification should be designed in order to discern the reinforcing value of the method utilized by trainees before and after propaedeutic instruction.

The learning laboratory reopened at the start of the Fall Quarter, 1975. Three of the part-time summer participants who continued as laboratory managers trained the new tutors in the procedures and techniques utilized. Three new Learning House youngsters were tested via the Stanford Diagnostic Tests. The fourth child, who had participated in the learning laboratory program this summer, was prescribed to the materials designed to remediate his weaknesses as signaled by his final Stanford Diagnostic Test scores. Two of the new Learning House youngsters were seven-year-old nonreaders. The tutors found it extremely reinforcing to observe these youngsters learn the fundamental elements of the reading process.

A number of modifications were initiated into the learning laboratory during the fall. One involved the use of 45-minute periods, four days per week, for tutorial instruction. The second involved the deletion of edible reinforcers and the substitution of Reinforcement Menus and activity reinforcers executed by the tutors each week. Under this program, each tutor is assigned to one child who is provided with an activity reinforcer (according to his interests) upon receiving a criterion number of points (raised periodically) for the week's tutoring sessions. This new procedure has controlled for the habituation to reinforcers through provision for greater child reinforcement selection (Homme, 1974). The third change involves the design of the tutee's weekly schedule by the tutors themselves. These schedules were previously developed by the project director, but have now been relegated as tutorial tasks in order to give the current participants more responsibility for the learning lab program.

The learning laboratory has continued through the Spring Quarter with five new tutors who graduated from the Learning House observational system. The generational approach, in which the former tutors train the neophytes in the requisite skills, was utilized. A new package of materials containing the course outline, requirements, description of the Stanford Diagnostic Tests and learning lab materials, and information as to how to use the Learning House point cards was distributed to all new tutors. (See Appendix 13 for course packages.) Each tutor received three to four units of college credit from Stanford University for participation in the learning lab program.

A number of experimental procedures to evaluate the efficacy of current learning lab functioning have been proposed. An intensive design similar to that conducted this summer (see Appendix 14) could be used with multiple subjects for isolated skill attainment to evaluate the subject's progress in these specific academic areas. A contrast between the 92-hour summer tutoring session and a shorter (36-hour) tutoring program will be attempted in order to compare the relative efficacy of the two procedures. The effectiveness of each of the techniques utilized (e.g., programmed units, makeshift materials, paraprofessional tutoring, peer monitoring, reinforcement, and self-charting of progress) should be evaluated to discern the comparative results of these methods. A larger sample size, randomly assigned experimental and control conditions, in conjunction with the above methodologies together and in duals should be used to study the efficacy of these procedures with a similar sample of youngsters.

Keppel and Smith (1975) contended that the benefit of field studies, such as the one above, is that they are conducted in settings where the behavior of interest usually occurs and the research findings are a function of all variables which operate in the real-life situation. It would therefore be reasonable to generalize the empirical results obtained in the family-style treatment facility previously described to other similar facilities. In effect, the above field research provides a valid basis for some extrapolation of findings to educational programs in similar treatment centers. However, reservation should be made in such generalization of findings since a small n was used which does not accurately sample population parameters and the Hawthorne effect may have influenced the treatment results (i.e., the lack of comparison with an additional treatment methodology may indicate that the novelty and attention received by the experimental subjects were sufficient to cause the gains achieved). A similar study, correcting for these methodological flaws, would provide considerable support for the internal and external validity as well as the efficacy of the aforestated treatment methodology.

CHAPTER VI

SUMMARY

The objectives of this project were threefold: 1) the remediation of reading and arithmetic deficits of pre-adolescent delinquents residing at Learning House, a residential, family-style treatment facility; 2) the training of paraprofessional and peer tutors through a systematized method of verbal and written presentation of skills, modeling, rehearsal, and evaluative feedback; and 3) the creation of a continuing learning laboratory based on diagnosis, individualized prescription, programmed units, reinforcement (social/point/tangible), and self-monitoring of progress at the Learning House treatment facility.

The experimental subjects consisted of five youngsters between the ages of 10 and 13 who resided at Learning House during the 12-week summer session. The Learning House control subjects consisted of four youngsters, matched to the experimental subjects by age and grade, who had previously been Learning House residents (replaced by the experimental subjects) before the initiation of the learning laboratory. The second control group consisted of four youngsters, matched to the experimental subjects by grade and score on the Lorge Thorndike Intelligence Test. Two control subjects were deleted from the study due to the fact that their pretest scores fell at the upper ranges of the Stanford Diagnostic Test, rendering their performance unreliable due to the test's construction.

The full-time, stipended staff (called laboratory managers) consisted of three graduate students and two seniors, all of whom had spent at least two quarters in the Learning House treatment program. These personnel participated in three-day pre-project workshops in which oral and written presentations of behavior modification skills and guides to the material utilized in the learning lab were disseminated. Modeling, role-playing, and evaluation of behavioral skills to be used in the laboratory were accomplished.

The five part-time staff members (labeled college tutors) consisted of two junior and three senior class members who were trained by the full-time staff in the materials and procedures previously mentioned. These personnel observed the functioning of the learning laboratory, participated in rehearsal of the requisite skills, were evaluated upon their performance, and then began to participate in the supervision of the learning lab under the direction of the full-time staff. A two-hour seminar was held each week to discuss the use of child management techniques, problems relating to lab procedures, and the training of part-time personnel. All staff members received a written pre-post test designed to examine acquisition of behavioral skills, knowledge of materials available at the lab, and concepts necessary for use of the Stanford Diagnostic Tests. An Attitude toward Behavior Modification questionnaire was also administered to all staff members before and after the 12-week summer session.

All subjects received the Stanford Diagnostic Tests in Reading and Arithmetic during three time periods. The mean time interval between tests 1 and 2, and 2 and 3, was two months and three months, respectively. After the experimental subjects were administered the baseline Stanford Diagnostic Tests, they were assigned to an appropriate set of materials corresponding to subtest areas requiring remediation. The materials consisted of standardized programmed kits which provided exercises at graded ability levels, allowing the child to progress at his own rate. Appropriate sequencing, high interest presentations, immediate feedback, and posttests to designate learning acquisition were additional features of these materials. Each child received a designated number of points and an edible reinforcer for completion of work and reaching 90% criterion level on the assigned task. After task completion, the child charted his progress on a bulletin board under his name. During the eighth week of instruction, peer monitoring was instituted. This procedure entailed having each child administer and correct the posttest of another child. The peer monitor also supervised the charting of progress and the dispensing of point and edible reinforcers. The children spent progressively greater periods of time in the learning lab, and by the seventh week each child spent two hours per day in tutoring. At the termination of the treatment period, the experimental subjects had 92 hours of tutorial instruction.

The results of the difference scores between baseline and final testing indicated substantial gains on most subtests for the experimental group. Appraising those subtests measured in grade equivalents, the experimental group improved a mean of 1.64 grades as compared to .56 and .32 grades for the control groups in reading comprehension; the experimental group also improved a mean of 3.1 grades in arithmetic conceptualization and 1.61 grades in arithmetic computation as compared to .76 and .5 grades in the former area and .20 and .34 in the latter area for the control groups. A simple one-way analysis of co-variance was performed on the baseline scores (mean of tests 1 and 2), and the adjusted mean final scores for all three groups. Four subtests: Word Blending - $F(2,9) = 4.35$, $p < .05$; Arithmetic Conceptualization - $F(2,9) = 20.61$, $p < .001$; Arithmetic Computation - $F(2,7) = 8.97$, $p < .025$, and Fractions reached statistical significance. Due to the small sample size, the fact that three subtests did not meet the assumption of homogeneity of slope, and the inter and intra subject variability, a non-parametric statistic (the sign test for matched pairs) was utilized to confirm or disconfirm the covariance analysis. Using this statistic, two additional subtests: Reading Comprehension ($X=1$, $n=8$, $p < .035$) and Word Analysis ($x=1$, $n=8$, $p < .035$) reached statistical significance. The sign test also confirmed the significance of the four subtests reaching significance on the covariance analyses.

A comparison of the student participant's performance on the pre-post written test and the attitude questionnaire was also executed. Alternate forms of the written test (designed by the project director) were utilized. A one-tailed T-test for dependent means was performed on the number of items correctly answered. The pretest mean was 12.44, while the posttest mean was 21.33. The results indicated that $+(8) = 6.52$, $p < .001$. The results of the Attitudes toward Behavior Modification Scale showed a mean pretest score of 76.55 and a posttest score of 73.55. A one-tailed T-test for dependent means indicated that $+(8) = -.619$, n.s. Thus a significant increase in positive attitudes toward behavior modification was not attained. The third measure designed to gleen the efficacy of staff training was a behavioral criterion test in which subjects role-played the requisite tutorial responses. All participants reached criterion (100% correct responding) by the end of the 12-week summer session.

The learning laboratory reopened at the start of the Fall Quarter, 1975, and has continued with the new youngsters now residing at Learning House. The generational approach, in which the former tutors trained the neophytes in requisite skills, was utilized. Thus the project had been relatively effective in achieving its stated objectives.

Research utilizing larger sample sizes, and randomized groups in conjunction with comparisons of the aforementioned treatment and other methodologies would provide considerable support for the external and internal validity of the effectiveness of the remedial program herein described.

REFERENCES

REFERENCES

Aaron, R., Muench, S., and Call, L. Computer-managed instruction for behaviorally disordered adolescents. Reading Improvement, 1975, 12 (2), 103-107.

Allen, V.L., and Feldman, R.S. Learning through tutoring: low-achieving children as tutors. The Journal of Experimental Education, 1973, 42 (1), 1-5.

Anastasi, A. Psychological testing. London: The Macmillan Co., 1972.

Andrews, J.K. The results of a pilot program to train teachers in the classroom application of behavior modification techniques. Journal of School Psychology, 1970, 8 (1), 37-42.

Ayllon, T., and Azrin, N. Measurement of reinforcement of the behavior of psychotics. Journal of the Experimental Analysis of Behavior, 1965, 8, 357-383.

Ayllon, T., and Michael, J. The psychiatric nurse as a behavioral engineer. Journal of the Experimental Analysis of Behavior, 1959, 2, 323-334.

Bandura, A. Social learning theory. New York: General Learning Press, 1971.

Bandura, A., and McDonald, F. The influence of social reinforcement and the behavior of models in shaping children's moral judgement. Journal of Abnormal and Social Psychology, 1963, 67, 274-281.

Baldwin, J. Arithmetic involvement series. Palo Alto, Ca.: Enrich, 1974.

Barlow, I.H. Reading and computation ability as determinants of problem solving. The Arithmetic Teacher, 1967, 11, 18-21.

Baumann, J.R., and Carter, L.L. Individualization, project learning, and team teaching in general mathematics. School Science and Mathematics, 1976, 76 (1), 63-67.

Bayer, C.A. Self monitoring and mild aversion treatment of trichotelomania. Journal of Behavior Therapy and Experimental Psychology, 1972, 3, 139-141.

Beatty, L.S., Madden, R., and Gardner, E.F. The Stanford Diagnostic Arithmetic Test: Manual. New York: Harcourt, Brace, and World, Inc., 1966.

Becker, W.C., Engelmann, S., and Thomas, D.R. Teaching: a course in applied psychology. Chicago: Science Research Associates, 1971.

Berecz, J. Modification of smoking behavior through self administered punishment of imagined behavior: a new approach to aversive therapy. Journal of Consulting and Clinical Psychology, 1972, 38, 244-250.

Birnbrauer, J.S., Wolf, M.M., Kulder, J.D., and Tague, C.E. Classroom behavior of retarded pupils with token reinforcement. Journal of Experimental Child Psychology, 1965, 2, 219-235.

Blake, K. Redundancy and retarded and normal pupils sight vocabulary learning. Journal of Research and Development in Education, Monograph, 1975, 8, 10-11.

Blanchard, R.M., and Ball, R.B. Sports-motivations to reading. Palo Alto, Ca.: Enrich, 1974.

Bloom, R.D. Learning to read: an operant perspective. Reading Research Quarterly, 1973, 8 (2), 147-166.

Boyd, L.D. Microcounseling for a counseling-like verbal response set: differential effects of two micromodels and two methods of counseling supervision. Journal of Counseling Psychology, 1973, 20 (1), 97-98.

Braden, M.R., Hall, V., and Mitts, B. The effect of self recording on the classroom behavior of two eighth grade students. Journal of Applied Behavioral Analysis, 1971, 4 (3), 191-199.

Brady, G., and Zimmerman, B.J. The effects of modeling and classroom organization on the personal space of third and fourth grade children. American Educational Research Journal, 1975 (in press).

Brooks, C.H. A combined phonics and multi-sensory approach promotes reading improvement. Reading Improvement, 1975, 12 (2), 87-93.

Busse, L.L., and Henderson, H.S. Effects of contingency management upon reading achievement of junior high educable mentally retarded students. Education and Training of the Mentally Retarded, 1972, 2, 67-73.

Carlson, L.B., and Patter, R.E. Training classroom teachers to provide inclass educational services for exceptional children in rural areas. Journal of School Psychology, 1972, 10 (2), 147-151.

Catterall, C.D. And the other view: increasing innovation and behavioral change through collaboration with a college training program. Journal of School Psychology, 1970, 8 (3), 215-219.

Chernen, L., and Yates, B.T. Learning House: the start of a new life. Palo Alto, Ca.: Learning House, 1974.

Clark, C.H. Individualized instruction: it can't be done with a screw-driver. The Arithmetic Teacher, 1976, 23 (1), 50-53.

Clark, H.B., Macrae, J.W., Ida, D.M., and Smith, N.R. The role of instructions, modeling, verbal feedback, and contingencies in the training of classroom teaching skills. In E. Ramp and G. Semb (Eds.), Behavior analysis: areas of research and application. Englewood Cliff, New Jersey: Prentice-Hall, 1975.

Cloward, R.D. Studies in tutoring. Journal of Experimental Education, 1967, 36, 14-25.

Cohen, M.L., Filipazak, J.A., and Bis, J.S. Case project contingencies applicable for special education. Brief progress report. Institute of Behavioral Research, Silver Springs, Maryland, 1965.

Corwell, C.E., and Mosenfelder, D. Reading Attainment System I and II. New York: Grolier Educational Corp., 1975.

Deckle, O. The relationship of amount of practise for learning of synonyms between disabled and normal learners. Journal of Research and Development in Education, Monograph, 1975, 8, 32-33.

Eagle, E. The relationship of certain reading abilities to success in mathematics. Mathematics Teacher, 1948, 41, 175-179.

Earp, N.W. Observations in teaching reading in mathematics. Journal of Reading, 1970, 13 (7), 529-532.

Ellson, D.G., Barber, L., Engle, T.L., and Kampwerth, L. Programmed tutoring: a teaching aid and research tool. Reading Research Quarterly, 1965, 1, 77-127.

Engelmann, S., and Bruner, E.C. Distar Reading II. Chicago: Science Research Associates, 1974.

Fawcett, S.B., and Miller, L.K. Training public speaking behavior: an experimental analysis and social validation. Journal of Applied Behavior Analysis, 1975, 8, 125-135.

Feshback, S., and Adelman, H. Remediation of learning problems among the disadvantaged. Journal of Educational Psychology, 1974, 66 (1), 16-28.

Fixsen, D.L., Philips, E.L., and Wolf, M.M. Achievement Place: the reliability of self reporting, peer reporting, and their effects on behavior. Journal of Applied Behavior Analysis, 1972, 5, 19-30.

Fletcher, R.K., and Fawcett, S.B. Training writers of instructional packages: a systematic approach to skill training. Paper presented at the American Psychological Association Convention, Chicago, 1975.

Frelow, R.D. Charry, J., and Frelish, B. Academic progress and behavioral changes in low achievement pupils. The Journal of Educational Research, 1974, 67 (6), 263-266.

Gagné, R.M. Learning and proficiency in mathematics. The Mathematics Teacher, 1963, 56, 620-626.

________. The conditions of learning (2nd ed.). New York: Holt, Rinehart, and Winston, 1970.

Gaynor, J.F., and Walking, W.D. The effectiveness of currently enrolled student proctors in an undergraduate special education course. Journal of Applied Behavior Analysis, 1974, 17, 263-267.

Goodwin, D., Garvey, W.P., and Barclay, J.R. Microconsultation and behavior analysis: a method of training psychologists as behavioral consultants. Journal of Consulting and Clinical Psychology, 1971, 37 (3), 355-363.

Gormly, J., and Nittali, M.J. Rapid improvement of reading skills in juvenile delinquents. Journal of Experimental Education, 1971, 40 (2), 45-48.

Gottman, J.M., and McFall, R.M. Self monitoring effects in a program for potential high school dropouts: a time series analysis. Journal of Consulting and Clinical Psychology, 1972, 39, 273-281.

Gray, F., Graubard, P., and Rosenberg, H. Little brother is changing you. Psychology Today, March, 1974.

Greenwood, C.R., Sloane, H.N., and Baskin, A. Training elementary aged peer behavior managers to control small group programmed mathematics. Journal of Applied Behavior Analysis, 1974, 7, 103-115.

Grice, J.S., and Wolfe, L.R. Peer versus teacher correction of classroom and selected criteria. In Frank P. Greene (ed.) Investigations relating to mature reading. Twenty-first Yearbook of the National Reading Conference, 1972, 5, 218-227.

Hafner, L.E. Editor's page. Journal of Reading Behavior. 1972-73, 5 (2), 3-5.

Hall, S.M. Self control and therpist control in the behavioral treatment of overweight women. Behavior Research and Therapy, 1972, 10, 59-68.

Hamblin, J.A., and Hamblen, R.L. On teaching disadvantaged preschoolers to read: a successful experiment. American Educational Research Journal, 1972, 9, 209-215.

Hamblen, R.L., Buckholdt, K., Ferritor, D., Kozloff, M., and Blackwell, L. The humanization process. New York: John Wiley and Sons, 1971.

Hater, M.A., Kane, R.B., and Byrne, M.A. Building reading skills in the mathematics class. The Arithmetic Teacher, 1974, 21 (8), 662-668.

Hawkins, R.P., Peterson, R.F., Schweed, E., and Bijou, S.W. Behavior therapy in the home: amelioration of problem parent-child relations with the parent in a therapeutic role. Journal of Experimental Child Psychology, 1966, 4, 99-107.

Heitzmann, A.J. Effects of a token reinforcement system on the reading behavior of black migrant primary school pupils. The Journal of Educational Research, 1974, 67 (71), 299-302.

Herbert, E.W., and Baer, D.M. Training parents as behavior modifiers: self recording of contingent attention. Journal of Applied Behavior Analysis, 1972, 5, 139-149.

Herzig, S. Junior high school students as teaching aids. The Arithmetic Teacher, 1974, 21 (4), 333-335.

Hoffman, H.V. A role for the peer tutor in the consultation process. Unpublished Manuscript, 1974.

Homme, L. How to use contingency contracting in the classroom. Champaign, Ill.: Research Press, 1974.

Horan, J.J., Girolomo, M.A., Hill, R.L., and Shute, R.E. The effect of older-peer participant models on deficient academic performance. Psychology in the Schools, 1974, 11 (2), 207-211.

Hosford, P. The effect of redundancy on the learning of sight/ vocabulary by learning disabled and normal pupils. Journal of Research and Development in Education, Monograph, 1975, 8, 18-20.

Howell, P. Project SOS (Save Our Slow Ones). The Arithmetic Teacher, 1972, 19 (1), 29-33.

Hren, C., Mueller, K., Spates, C.R., Ulrich, C., and Ulrich, R.E. The learning village elementary school. In Ulrich, R., Stachnik, T., and Mabry, J. Control of Human Behavior (Vol 3). Glenview, Ill.: Scott, Foresman and Co., 1974.

Ivey, A. Microcounseling. Springfield, Ill.: Charles Thomas, 1971.

________. Microcounseling: the counselor as trainer. Personal and Guidance Journal, 1973, 5, 311-316.

________. Microcounseling and media therapy: state of the art. Counselor Education and Supervision, 1974, 13, 172-183.

Ivey, A., Normington, D., Miller, C., Morrill, W., and Haas, R. Microcounseling and attending behavior: an approach to prepracticum counselor training. Journal of Counseling Psychology, 1968, 15 (5), Monograph Supplement, 1-2.

Johnson, D.P. The teaching of reading. The Journal of Educational Research, 1974, 67 (9), 412-420.

Johnson, M., and Bailey, J.S. Cross-age tutoring: fifth graders as arithmetic tutors for kindergarten children. Journal of Applied Behavior Analysis, 1974, 7, 223-232.

Johnson, S.M., and White, F. Self observation as an agent of behavioral change. Behavior Therapy, 1971, 2, 488-497.

Kane, R.B. The readability of mathematics textbooks revisited. Mathematics Teacher, 1970, 63, 579-581.

Kanfer, F.H. The maintenance of behavior by self-generated stimuli and reinforcement. In A. Jacobs and L.B. Sachs (Eds.), The psychology of private events. New York: Academic Press, 1971.

Karlsen, B., Madden, R., and Gardner, E.F. The Stanford Diagnostic Reading Test: Manual. New York: Harcourt, Brace, and World, 1968.

Kauser, A.W. An investigation of the development of abstract thinking in children through programmed instruction. Dissertation Abstracts, Ann Arbor, Michigan: University of Michigan, 25, 5, 376.

Kazden, A.E. Self monitoring and behavior change. In M.J. Mahoney and C.E. Thoresen, Self control: power to the person. Monterey: Brooks Cole Publishing Co., 1974.

Keppel, G.M., and Smith, F. Research and evaluation design for a schoolwide reading program. Reading Improvement, 1975, 12 (1), 2-7.

Kirigen, K.A., Ayala, H.E., Braukman, C.J., Brown, W.G., Minken, N., Phillips, E.L., Fixsen, D.L., and Wolf, M.M. Training teaching parents: an evaluation of workshop training procedures. In E. Ramp and G. Semp (Eds.), Behavior analysis: areas of research and application. Englewood Cliff, New Jersey: Prentice-Hall, 1975.

Kolb, D.A., Winter, S.K., and Berlew, D.E. Self directed behavior change: two studies. Journal of Applied Behavioral Science, 1968, 4, 453-471.

Krasner, L. Studies of the conditioning of verbal behavior. Psychological Bulletin, 1958, 55, 148-170.

Krauser, A.W. An investigation of the development of abstract thinking in children through programmed instruction. Dissertation Abstracts, Ann Arbor, Michigan: University of Michigan, 25, 5376.

Kurpius, D. Objectives, theories, and methodologies for video application in counseling and counselor training. In Farwell, G., Gamsky, N., and Mathieu-Coughlan, P. (Eds.), The Counselor's Handbook. New York: Intext, 1974.

Kuypers, D.S., Becker, W.C., and O'Leary, K.D. How to make a token system fail. Exceptional Children, 1968, 35, 101-109.

Lahey, B.B., Weller, D.R., and Brown, W.R. The behavior analysis approach to reading: phonics discrimination. Journal of Reading Behavior, 1972-73, 5 (3), 200-206.

Lauver, P.J., and Brady, G.H. Acquisition and retention of verbal interviewer behavior as a function of two modeling-based instructional techniques. Paper presented at the Western Psychological Association Convention, Sacramento, Ca., 1975(a).

Lauver, P.J., and Brady, G.H. The relative effectiveness of self modeling as a procedure for teaching basic interviewing skills. Paper presented at the American Educational Association, Washington, D.C., 1975 (b).

Lazarus, A. Behavior rehearsal vs. nondirective therapy vs. advice in effecting behavior change. Behavior Research and Therapy, 1966, 4 (3), 209-212.

Lent, J.R. A demonstration program for intensive training of institutionalized mentally retarded girls. Progress Report, Bureau of Child Research, University of Kansas, 1966.

Lessenger, W.E. Reading difficulty in arithmetical computation. Journal of Educational Research, 1925, 11, 287-291.

Leton, D.A. The structure of the Stanford Diagnostic Reading Test in relating to the assessment of learning-disabled pupils. Psychology in the Schools, 1974, 11 (1), 40-47.

Levenkran, J., Santagrassi, D.A., O'Leary, D. Increasing academic performance through contingent access to tutoring. Psychology in the Schools, 1974, 11 (2), 201-207.

Lipson, J.I. Individualized instruction in elementary mathematics. Research in Mathematics Education, National Council of Teachers of Mathematics, Washington, D.C., 1967, 76-79.

List, L. Remedial reading in the Virgin Islands. Reading Improvement, 1970, 7 (3), 16-17.

Lorge, I. Influence of regularly interpolated time intervals on subsequent learning. Teachers' College Controlled Education, 1930, No. 438.

Lorge, I., Thorndike, R.L., and Hagen, E. The Lorge-Thorndike Intelligence Tests: Manual. New York: Houghton-Mifflen Company, 1964.

Madsen, C.H., Madsen, C.K., Saudargas, R.A., and Edgar, D.E. Classroom RAID (Rules, Approval, Ignore, Disapproval): a cooperative approach for professional volunteers. Journal of School Psychology, 1970, 8 (3), 180-185.

Mahoney, M.J., Moore, B.S., Wade, T.C., and Moura, N.G.M. The effects of continuous and intermittent monitoring on academic behavior. Journal of Consulting and Clinical Psychology, 1973, 41, 65-69.

Mahoney, M.J., and Thoresen, C.E. Self control: power to the person. Monterey, Ca.: Brooks/Cole Publishing Company, 1974.

Maginnus, G.H. Evaluating remedial reading gains. Journal of Reading, 1970, 13 (7), 523-528.

Malott, R.M. Instructors quiz manual for contingency management in education and other equally exciting places, etc. Ann Arbor, Michigan: Behaviordelia, Inc., 1974.

Mathews, R.M., and Fawcett, S.B. Instructional technology for community application: training paraprofessional trainers. Paper presented at the Association for Advancement of Behavior Therapy, San Francisco, Ca., 1975.

McFall, R.M. The effects of self monitoring on normal smoking behavior. Journal of Consulting and Clinical Psychology, 1970, 35, 135-142.

McFall, R.M., and Hammen, C.L. Motivation, structure, and self-monitoring: the role of nonspecific factors in smoking reduction. Journal of Consulting and Clinical Psychology, 1971, 37, 80-86.

McFall, R.M., and Marston, A.R. An experimental investigation of behavior rehearsal in assertive training. Journal of Abnormal Psychology, 1970, 76, 295-303.

McNamara, J.R., and McDonough, T.S. Some methodological considerations in the design and implementation of behavior therapy research. Behavior Therapy, 1972, 3, 361-378.

Meconi, L.J. An experimental study of concept learning and retention in mathematics. Dissertation Abstracts, Ann Arbor, Michigan: University of Michigan, 27, 2948-A.

Miller, K.L., Rider, D., Dangel, R., Lies, A., and Peterson, D. A behavioral method for teaching psychologists how to write journal articles. Paper presented at the Association for Advancement of Behavior Therapy Convention, San Francisco, Ca., 1975.

Milner, E. Study of the relationship between reading readiness in grade school children and patterns of parent-child interaction. Child Development, 1951, 22, 95-112.

Musgrove, M.J. A scale to measure attitudes toward behavior modification. Psychology in the Schools, 1974, 11 (4), 392-393.

Napa Valley Unified School District. Project I.D.E.A. (Individualized-Diagnosed Error Analysis): Project General Information. Unpublished Manuscript, 1974.

Nelson, R.O. An expanded scope for behavior modification in school settings. Journal of School Psychology, 1974, 12 (4), 276-283.

Niemann, M. Telor phonics multimedia reading laboratory, Palo Alto, Ca.: Enrich, 1974.

O'Daffer, P.G. Individualized instruction: a search for a humanized approach. The Arithmetic Teacher, 1976, 23 (1), 23-28.

O'Leary, K.D., and Drabman, R. Token reinforcement programs in the classroom: a review. Psychological Bulletin, 1971, 15 (4), 379-398.

Packer, A. Ashton-Warner's key vocabulary for the disadvantaged. Reading Teacher, 1962, 23, 559-564.

Paradis, E., and Peterson, J. Concept of mastery learning applied to reading. The Journal of Educational Research, 1972, 66, 118-129.

Parker, D.H. Reading Laboratory - Kit 3A (1973 Edition). Chicago, Ill.: Science Research Associates, 1974.

Parker, D.H., Shipley, J.T., and Walker, F.R. Vocabulab 3 Program. Chicago, Ill.: Science Research Associates, 1974.

Parker, D.H., and Walker, F.R. Spelling Word Power Laboratory Series 2a, 2b, 3a. Chicago, Ill.: Science Research Associates, 1974.

Pennypacker, H.S., Koenig, C.H., and Seaver, W.H. Cost efficiency and effectiveness in the early detection and improvement of learning disabilities. In P.O. Davidson, F.W. Clark, and L.A. Hannerlynck (Eds.) Evaluation of behavioral programs: in community, residential, and school settings. Champaign, Ill.: Research Press, 1974.

Peterson, C.C. Self selection of vocabulary in reading instruction. The Journal of Educational Research, 1974, 67 (6), 253-254.

Pfeiffer, C. Teaching preschoolers complex skills using a programmed exchange. Unpublished Doctoral Dissertation, Washington University, 1969.

Phillips, E.L. Achievement Place: token reinforcement procedures in a home style rehabilitation setting for predelinquent boys. Journal of Applied Behavior Analysis, 1968, 1, 213-223.

Phillips, E.L., Phillips, E.A., Wolf, M.M., and Fixsen, D.L. Achievement Place: development of the elected manager system. Journal of Applied Behavior Analysis, 1973, 6, 541-561.

Pitts, R.J. Relationships between functional competence in mathematics and reading grade levels, mental ability, and age. Journal of Educational Psychology, 1952, 43, 486-492.

Powell, J., and Azrin, N. The effects of shock as a punisher for cigarette smoking. Journal of Applied Behavior Analysis, 1968, 1, 63-71.

Proctor, C.M., and Johnson, P. Computational Skills Development Kit. Chicago, Ill.: Science Research Associates, 1974.

Rehn, O.P., and Marston, A.R. Reduction of social anxiety through modification of self reinforcement: an investigation therapy technique. Journal of Counseling and Consulting Psychology, 1968, 32, 565-574.

Renfro, M.J. High school students help children in special course. Journal of Reading, 1975, 19 (3), 241-242.

Rozen, P.; Poritsky, S., and Sotsky, R. American children with reading problems can easily learn to read English represented by Chinese characters. Science, 1971, 171, 1264-1267.

Rutherford, R.B. The effects of a model videotape and feedback videotapes on the teaching style of teachers in training. The Journal of Experimental Education, 1973, 42 (1), 64-69.

Sanborn, B., and Schuster, W. Establishing reinforcement techniques in the classroom. In Krumboltz, J. and Thoresen, C. Behavioral Counseling. New York: Holt, Rinehart, and Winston, Inc., 1969.

Sandura, J.M. Research in psychomathematics. The Mathematics Teacher, 1968, 61, 581-591.

Schnell, J.H., and Klein, L.K. Development of a mathematics laboratory. The Arithmetic Teacher, 1974, 21 (6), 492-496.

Seligman, M.E. Helplessness: on depression, development, and death. San Francisco: W.H. Freeman and Co., 1975.

Shaver, J.P., and Huhn, D. The effectiveness of tutoring underachievers in reading and writing. The Journal of Educational Research, 1971, 68, 107-112.

Skinner, B.F. Verbal behavior. New York: Appleton-Century-Crofts, 1957.

________. The technology of teaching. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1968.

Smith, D.E. Increasing task behavior difficulty in language arts program by providing reinforcement. Journal of Experimental Child Psychology, 1969, 8, 45-62.

Staats, A.W., and Butterfield, W.H. Treatment of nonreading in a culturally deprived juvenile delinquent: an application of reinforcement principles. Child Development, 1965, 36 (4). 925-942.

Staats, A.W., Finley, J.R., Minke, K.A., and Wolfe, M.M. Reinforcement variables in the control of unit reading responses. Journal of Experimental Analysis of Behavior, 1964, 7, 139-149.

Staats, A.W., and Staats, C.K. A comparison of the development of speech and reading behavior with implications for research. Child Development, 1962, 33 (4), 831-846.

Staats, A.W., and Staats, C.K. Complex human behavior. New York: Holt, Rinehart, and Winston, 1963.

Staats, A.W., Staats, C.K., Schutz, R.E., and Wolf, M.M. The conditioning of reading responses using extrinsic reinforcement. Journal of Experimental Analysis of Behavior, 1962, 5, 33-44.

Stauffer, R.G. The language experience approach to the teaching of reading. New York: Harper and Row, 1970.

Stevens, T.M. Psychological consultation of teachers of behaviorally handicapped children. Journal of School Psychology, 1970, 8 (1), 13-18.

Stollak, G.E. Weight loss obtained under different experimental procedures. Psychotherapy: Theory, Research, and Practise, 1967, 4, 61-64.

Stretch, L.B. The relationship of problem solving in arithmetic to comprehension in reading. Contribution to Education No. 87. Nashville: George Peabody College for Teachers, 1931.

Stuart, R.B. A three-dimensional program for the treatment of obesity. Behavior Research and Therapy, 1971, 9, 177-196.

Sturm, I.E. The behavioristic aspect of psychodrama. Group Psychotherapy, 1965, 18, 50-64.

Sullivan, M.D. Programmed math: Books 1-8. Sacramento, Ca.: California State Department of Education, 1970.

Suppes, P., and Morningstar, M. Computer-assisted instruction at Stanford, 1966-68. Data, model, and evaluation of the arithmetic program. New York: Academic Press, 1972.

Surratt, P.R., Ulrich, R., and Hawkins, R.P. An elementary student as a behavioral engineer. Journal of Applied Behavior Analysis, 1969, 2 (2), 85-92.

Symula, J.F. The Fredonia migrant tutorial reading program. Reading Improvement, 1975, 12 (2), 66-70.

Taber, J.I., Glaser, R., and Schaefer, H.A. Learning and programmed instruction. Reading, Mass.: Addison-Wesley Publishing Co., 1965.

Terkeurst, A.J. The intrinsic programmed approach to the discovery of concepts in general psychology. Journal of Experimental Education, 1965, 33, 351-355.

Thorp, R.G., and Wetzel, R.J. Behavior modification in the natural environment. New York: Academic Press, 1969.

Thomas, D.L., and Miller, L.K. A behavioral method for development of peer-designed curriculum. Paper presented at the Association of Advancement of Behavior Therapy, San Francisco, 1975.

Tyler, V.O., and Brown, G.D. Token reinforcement of academic performance with institutionalized delinquent boys. Journal of Educational Psychology, 1968, 59 (3), 164-168.

Ulrich, R., and Kent, N.P. New tactics for the education of psychologists. Paper presented at the American Psychological Association, New York, 1966.

Underwood, B.J., and Schultz, R.W. Meaningfulness and verbal learning. New York: Lippincott, 1960.

Wadsworth, H.G. A motivational approach toward the remediation of learning disabled boys. Exceptional Children, 1971, 38, 33-42.

Wagner, M.K. Reinforcement of the expression of anger through role-playing. Behavior Research and Therapy, 1968, 6, 91-95.

Weaver, F.H., and Miller, L.K. The effects of a proctor training package on university students' proctoring behaviors. In J.M. Johnston (Ed.) Behavior research and technology in higher education. Springfield, Ill.: Charles C. Thomas, 1975.

Weber, G. Inner-city children can be taught to read: four successful schools. Council for Basic Education, Occasional Papers, 1971, 18, 1-35.

White, J.T. A profile of individualized instruction. The Mathematics Teacher, 1972, 65 (5), 394-453.

Wilson, E. Improving the ability to read arithmetic. Elementary School Journal, 1922, 22, 380-386.

Wolf, M.M., Giles, D.K., and Hall, V. Experiments with token reinforcement in a remedial classroom. Behavior Research and Therapy, 1968, 6, 51-64.

Yeager, J.L., and Lindvall, M. An exploratory investigation of selected measures of rate of learning. The Journal of Experimental Education, 1967, 36, 78-81.

Zeilberger, J., Samper, S., and Sloane, H. Modification of a child's problem behaviors in the home with the mother as therapist. Journal of Applied Behavior Analysis, 1968, 1, 47-53.

Zifferblatt, S.M., and Yates, B.T. Cost-effectiveness analysis for behaviorally based treatment programs. Unpublished manuscript, Stanford University, 1974.

Zimmerman, B.J., and Rosenthal, T.L. Concept attainment, transfer, and retention through observation and rule provision. Journal of Experimental Child Psychology, 1972, 14, 139-150.

Zimmerman, E.H., Zimmerman, J., and Russell, L.B. Differential effects of token reinforcement on instruction following behavior in retarded students instructed as a group. Journal of Applied Behavior Analysis, 1969, 2, 101-112.

Zoll, E.J. Research in programmed instruction in mathematics. The Mathematics Teacher, 1969, 62, 103-110.

APPENDICES

33

NATIONAL SCIENCE FOUNDATION
WASHINGTON, D.C. 20550

March 14, 1975

Dr. John H. Bunzel, President
San Jose State University Foundation
125 South Seventh Street
San Jose, California 95114

Proposal/Grant No.
EPP75-09299

Dear Dr. Bunzel:

It is a pleasure to inform you that $13,610 is granted to San Jose State University Foundation for support of the Student-Originated Studies project entitled "Development of a Learning Laboratory at a Treatment Center for Pre-Adolescent Delinquents" as outlined in the above-numbered proposal, and any subsequent modifications mutually agreed to by the grantee and the National Science Foundation. This project is under the direction of Leslie Charmen, Student Project Director, assisted by Dwight L. Goodwin, Department of Psychology, Faculty Project Advisor.

The funds provided by this grant are intended to assist in the support of the project at the agreed level of effort for approximately ten months. The NSF share of such support is summarized in the attached budget. The grant is effective March 15, 1975 and, unless otherwise amended, will expire on December 31, 1975.

The provisions of FL 25, "Administration of NSF Project Award," attached, less the cost sharing provisions of subparagraph 7.b., are applicable to this grant. Such cost-sharing obligation as the grantee institution may have, because of the research component of this science education training project, is deemed to be satisfied by the institution's contributions to the project of necessary space, equipment, goods or services.

The provisions of "Guide for Preparation of Proposals and Project Operation for the Student-Oriented Program" (E 75-7) are applicable to the technical direction of the project and to the preparation of technical reports.

Sincerely yours,
GAYLORD L. ELLIS
GRANTS OFFICER
Gaylord L. Ellis
Grants Officer

Attachments

PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR COPY

Appendix 2

NATIONAL SCIENCE FOUNDATION
Washington, D.C. 20550

EDUCATION
GRANT BUDGET & FISCAL REPORT

Form Approved
OMB No. 99-RO168
NSF Form 135, Apr. 71

Please read instructions on reverse side before completing this form.

INSTITUTION & ADDRESS	NSF PROGRAM / PROJECT DIRECTOR	PROJECT PERIOD
San Jose State University Foundation San Jose State University San Jose, Calif. 95192	NSF-EPP/SOS Chernan	SUMMER / ACAD. YEAR 19__ 19__ 19__

PROPOSAL NUMBER	GRANT NUMBER	GRANTEE ACCOUNT NUMBER	REPORTING PERIOD
	EPP75-09299	02-09-1255	FROM 3/15/75 TO 12/31/75

A. PARTICIPANT SUPPORT	RATE	NUMBER BUDGETED	NSF GRANT BUDGET	TOTAL # PAID	GRANTEE EXPENDITURES
12 weeks @ $80.00/wk.		5	4,800.00	5	4,800.00
10. Total Participant Support			$4,800.00		$4,800.00

B. OPERATING COST	NSF GRANT BUDGET		GRANTEE EXPENDITURES
SALARIES AND WAGES			
11. Director (Administrative $______; Instruction $______		11	
12. Staff		12	
13. Assistants	3,600.00	13	3,412.52
14.		14	
15. Secretarial and Clerical	400.00	15	272.00
16. TOTAL SALARIES AND WAGES	$4,000.00	16	$3,684.52
17. Staff Benefits (When charged as direct costs)	152.00	17	134.06
18. TOTAL SALARIES, WAGES AND STAFF BENEFITS (16&17)	$4,152.00	18	$3,818.58
19. Guest Lecturers		19	
20. Staff Travel	435.00	20	435.00
21. Field Trips		21	
22. Laboratory and Instructional Materials	1,664.00	22	2,233.03
23. Office Supplies, Communications, Publicity	117.00	23	130.97
24. Fees		24	
25.		25	
26. Permanent Equipment	132.00	26	-0-
27. Publication Costs	298.00	27	342.32
28. TOTAL DIRECT OPERATING COSTS (18 thru 27)	$6,798.00	28	$6,959.90
29. INDIRECT COSTS	2,012.00	29	1,850.10
30. TOTAL OPERATING COSTS (28 & 29)	$8,810.00	30	$8,810.00

C. GRANT & EXPENDITURE TOTALS		
31. Total Granted by NSF (Participant Support (10) + Total Operating Costs (30))	$ 13,610.00	
32. Total Expenditures Charged to Grant (10 + 30)		$ 13,610.00
33. Unexpended Balance (31 – 32)		$ -0-

We certify that the expenditures listed above are properly chargeable to this Grant.

SIGNATURE OF BUSINESS OFFICER	TYPED OR PRINTED NAME & TITLE	DATE
M T Chase	Contract and Madlyn T. Chase, Grant Officer	April 7, 1976

SIGNATURE OF PROJECT DIRECTOR	TYPED OR PRINTED NAME	DATE
Leslie Chernan	Leslie Chernan, Project Director	

FOR NSF USE ONLY
Final Fiscal Report Accepted

Grant Closed ______ Remains Open ______

By ______ Date ______

Grants Administration Section, Area ______

FOR NSF USE ONLY

Organ. Code	F.Y.	Fund ID	Prog. Code	Ob.Class	O/Dres.	Award No.	Amd.	Inst. Code	Unexpended Balance	Trans.	Lot
									$		

PAGES 193-224, APPENDIX 3, STANFORD ACHIEVEMENT TESTS, REMOVED DUE TO COPYRIGHT RESTRICTIONS

APPENDIX 4

DISTAR READING II

I) Contents
   1) Distar Fast Cycle
      A) Teacher's Guide
      B) Teacher's Presentation Book
      C) Teacher's Take Home Book
      D) Student's Take Home Book
   2) Distar Reading II
      A) Teacher's Guide
      B) Teacher's Take Home Book
      C) Student's Take Home Book
      D) Teacher Presentation Books A-D
      E) Spelling Book
   3) Miscellaneous
      A) 30 Group Progress Indicators
      B) Distar Page Protector

II) Performance Levels
   1) Fast Cycle
      A) Beginning Kindergarten and First Grade children
      B) Children who have completed Distar Reading I but are not firm in skills needed for performance in Reading II.
      C) Children who have been taught in another reading series and do not achieve sufficiently well on the Placement Test to be placed in Reading II.
   2) Distar Reading II
      A) Second Grade children
      B) Children who have completed Distar Reading I or who were exposed to Distar Reading I for an entire year.
      C) Children who have had one year of instruction in another reading program.
   3) Placement Test (for First and Second Grade children who have had some reading instruction)
      A) Each child reads aloud the story on page 1 of the Teacher's Guide
      B) Page 1 and 2 of Teacher's Guide specifies how errors are scored
      C) Children who score between 11 and 15 errors begin with lesson 30 of Fast Cycle
      D) Children who score 16 errors or more begin with lesson 1 of Fast Cycle

III) Elaboration of Contents
   1) Fast Cycle
      A) Teacher's Guide
         i) Provides a brief rationale for skills taught and specifies how to teach each of the more critical concepts (to be used as reference book for Distar Kit)

B) Teacher's Presentation Book

i) Specifies every exercise that is to be presented to the children for each lesson

ii) Indicates what the teacher should say and do and what the children are to say and do for every activity

iii) The book is divided into 30-40 minute lessons. The first page of the lesson is indicated by the word Lesson, preceded by the number. The end of the lesson is indicated by the words: End of Lesson

iv) Track headings indicate the major skill that is being taught in each part of the lesson. Each track heading appears in bold-faced capitals above the exercise

v) Every exercise within the lesson is labeled as a task and is numbered. The first exercise of the lesson is Task 1 (there may be as many as 32 tasks in a lesson). Following the task number is a brief description of the task. Each task designates the steps that will be followed in its presentation.

vi) Conventions for various printings within the Teacher's Presentation Book

a) What the Teacher says appears in red type

b) What the Teacher does appears in black type (e.g., what is pointed to, how to signal the children to respond, and when to repeat a task

c) The exact acceptable oral response of the children is indicated in italics

d) What the children are to do is indicated by words enclosed in parentheses (e.g., what the children are to touch, point to, write, etc.)

C) Student's Take Home Book

i) The Take Home Book is a 128-page student workbook. The take home activities are coordinated with the other activities in a lesson (except in lesson 1, where there is no take home activity)

ii) There are two types of activities presented in connection with the take home lessons

a) Teacher-directed activities in which the teacher directs the children in the steps involved in working an activity. The teacher-directed activities involve daily story reading and directions for new types of activities that will appear in the take home lessons. The teacher-directed activities are part of the daily lesson.

b) Independent activities in which the children work without help from the teacher. Most of the take home activities are independent tasks

c) The take-home activities appear as the last series of tasks in the daily teacher presentation lesson and should take from 15-20 minutes to complete

d) All directions for presenting take-home activities appear in the Teacher's Presentation Book for each lesson. The directions indicate what should be said to the child and the kinds of responses the children are to produce

D) Teacher's Take Home Book

i) The Teacher's Take Home Book is a duplicate of the Student's Take Home Book, and contains the answers to all student take home activities

2) Distar Reading II

A) Teacher's Guide for Reading II

i) Provides rationale for each skill taught in Reading II and detailed information on how to teach the program and how to correct when the children make errors.

B) Four Teacher Presentation Books for Reading II

i) Specifies each task in each lesson to be presented to the children. The books provide information which tell the teacher what to do and say, the acceptable child responses, and correction procedures for every task

Book A - Lessons 1-40
Book B - Lessons 41-80
Book C - Lessons 81-120
Book D - Lessons 121-160

C) The Spelling Book

i) Contains instructions to the teacher presented in 160 lessons. Tasks are specified according to the same conventions as those used in the Teacher Presentation Books for the reading lessons. Each spelling lesson requires 10-15 minutes

D) Four Storybooks for Reading II

i) Storybooks are used by the children and are softbound and reusable.

E) Three Take Home Books for Reading II

i) Each child has one set of these books. They contain seatwork for each of the 160 lessons in Reading II

F) Teacher's Take Home Book

i) A duplicate of the Student Take Home Book, which contains answers to all exercises

3) Miscellaneous

A) Group Progress Indicators

i) Allows the teacher to mark the last lesson completed by each child

B) Acetate Protector

ii) Can be placed over the pages of the Teacher Presentation Book to protect them from smudges

IV) Fast Cycle Skills

1) Sounds

A) Letter symbols are taught as sounds. Letter names are not taught. Sounds exercises appear in lessons 1-70.

2) Sat It Fast

A) This is a verbal task as it involves no symbols. The teacher says a word slowly, the children identify the word, saying it at a normal speaking rate. Say It Fast exercises are presented during lessons 1-6.

3) Say The Sounds

A) This is a verbal task in which the children say the sounds in a spoken word with the teacher (aaammm). Then they say the word fast (am). Say The Sounds exercises appear in lessons 1-4.

4) Sound It Out

A) This prereading skill teaches the children basic word soundout behavior. This exercise involves written words which appear in the children's take-home activity. They may be merely sound blends such as ēs. The children touch under each of the sounds and say the sounds as they touch under them (ē ē ē sss). The children do not identify the word in the Sound It Out exercise. Sound It Out exercises appear in lessons 3-6.

5) Rhyming

A) For these exercises, the children first identify a sound (m). They then rhyme with a specified ending such as (ē). The teacher touches the symbol and the children say mmmē. Then the children say the word fast (me). Rhyming exercises appear in lessons 1-10.

6) Word Reading

A) Word Reading begins in lesson 6 and continues through lesson 70. There are 26 different systems of presenting the word that is to be read. Initially the Word Reading exercises involve using the skills that have been taught in Sound It Out and Say It Fast. As the teacher touches under each sound (m, at) the children identify the sounds of the words without pausing between the sounds (mmmat). The children then say the word fast (mat). In later exercises, the children are taught to read words the fast way without sounding them out. Some of the early word reading exercises (lessons 6-17) involve take home exercises. The children touch the sounds of a word and say the sounds without pausing between the sounds. They then say the word fast.

7) Stories
   A) Stories are introduced in lesson 11 and continue through lesson 70. The children read the stories a word at a time, following the procedures used in Word Reading. The teacher asks comprehension questions about the content of each story (the questions are specified in the Teacher Presentation Book). Initially, stories are only a few words in length. By lesson 70, the children are reading stories that are about 160 words long

8) Independent Take Home Activities
   A) Designed to give the children practice in working independently and to reinforce the skills that have been taught during the teacher directed activities presented in each lesson
      i) Take Home Activity Skills
         a) Sound writing
            - Appears in lessons 2-70. The children write the sounds that have been presented in the sounds exercises
         *b) Pair Relations
            - Appears in lessons 2-57. The purpose of these exercises is to teach the children how to match something that appears in a picture with the appropriate written word. The exercise initially involves fixing up boxes so that they match a model box. A model box may be a m . The children are presented with different boxes such as m which must be fixed up. Later, pair-relations exercises involve pictures and sentences. The children cross out sentences that do not tell about the picture
         c) Story and Sentence Copying
            - Appears in lessons 11-34. A model sentence exactly like or similar to a sentence read in the story appears on the take home exercise. The children copy the sentence on spaces below the model sentence
         d) Sound Matching
            - Appears in lessons 12-34. Two columns of familiar sounds are presented. The order of sounds in each column is different. The children draw lines from each sound in the left column to the corresponding sound in the right column
         e) Word Matching
            - Appears in lessons 18-51. The format is similar to that of Sound Matching, except that two columns of familiar words are presented. The children draw

lines from each word in the left column to the corresponding word in the right column

f) Reading Comprehension
- Appears in lessons 52-70. A short reading selection appears in the take home. Following the selections are items that test the child's comprehension of the material. The children read the selection independently and answer the questions.

g) Story Items
- Appears in lessons 59-70. Items that test the comprehension of the story read during the lesson appear on the worksheet. The children independently read the items and answer them

PROCEDURE FOR DISTAR READING II FAST CYCLE

1. Read each lesson before administering to child. Make note of specific teacher and pupil directions. Notice where the lesson begins and ends.

2. Administer one 30-40 minute lesson per day along with one take-home exercise (except for lesson 1, where no take-home exercises are provided).

3. Read the Sounds Chart on page 8 of the Teacher's Guide so that you introduce the sounds correctly to the child. (Remember, only letter sounds are used; letter names are not taught.)

4. Carefully follow the directions in the Teacher Presentation Book; read the directions to the child exactly as given in the text.

5. If a child performs a task incorrectly (i.e., an inappropriate response to signal, delaying before saying the sound, responding before sound is touched, continuing to respond after touch is released, etc.), go to the correction instructions and administer as given until the child can respond correctly.

6. Each lesson is to be taught to criterion, meaning that at the conclusion of any task, every child should be able to perform the task by himself, without any need for correction. Children are "at criterion" or "firm" on a task only when they can perform immediately with the correct response. Continue with the task until the child can perform at criterion level.

7. The child receives 1500 points for completing the Teacher Presentation lesson and 1000 points for completing the Take Home activity (the Tutor should work with the child until the child has completed the Take Home activity to 100% criterion). Remember to use praise whenever the child makes a correct response concurrently when administering points.

8. Where exercises indicate that different children should be called upon, do the task with the given individual child (change the wording of directions when necessary for this deviation).

9. If a child does not reach criterion on a given task, note this on the child's folder and state that the task should be reviewed on the following day.

10. If the child has been attending and is having difficulty with a particular task, give him the full 2500 points, although he has not reached criterion on all tasks within the lesson. If the child has not been attending, subtract 1000 points from his point total for the session for failure to reach criterion level on all tasks given.

BEHAVIORAL CRITERION

DISTAR READING II FAST CYCLE

	Yes	No
1. Tutor reviews lesson before administering to child		
2. Tutor reviews sounds on Sound Chart (page 8, Teacher's Guide)		
3. Tutor reads the directions from Teacher Presentation Book exactly as given		
4. Tutor gives directions from Teacher Presentation Book exactly as given		
5. If child performs a task incorrectly Tutor reads correction instructions to the child		
6. Tutor administers lesson until child is able to perform task by himself without any need for correction		
7. Tutor administers 10-15 minute Take Home activity after completion of lesson		
8. Tutor administers praise and points for completion of work and reaching criterion level		

THE READING ATTAINMENT SYSTEM (RAS)

1 AND 2

I). Contents
- A) 20 color coded, graded reading selections
- B) A 10-question, multiple choice reading comprehension check
- C) 120 skill cards containing a glossary as well as vocabulary and word attack drills
- D) Answer keys for the comprehension checks and skill cards
- E) A pronunciation guide wall chart
- F) An instructor's manual
- G) A reading shelf with compartments and color keyed dividers
- H) 30 reader record books to record answers to the reading checks and skill cards; a progress plotter to record the number correct on reading check and skill cards

II) Grade Level of Reading Selections (Reading Attainment System 1 - Levels 3.0-4.5)
- A) Red - 3.0-3.2
- B) Orange - 3.3-3.5
- C) Brown - 3.6-3.8
- D) Green - 3.9-4.1
- E) Blue - 4.2-4.3
- F) Purple - 4.4-4.5

III) Grade Levels of Reading Selections (Reading Attainment System 1 - Levels 4.6-6.5)
- A) Maroon - 4.6-4.8
- B) Orange - 4.9-5.2
- C) Grey - 5.3-5.5
- D) Green - 5.6-5.9
- E) Blue - 6.0-6.2
- F) Violet - 6.3-6.5

IV) Reading Selections (20 for each color coded group)
- A) Designed to appeal to student interests
- B) Color coded for reading level (Teacher's Manual)
- C) Title Examples and Descriptions (pages 45-55 - RAS 1) (pages 46-57 - RAS 2)
  - 1) Sample titles
    - a) RAS 1 (Training a Cop, I Hit Him in Self Defense)
    - b) RAS 2 (What Kind of Shape is Your Car In, Hypnosis, Pete Grey - The Impossible Baseball Player)

V) Reading Checks
- A) Tests of comprehension skills contained at end of selection
- B) Questions 1 and 2 (Understanding of the story as a whole)
- C) Questions 3-8 (Literal meaning - factual questions; recall of specific incidents)
- D) Questions 9-10 (Inferential questions, drawing conclusions, broader implications of materials in selections)

VI) Skill Cards
- A) Vocabulary Building
  - 1) Glossary with unfamiliar words
  - 2) Glossary exercises
    - a) Definitions
    - b) Use in story
    - c) Use in glossary sentence
- B) Word Attack Skills (Teacher's Manual) (pages 57-60 - RAS 1) (pages 58-60 - RAS 2)
  - 1) Filling out incomplete sentences with words from glossary
  - 2) Identification of synonyms
  - 3) Identification of antonyms
  - 4) Identification of homonyms
  - 5) Contractions and possessives that use apostrophes
  - 6) Alphabetization
  - 7) Prefixes
  - 8) Suffixes
  - 9) Spelling

VII) Reader Record Book
- A) Child records answers to reading check and skill cards
- B) Progress plotter
  - 1) Child records the number correct on reading check and skill card for each selection

VIII) The Answer Keys
- A) Keyed to color and number of reading selection
- B) Self correcting
  - 1) Reading check - Side 1
  - 2) Skill card check - Side 2

IX) Pronunciation Wall Guide
- A) Difficult to pronounce words from each selection
- B) Words on wall chart should be reviewed with child before he reads selection

PROCEDURE FOR USE

OF THE READING ATTAINMENT SYSTEM

1) Child is greeted and told that he will be working on the Reading Attainment System today.

2) All selections from the child's color group are removed, page of manual describing each selection from color group is opened, and child is given three minutes to choose a selection

3) If selection is not chosen within this time period, the lab manager chooses the selection for the child (i.e., selection should be somewhat consonant with the child's interests).

4) The child is then given the skill card that corresponds with the reading selection chosen.

5) The child also must receive his Reader Record Book where he writes the date, title of selection, color, and number, and answers to the reading check and skill card.

6) The child is told that he will have 25 minutes to complete: the reading selection reading check and skill card.

7) In addition, he is told that if he needs help with pronunciation, vocabulary, etc., to consult the lab manager or assistant.

8) When the time period has ended, or when the child has completed all of the above, he brings the selection to the lab manager or assistant. The child receives praise, points, and/or candy for completion.

9) The lab manager and child together use the color coded key to correct the reading check and skill card.

10) The lab manager then reviews the correct answers (how or why they were obtained) with the child.

11) The lab manager praises the child for his correct responses, and administers an additional 1000 points and/or an edible if the child has reached a 90% criterion level on both reading and skill check.

12) The child and lab manager then plot the number of correct responses on the Reading Check and Skill Card on the Progress Plotter (large dots should be used).

13) If the child receives 90% on both the Reading Check and Skill Card for four successive selections, he moves ahead to the next higher color group. The child receives much praise for this advancement.

Name: Date:

BEHAVIORAL CRITERION TEST

THE READING ATTAINMENT SYSTEM

		Yes	No
1. Selection of passage Three minutes for child or selection by lab manager	1.		
2. Use of pronunciation guide	2.		
3. Child is given Skill Card	3.		
4. Child is told to consult lab manager if he needs help	4.		
5. 25 minutes is given for completion of passage, reading, and skill check	5.		
6. At completion of reading check and skill cards, praise, points, and/or edibles are administered	6.		
7. Correction of reading check and skill card by child and lab manager	7.		
8. If child reaches 90% criterion, additional praise, points, and/or edibles are administered	8.		
9. Child and lab manager plot child's progress	9.		

Criterion Score: 9/9

SUPPLEMENTARY READING SERIES

I) Enrich Sports' Series - Motivations to Read (Cartridges TOI-1 through TOI-5)
   A) Performance Levels
      1) For students reading at grade levels 3-4
   B) Contents
      1) TOI-1 Football
      2) TOI-2 Baseball
      3) TOI-3 Basketball
      4) TOI-4 Soccer
      5) TOI-5 Track and Field
   C) Elaboration of Contents
      1) This kit is designed to provide practice in reading skills by capitalizing on student's natural interest in sports
      2) Students gain basic sports knowledge of football, baseball, soccer, track, and field
      3) Students are motivated to improve such reading skills as word recognition, vocabulary, word attack, and use of context and visual clues
      4) The low reading level and mature content of the kit makes it appropriate for a wide range of ages and interest levels

PROCEDURE FOR ENRICH SPORTS SERIES

1) Have student go through each individual cartridge
2) Administer 1500 points for completion of cartridge
3) Administer posttest after each cartridge
4) If student receives 90% criterion level on posttest, he receives an additional 1000 points and moves on to the next cartridge during the subsequent lesson
5) If student receives a score below 90%, he must redo cartridge and retake posttest during the next lesson

SRA READING LABORATORY 3A

I) Contents
   A) 150 different Power Builders, 15 in each of 10 reading levels
   B) Power Builder Key Cards
   C) 150 Rate Builders, 15 in each of 10 reading levels
   D) Rate Builder Key Bookets
   E) Student Record Books
   F) One Teacher's Handbook
   G) Colored Pencils

II) The Power Builders
   A) The Power Builders contain:
      1) An illustrated story that provides reading practice
      2) A How Well Did You Read section that develops comprehension skills in three general areas: information gathering, inference making, and critical evaluation
      3) A Learn About Words section that develops student's vocabulary through the use of context clues and semantic variation
      4) A What's Your Story section that encourages creative expression
   B) The reading levels are color coded and correspond to the following grade levels. All selections within a level are of equivalent difficulty
      1) Blue - 3.5
      2) Purple - 4.0
      3) Rose - 5.0
      4) Orange - 6.0
      5) Gold - 7.0
      6) Brown - 8.0
      7) Tan - 9.0
      8) Lime - 10.0
      9) Green - 11.0

      However, the entire kit was designed for junior high school students (grades 7-9) reading at these diverse levels.

III) The Power Builder Key Cards
   A) The Power Builder Key Cards correspond to the Power Builders in color and number, enabling each student to check his own work

IV) The Rate Builder Key Booklets
   A) The Rate Builder Key Booklets are designed to help students read faster and with greater concentration. Each consists of a short selection and a comprehension check. Students are allowed three minutes to read the selection and answer the check items. There are 150 different Rate Builders, 15 in each of the 10 reading levels. The reading levels and the identifying colors correspond to those of the Power Builders

V) The Rate Builder Key Booklets
   A) The Rate Builder Key Booklets enable each student to correct his own work as soon as he finishes

VI) The Student Record Book
- A) The Student Record Book provides record pages for the student's responses to the Power Builder and Rate Builder checks and charts on which he graphs his progress
- B) The Student Record Book also contains the Starting Level Guide with which the teacher can determine the color level at which each student should start
- C) The Teacher's Handbook contains complete directions and rationale for the introduction and operation of the Reading Laboratory. It also contains the Listening Skill Builders - selections to be read aloud to help students understand, retain, and analyze what they hear

VII) The Colored Pencils
- A) The colored pencils enable students to graph their progress in the color of the level in which they are working, making progress obvious at a glance

PROCEDURE FOR USE

OF THE SRA READING LABORATORY 3A

1. Administer the Starting Level Guide on pages SLG 1-4 (after page 34) in the Student Record Book. The paragraph on SLG 1 is an example. Give the child one minute for completion of this item. See page 15 in the Teacher's Manual for further directions. Give the child three minutes to read and answer the questions for each of the two following passages. Stop the child after each three-minute period has elapsed and tell him to go on to the next passage. The answers to the Starting Level Guide are in the inside back cover of the Teacher's Manual.

2. Use the chart on page 16 of the Teacher's Manual to direct the child to the appropriate color. Placement depends upon the child's grade and the number correct on the Starting Level Guide.

3. On the front cover of the Student Record Book, circle the color that the child will begin at. Each day, circle the number of the Power Builder and Rate Builder that the child has completed. When the child moves on to another color, be sure to circle the appropriate color level indicating this progress on the Daily Progress Chart.

4. Give the child all 15 selections for his color code and have him select one of his choice. If the child is doing a Power Builder for the first time, work through the How Well Did You Read and the Learn About Words sections with him. During the summer session, omit the What's Your Story items. Once the child has worked with the Power Builders, alow him to complete the exercises on his own, giving assistance when necessary.

5. Record the time that the child begins reading and the time that he completes the reading selection. Tell the child to remind you of this interval by saying start and finish to designate this period. Also have the child say start and finish when he begins and ends the written exercises. Record these intervals on his Student Record Book.

6. When the child has completed all exercises from his selection, correct his work using the Power Builder Key Card that corresponds with his selection.

7. When the corrections are completed, the child is given the Rate Builder which corresponds to the number of the selection chosen. He is given three minutes to complete the reading selection and exercises. When the child has completed this task, correct his exercises using the Rate Builder Key Booklet containing the answers that correspond to each Rate Builder.

8. The child must reach 90% criterion on both the Power Builder and Rate Builder on six consecutive selections in order to move on to the next color coded level.

9. The child receives praise for completion of assignment and edibles and/or points for reaching 90% criterion level. If he does not initially reach 90% criterion, he can go back and correct his answers. The rationale for all incorrect responses is then reviewed with the child.

10. After completion of the selection, the child charts his progress on the Power Builder Progress Chart at the back of his Student Record Book.

11. Have the child record the percentage correct on the comprehension questions (How Well Did You Read?) and the vocabulary questions (Learning About Words). You can use the conversion table to compute these percentages. Use the colored pencils, which correspond with each reading level, to make a bar designating the percentage correct (see page 68 in the Student Record Book).

12. Subtract the starting time from the ending time to compute the reading and working time each day. Designate reading time with an 0 and working time with an X.

13. Have the child chart his percentage correct on the Rate Builder Progress Chart on the front cover of the Student Record Book. Again use the bar lines with the appropriate colored pencil for the child's reading level.

BEHAVIORAL CRITERION

SRA READING LABORATORY 3A

			Yes	No
1.	From the Starting Level Guide the child is assigned to the appropriate color coded reading selections.	1.		
2.	The lab manager looks at the front cover of the child's Student Record Book to determine his current reading level.	2.		
3.	The child is given all 15 selections of his appropriate color level.	3.		
4.	The time the child starts and finishes his reading selections as well as the time he starts and finishes his exercises are recorded.	4.		
5.	The child is given any necessary assistance in completing the assignment.	5.		
6.	When the child has completed the Power Builder and exercises, his assignment is corrected using the color coded Power Builder Keys.	6.		
7.	The child is then given the Rate Builder which he completes within three minutes.	7.		
8.	The child's Rate Builder exercises are then corrected using the Rate Builder Answer Key.	8.		
9.	The child is administered praise, points, and/or edibles for reaching 90% criterion level. He then gets a second chance to correct his answers (if he had not originally reached criterion level).	9.		
10.	All incorrect answers are then reviewed and the rationale for the correct answers is given.	10.		
11.	The child's progress on the Power Builder and Rate Builder, as well as the reading and working time are then plotted on the Progress Charts in the Student Record Books.	11.		

SRA VOCABULAB 3

I) Contents
   A) 1 Teacher's Handbook
   B) 150 Vocabu-builders, 90 of which are duplicates
   C) 20 Explorawheels (all duplicates)
   D) 16 Key Booklets (all duplicates)
   E) 1 Student Record Booklet
   F) 1 Phonograph Record
II) The Teacher's Handbook
   A) The Teacher's Handbook is a guide to the use of the Vocabulab. Pages 7-26 are most relevant to the Vocabulab as used in the Learning Laboratory.
III) The Vocabu-builders
   A) There are 60 different Vocabu-builders for 10 interest areas at 6 levels, A-F: ranging from the 4th through 9th grade level (although all material is geared to houngsters of junior high school level, grades 7-9).
   B) Each Vocabu-builder is a four-page illustrated booklet composed of a story and accompanying exercises.
      1) Interest Areas of Selections (pages 39-43, Teacher's Manual)
         a) Bringing People Together
         b) History Makers
         c) World of Work
         d) Other People, Other Lands
         e) Understanding Self and Others
         f) The Arts
         g) Science and Invention
         h) Animals
         i) Language
         j) Sports
      2) Color Coding
         a) Level A - Orange (4th grade)
         b) Level B - Yellow (5th grade)
         c) Level C - Green (6th grade)
         d) Level D - Blue (7th grade)
         e) Level E - Purple (8th grade)
         f) Level F - Tan (9th grade)
      3) Symbols
         a) Each interest area has an easily identifiable symbol so that the student can tell at a glance the area to which a particular Vocabu-builder belongs. For example, the symbol representing an animal footprint indicates the interest area dealing with animals.
      4) Vocabu-builder Exercises
         a) Exercises A and B: determining the meaning of words through context
         b) Exercise C: deals with previxes
         c) Exercise D: deals with roots
         d) Exercise E: deals with suffixes
         e) Exercises F, G, and H: deal with synonyms, homonyms, and antonyms

f) Exercise I: deals with idioms
g) Exercises J and K: deal with the Explorawheel, constructing words, poems, figures of speech, or word categories

IV) The Explorawheel
A) The Explorawheel is a manipulative device that enables the student to put together word parts to form whole words. Each Vocabu-builder has one exercise in which the Explorawheel must be used

V) The Key Booklet
A) The Key Booklet is a listing to all scorable exercises that are a part of each Vocabu-builder

VI) The Student Record Book
A) The Student Record Book contains all of the student's responses to the exercises in the Vocabulab and a record of his achievements
B) Contents
1) The Starting Level Guide (pages 14 and 15, Answers on page 37 of the Teacher's Manual) is to be used as an aid for determining where each student is to start in the laboratory, i.e., Levels A, B, or C
2) The Ending Level Guide (page 26, Answers on page 38 of the Teacher's Manual) intended for use at the conclusion of work in the laboratory
3) The Vocabulab starter which is a sample Vocabu-builder to be used by all students as an introduction to work in the laboratory
4) A section of orientation materials (pages 5-13)
5) A Program Pattern Chart for recording the student's progress in the Vocabulab

VII) The Phonograph Record
A) The record, World of Words, is the audio introduction to a study of words in general and to the Vocabulab in particular

PROCEDURE FOR USE

OF THE SRA VOCABULAB 3

1) Have child take the Starting Level Guide on pages 14 and 15 of the Student Record Book. Correct using answer key on page 37 of the Teacher's Manual.

2) The level at which the child misses five or more items out of a total of 15 is his starting level.

3) Direct the child to the appropriate color keyed selection, A, B, or C.

4) Give the child all selections from his appropriate initial color keyed level.

5) Inform the child that there are 10 different interest areas (during his first session with use of the kit). Have the child read through the directory of interest areas on pages 8-10 in his Student Record Book. Also inform the child of the symbols which designate each interest area.

6) Have the child read the selection. Do the first set of exercises with him in order to introduce him to the new terminology, manner in which questions are written, etc., in order to assure that he will be successful with the assignment.

7) Introduce the child to the Explorawheel (when the questions dealing with this device appear). Allow the child to turn the wheel to gain familiarity with its operation. Help the child do the first few exercises that require the use of this wheel.

8) When the child has completed the exercises, correct his work using the Key Booklet provided in the kit. Criterion level for these exercises are 2/3 (20 out of 30, 26 out of 40 correct). Allow the child to go back over his incorrect answers if he does not reach criterion level. Then feview the correct answers with the child in order that he see how the answers were achieved.

9) Record the number correct below the total on the Program Pattern Chart. Also record the date on which the exercise was completed.

10) The child moves on to the next color level only after he reaches criterion on 5 consecutive selections within a color level.

11) After the child has progressed through the entire Vocabulab, administer the Ending Level Guide (page 26 of the Student Record Book, Answers on page 38 of the Teacher's Manual).

12) If the child misses 5 or more answers on any level (A, B, or C), have him redo 4 exercises within each level missed. Then have the child retake the Ending Level Guide to assure that remediation has occurred.

BEHAVIORAL CRITERION

SRA VOCABULAB 3

			Yes	No
1)	Lab manager administers the Starting Level Guide and assigns child to the appropriate starting level, A, B, or C.	1)		
2)	The lab manager gives the child all selections from his appropriate color coded level.	2)		
3)	The child is informed of the interest areas and symbols from each of these areas.	3)		
4)	The lab manager directs the child to read the selection.	4)		
5)	If the child is working with the Vocabulab for the first time, the lab manager does the first set of exercises with the child. If the child is already familiar with the Vocabulab, the lab manager assists the child with exercises when needed (informing him beforehand that help is available).	5)		
6)	The lab manager and child use the Explorawheel to solve the appropriate exercises.	6)		
7)	The lab manager corrects the child's work using the Key Booklet.	7)		
8)	If the child reaches criterion, he receives praise and/or edibles for completion and correctness of response. If the child does not reach criterion, he is allowed to go back and correct his work.	8)		
9)	The lab manager reviews all incorrect answers with the child.	9)		
10)	The lab manager and child record the number correct below the total in the Program Pattern Chart at the back of the Student Record Book.	10)		

SRA SPELLING WORD POWER LABORATORY

2b, 2c, 3a

I) Contents
- 1 Teacher Manual
- 81 Learning Wheels, 21 of which are duplicates
- 44 Check Tests, 2 each of 22 different tests
- 44 Check Test Key Cards, 2 each of 22 different key cards
- 1 Student Record Book

A) The Learning Wheels
1) 60 different Learning Wheels divided among the 11 levels of the laboratory. The letters are designated by color and letter (e.g., colors orange through purple, i.e., Orange-A, A-1 through A-6). See back of Student Record Book. Duplicates of the most frequently used learning wheels are provided
2) Each wheel has two tracks (lists of problems) that can be used interchangeably (e.g., A-1, Tracks I and II) to increase the availability of each wheel. Track II of a Learning Wheel is printed on the back of Track I of a different Learning Wheel.
3) The Homonyms Level (HX-1 through HX-6) is a list of frequently misspelled homonyms (words that sound the same but are spelled differently and mean different things)
4) The Tricky Words Level (T-1 through T-6) provides practice with troublesome words that in many cases cannot be patterned or covered by rules

B) The Check Tests and Key Cards
1) There are 2 Check Tests for each color level (e.g., Check Test A and Check Test AA). Thus if a student needs a retest at any learning level, he may use forms that are equivalent in difficulty. The student takes a Check Test after he has completed a color (or letter) level
2) When the Check Test has been completed, the test is scored with the appropriate answer key for that level. Key Cards provide the correct answers for the Check Test questions

C) The Student Record Book
1) The Student Record Book contains all the child's spelling responses and his record of achievement, except for his writing of misspelled words (which he does on a separate paper) and his answers to the Spelling Achievement Tests. The book contains:
   a) a placement guide for determining where each student is to start in the laboratory
   b) a program chart (back cover) to record what the student has completed and what he still needs to study
   c) a section of orientation material

d) pages on which the student is to write responses to Learning Wheel exercises and Check Tests
e) a Word Usage section for added instruction and enrichment, with correction keys
f) discussion pages (will not be used)

D) Performance Levels
1) Spelling Laboratory 2b - Grade Levels 4-5
2) Spelling Laboratory 2c - rade Levels 6-7
3) Spelling Laboratory 3a - Grade Levels 7-9

PROCEDURE FOR USE

OF SRA SPELLING WORD POWER LABORATORY 2b, 2c, 3a

1) Lab managers administer the Spelling Placement Guide to each student.
2) From items incorrect on the Spelling Placement Guide, the lab manager circles (on the last page of the Student Record Book) those cards that must be completed by the child (e.g., if the child gets any items number 1-5 incorrect on the Spelling Placement Guide, he must do card A-1).
3) The lab manager has the child do Spelling Hints (pages 9 and 10) of the Student Record Book. He gives the child points and edibles for completion, then corrects the assignment using the key on page 21 of the Teacher's Manual.
4) The lab manager then gives the child Track I or II of the first Learning Wheel in the child's starting color.
5) The lab manager has the child read the card and answer the instructional examples (A, B, C, D, E) on the Learning Wheel panel. The lab manager then corrects these examples (pages 44 and 45 of Teacher's Manual has answers) before the child goes on with the rest of the card.
6) If the child gets the examples correct, he continues with the problems that appear in the window of the Learning Wheel. If the child gets any of the examples incorrect, the lab manager explains the spelling concept to the child, reviewing the information given on the Spelling Wheel.
7) The child then turns the Spelling Wheel until the first spelling problem shows in the window of the wheel. The child writes the word on the Learning Wheel record page in the Student Record Book. He then turns the wheel again and finds the correct spelling. If the child's spelling of the word is correct, he moves on to the next word. If the word is incorrect, he must write the word three times on a given piece of notebook paper. The child receives points and edibles for completion of assignment.
8) When the child has completed a Learning Wheel, he crosses it out at the back of his program chart - A-1 - Track I
A-11 - Track II
9) The lab manager then gives the child an oral test on the words just studied on the Learning Wheel (only when the child is not about to complete a color level, since at those times he goes on to assignments in items 10, 11, and 12). The child receives points and edibles for reaching 90% criterion on this oral spelling test. Scores are plotted and
10) When the child completes all Learning Wheels for a given level, he does the alphabetization page for that level. The lab manager then corrects the alphabetization page (using the key on page 62 of the Student Record Book). The appropriate number of points and edibles are given for completion of assignment and for reaching 90% criterion on this exercise.

11) After completion of a color level, the child also does a Word Usage page for that level, i.e., A - Wu-1, B - Wu-2, etc. The child receives points and edibles for completion of assignment and additional points and edibles for reaching 90% criterion. Answers to Word Usage problems are located on pages 60 and 61 of the Student Record Booket.
12) Finally, after the completion of a given color level, the child takes the Check Test for that level. The Check Test uses either single or double letters, e.g., A or AA (both test the same concepts). The child receives points and edibles for completion of the Check Test and additional points and edibles for reaching 90% criterion level. The answers to the Check Tests are located in the Spelling Laboratory box.
13) The child continues in the Spelling Laboratory according to his results on the Check Test. If he misses no more than one word on any Learning Wheel, he moves to the next higher color. If he misses more than one word on any Learning Wheel, he reviews the Learning Wheel for these words, using Track II if he had used Track I previously.
14) If the child must redo one or more Learning Wheels within a given color, he retakes Check Test 2 (AA for example) when he has again completed the appropriate Learning Wheels.
15) The Lab Manager plots the child's progress in each Check Test on the Progress Chart at the back of the Student Record Book.

BEHAVIORAL CRITERION

SPELLING WORD POWER LABORATORY 2b, 2c, 3a

			Yes	No
1.	The lab manager looks at Program Chart of the Student Record Book and gives the child Track I or II of the child's starting color.	1.		
2.	The lab manager has the child read the card and answer the instructional examples (A, B, C, D, E) on the Learning Wheel panel.	2.		
3.	The lab manager then corrects these examples before the child goes on with the rest of the card.	3.		
4.	If the child gets the examples correct, he continues with the problems that appear in the window of the Learning Wheel. If the child gets any of the examples incorrect, the lab manager explains the spelling concept to the child, reviewing the information given on the spelling wheel.	4.		
5.	The lab manager has the child turn the Spelling Wheel until the first spelling problem shows in the window of the wheel. The child writes the word on the Learning Wheel record page in the Student Record Book. He then turns the wheel again and finds the correct spelling. ~~If~~ the child's spelling of the word is incorrect, he must write the word three times on a given piece of notebook paper. The child receives points and edibles for completion of assignment.	5.		
6.	When the child has completed a Learning Wheel, he crosses it out on his Program Chart (at the back of his record book).	6.		
7.	The lab manager then gives the child an oral test on the words just studied on the Learning Wheel (only when the child is not about to complete a color level). The child receives points and edibles for reaching 90% criterion. Scores are plotted on graph provided.	7.		
8.	If the child has completed all Learning Wheels of a given level, he is given the alphabetization page for that level. The lab manager then corrects the alphabeti-	8.		

	Yes	No
zation page. The appropriate number of points and edibles are given for completion of assignment and for reaching 90% criterion level.		
9. After completion of a color level, the child also does a word usage page for that level. The child receives points and edibles for completion of assignment and additional points and edibles for reaching 90% criterion level.	9.	
10. After completion of a given color level, the child takes the Check Test for that level. The child receives points and edibles for completion of assignment and additional points and edibles for reaching 90% criterion level.	10.	

CONSONANT AND VOWEL SOUNDS KIT

I) Contents

A) Sound cassettes combining music, sound effects, and narration to teach phonics. Each cassette first introduces the alphabet, then the concept of consonants, vowels, and diacritical markings, and the sound of the letters in the story. The student works along with a corresponding letter card. The story begins with the listener, using the Telor and the corresponding visual cartridge.

B) Visual cartridges, interchangeably used in the Telor, which pictorially carry out the theme heard in the story portion of the corresponding sound cassette. Each skill is individually introduced and pictured. Then the combined skills are reviewed and tested.

C) Letter cards, which reinforce the alphabet, emphasize the consonants, utilize diacritical markings for short and long sounds, and direct the user's attention to the sound of the particular letters to be taught in that lesson. The letter card is used with the corresponding cartridge during a four-minute introductory narrative concerning consonants, vowels, or short and long sounds, prior to the use of the visual cartridge lesson with the cassette narrative.

D) Performance evaluators are to be used as posttests for each specific lesson (consisting of cassette, cartridge, and letter card.

E) Performance Evaluators are to be used as-pre and posttests for each kit (one for each beginning sound, one for each ending sound, one for each long vowel, and one for each short vowel).

II) Lesson Contents

A) Consonant Sounds
1) Lesson: p-j-d-g (15:10) Sounds of a Party
2) Lesson: b-k-c-y (15:53) Sounds of a Beach Party
3) Lesson: s-n-f-r (15:17) Sounds of a Parade
4) Lesson: h-q-v-w (16:26) Sounds of the Haunted House
5) Lesson: z-l-x-m-t (17:09) Sounds of a Trip to the Zoo

B) Vowel Sounds
1) a (16:26) Sounds of Astronaut Abel's Trip to the Moon
2) e (12:16) Sounds of Engineer Edith's Train Ride
3) i (14:32) Sounds of Inventor Isaac's Laboratory
4) o (15:19) Sounds of Oscar Oldtimer's Adventure
5) u (14:56) Sounds of Umpire Uto's Baseball Game

PROCEDURE FOR USE

OF THE CONSONANT AND VOWEL SOUNDS KIT

1) Administer the total performance evaluator for the Consonant or Vowel Sounds Kit as a pretest. Total points and/or edibles are given.
2) Give child the appropriate lesson materials consisting of cassette, cassette player, Telor programmed learning aid (blank button), cartridge, and letter card.
3) Place cassette in player for child and assure that letter card and four-minute initial narration appropriately correspond.
4) Be sure that after the four-minute initial narration that the child begins using the Telor programmed learning aid and cartridge along with the subsequent narration.
5) Specify to the child that he must inform you when the lesson has ended.
6) Turn off the cassette player and administer praise, points, and/or edibles for completion of assignment.
7) Administer the appropriate performance evaluator as a post-test for the lesson.
8) If the child receives a criterion level of 90% or above, praise, 1000 points, and/or an edible are additionally administered.
9) The child and lab manager then plot the child's score on the graph provided.
10) When the child completes each kit, the total performance evaluator is again administered. Appropriate point totals and/or edibles are given for completion and additional points, praise, and/or edibles are given for reaching 90% criterion. Pre and posttest scores are then graphically represented.

Name: Date:

BEHAVIORAL CRITERION TEST

CONSONANT AND VOWEL SOUNDS KIT

		Yes - No
1) The lab manager initially administers the Consonant or Vowel Sounds Kit pretest evaluator.	1)	
2) The lab manager gives the child the appropriate lesson materials consisting of the cassette, cassette player, Telor programmed learning aid (blank button), cartridge, and letter card.	2)	
3) The lab manager places the cassette in player and assures that the letter card and four-minute narration appropriately correspond.	3)	
4) The lab manager assures that after the four-minute initial narration the child begins using the Telor programmed learning aid and cartridge along with the subsequent narration.	4)	
5) The lab manager specifies that the child inform him when the lesson has ended.	5)	
6) The lab manager turns off the cassetts and administers praise, points, and/or an edible for completion of assignment.	6)	
7) The lab manager administers the performance evaluator as a posttest for the lesson.	7)	
8) If the child achieves 90% criterion, the lab manager administers an additional 1000 points, praise, and/or an edible.	8)	
9) The child and lab manager plot the child's score on the graph provided.	9)	

ARITHMETIC INVOLVEMENT SERIES

(ADDITION, SUBTRACTION, MULTIPLICATION, DIVISION, FRACTIONS, DECIMALS, CONCEPTUALIZATION, AND MATHEMAGIC (BEGINNING ALGEBRA)

I) Contents
   A) Telor programmed learning aid - hand-held, individualized instructional device (Leterred ABCD)
   B) Interchangeable cartridges in which each frame requires a response. If the child slides the appropriate selector forward, the frame will advance. If not, the frame will remain.
   C) Posttests which examine the content presented in the cartridges.

II) Contents of Cartridges
   A) No. E01 - Addition and Subtraction (Cartridges E01-11 through E01-20)
   B) Posttests after cartridges:
      1) E01-11, E01-12
      2) E01-13, E01-14
      3) E01-15, E01-16
      4) E01-17, E01-18
      5) E01-19, E01-20
      6) Give Diagnostic Test of Computational Skills Kit (Addition and Subtraction of Whole Numbers) to place the child on the appropriate further exercises in the above kit
   C) No. E02 - Multiplication (Cartridges E02-11 through E02-12)
   D) Posttests after cartridges:
      1) E02-11, E02-12
      2) E02-13, E02-14
      3) E02-15
      4) E02-16, E02-17
      5) E02-18, E02-19
      6) E02-20
      7) Give Diagnostic Test of Computational Skills Kit (Multiplication of Whole Numbers) to place the child on the appropriate further exercises in the above kit
   E) No. E03 - Division (Cartridges E03-1 through E03-10)
   F) Posttests after cartridges:
      1) E03-1, E03-2
      2) E03-3, E03-4, E03-5
      3) E03-6, E03-7, E03-8
      4) E03-9, E03-10
      5) Give Diagnostic Test of Computational Skills Kit (Division of Whole Numbers) to place the child on the appropriate further exercises in the above kit
   G) No. E04 - Fractions (Cartridges E04-1 through E04-9)

H) Posttests after cartridges:
   1) E04-1, E04-2
   2) E04-3
   3) E04-4, E04-5
   4) E04-6, E04-7
   5) E04-8, E04-9, E04-10
   6) Give Diagnostic Test of Computational Skills Kit (Addition, Subtraction, Multiplication, and Division of Fractions) to further place child

I) No. S01 - Understanding Decimals
   (Cartridges S01-1 through S01-10)

J) Posttests after given cartridges:
   1) S01-1 Place Value Review
   2) S01-2 Learn about 10ths
   3) Decimals and 100ths (S01-3)
   4) Using Decimals (S01-4)
   5) Problems and Practice (S01-5)
   6) Work with Decimals (S01-6)
   7) Decimals: Fractions and Division (S01-7)
   8) More on Multiplication (S01-8)
   9) Equivalent Decimal Fractions (S01-9)
   10) Division by Decimals (S01-10)
   11) Give Diagnostic Test of Computational Skills Kit (Decimals) to further place child

K) No. S03 - Mathemagic (Algebraic Series for Advanced Students)
   (Cartridges S03-1 through S03-5)

L) Posttests after given cartridges:
   1) S03-1 How Do Magic Squares Work
   2) S03-2 Be Your Own Magic Square Maker
   3) S03-3 Sums of Series: How to Add Without Adding
   4) S03-4 Sums of Series: How to Count Without Counting
   5) S03-5 Count by Matching

M) EOM - Basic Math Concepts
   (Cartridges EOM-1 through EOM-15)

N) Posttests after given cartridges:
   1) EOM-1 Sets 1
   2) EOM-2 Sets 2
   3) Addition and Subtraction Concepts 1 (EOM-3)
   4) Addition and Subtraction Concepts 2 (EOM-4)
   5) Multiplication Concepts 1 (EOM-5)
   6) Multiplication Concepts 2 (EOM-6)
   7) Division Concepts 1 (EOM-7)
   8) Division Concepts 2 (EOM-8)
   9) Understanding Fractions 1 (EOM-9)
   10) Understanding Fractions 2 (EOM-10)
   11) Primes and Divisibility (EOM-11)
   12) Addition and Subtraction of Fractions 1 (EOM-12)
   13) Addition and Subtraction of Fractions 2 (EOM-13)
   14) Multiplication and Division of Fractions 1 (EOM-14)
   15) Multiplication and Division of Fractions 2 (EOM-15)

PROCEDURE FOR USE

OF THE ARITHMETIC INVOLVEMENT SERIES

1) Child is greeted and told that he will be working on the Arithmetic Involvement Series (Addition, Subtraction, Multiplication, Division, or Fractions).

2) Child is then given the Telor Learning Aid and the appropriate cartridge. The cartridge is placed in the learning aid by the lab manager.

3) The lab manager must be sure that the first frame of the cartridge shows through the aperture (this is shown by the title of the cartridge appearning on the frame).

4) The child is shown how to work the first two examples (i.e., if he gets the correct answer, the frame will advance; if he does not, it will remain).

5) The child is also told that if he needs help on any of the problems, he should consult the lab manager.

6) The child records his answer to each frame on the paper provided. (The child's name, date, frame number, and arithmetic skill should also be recorded on this paper.)

7) After the child completes one cartridge, he either receives a posttest (if one comes after the cartridge just completed, or a second or third cartridge, after which he receives the posttest. The child is given a maximum of 20 minutes per cartridge.

8) After the completion of each set of cartridges (those encompassed by each posttest), the child is given 5000 points, and/or an edible, as well as much social reinforcement (praise).

9) After the child completes the posttest, the lab manager and child correct the test.

10) If the child reaches a 90% criterion level, he receives an additional 1000 points and/or an edible.

11) The child and lab manager then plot the percentage correct on the child's progress chart (percentage is explained to the child, e.g., "you received 27 out of 30 correct, that's 90%).

12) When the child completes an entire set of cartridges, he takes the appropriate Diagnostic Test of the Computational Skills Kit. The next steps are given under the procedure for the Computational Skills Kit.

BEHAVIORAL CRITERION TEST

ARITHMETIC INVOLVEMENT SERIES

			Yes	No
1.	Child is given Telor programmed learning aid and appropriate cartridge.	1.		
2.	Lab manager assures that first frame of cartridge appears in aperture.	2.		
3.	Child is shown how to work first two examples.	3.		
4.	Child is told that if he needs help, he should consult the lab manager.	4.		
5.	Child is given paper to record answers.	5.		
6.	Child is given a maximum time period of 20 minutes per cartridge.	6.		
7.	After completion of one-three cartridges, the child receives praise, points, and/or edibles for completion of assignment.	7.		
8.	Child is then administered posttest.	8.		
9.	Child and lab manager correct posttest.	9.		
10.	Child is given praise, points, and/or edibles for reaching 90% criterion.	10.		
11.	Child and lab manager plot child's progress.	11.		

Criterion Score: 11/11

COMPUTATIONAL SKILLS DEVELOPMENT KIT

I) Contents
- A) Six pads of Diagnostic Tests ranging from addition with whole numbers to decimals and percentages
- B) Four color groups of exercise cards, blue for whole numbers, yellow for fractional numbers, aqua for decimal numerals, and tan for percentages
- C) 16 reference cards, one for each of the skill areas (which briefly explains the mechanics of each computation)
- D) Student Record Books, which contain:
  1) One Survey Test - Part 1 covers computation with whole numbers and fractional numerals; Part 2 covers computation with decimal numerals and percentages. The Survey Test was designed to uncover the student's arithmetic strengths and weaknesses.
  2) 16 Progress Tests to indicate the progress made in each of the skill areas.
  3) One individual student record on which the child records his progress on each progress test taken

II) The Survey Test
- A) An inventory of computational skills (pages of Student Record Book - only Part 1 is appropriate for Learning House youngsters)
- B) From the problems that are incorrect on the survey test, the child is assigned to one of 16 diagnostic tests. See page 9 of the Teacher's Manual and pages 28 and 29 of the Student Record Book on how to assign child to the appropriate diagnostic test

III) The Diagnostic Test
- A) The Diagnostic Test directs the child to the appropriate exercise cards. Each numbered item on the diagnostic test corresponds to an exercise card. Those numbered items which are incorrect are recorded on page 29 of the Student Record Book. It is these exercise cards, within each area, that the child must complete before he takes the progress test for the skill area

IV) The Reference Cards
- A) The reference cards review the basic computational procedures and demonstrate how to perform the computations given on the exercise cards in each skill area

V) The Exercise Cards
- A) After the child has completed the Diagnostic Test, he begins the appropriate exercise card. He places a paper under the card, works the examples in the aperture, and then corrects his examples with answers on the opposite side of the page
- B) If the child completes the exercise in a-position, his answers will appear on the opposite side in c-position; if he completes the exercise in b-position, his answers will appear on the opposite side in d-position

VI) The Progress Tests
  A) When the child has completed all the needed exercise cards in a given skill area, he takes the progress test for that area
  B) If the child receives 70% or below on the progress test, he must be redirected to the appropriate exercise cards for further practice in that area

VII) The Student Record Book
  A) An item-by-item analysis of the child's score on the Survey Test
  B) An item-by-item analysis of the child's score on each diagnostic test
  C) A record of each set of exercises completed
  D) The progress test scores

PROCEDURE FOR COMPUTATIONAL SKILLS DEVELOPMENT KIT

1) The Survey Test will initially be administered to each child above grade 4.
2) Children will initially be assigned to the fundamental skill areas taught through the Arithmetic Involvement Series.
3) After completion of all cartridges and posttests for a given skill, the child will receive the Diagnostic Test for the kit in which he has received instruction (e.g., a child completing the multiplication cartridges would receive the multiplication diagnostic test).
4) The Diagnostic Test will determine which exercises the child must complete.
5) The child then completes all exercises within the skill area (a paper is placed under the exercise (in position a or b). The child never writes on the exercise card itself.
6) After completion of each exercise card, the child receives points and/or an edible, and much praise for completion of work.
7) The child and lab manager then correct the exercise card (in position c or d) and the child receives an additional 1000 points and/or an edible if he receives 90% or above on the exercise card.
8) The lab manager and child then plot the percentage correct on the exercise card, on the graph provided.
9) After completion of all exercise cards within a given skill area (the child will be given 25 minutes to complete each exercise card), he then takes the progress test for the skill area just practices.
10) If the child does not reach 90% or better on the progress test, he must go back and complete additional exercises in that area. (When the child does not reach 90% on an exercise card, he must also repeat that exercise card until 90% criterion level is reached.)
11) If the child is taking a progress test, he will receive points and/or an edible for completion of the assignment. If he receives 90% or above on this test, he receives an additional 1000 points and/or an edible.
12) After the child has completed the progress test in a skill area (to criterion), he returns to the Arithmetic Involvement Series for exercise in the fundamental skills of a subsequent skill area (order of skill areas to be completed by Tammy, Maria, Brian, and Chris (multiplication, division, fractions, conceptualization, addition, and subtraction) (order of skill areas to be completed by David - addition, subtraction, multiplication, Arithmetic Involvement Series only, division, Arithmetic Involvement Series only, conceptualization).
13) After completing the cartridges and posttests in each skill area of the Arithmetic Involvement Series, the child moves on to the diagnostic test, exercise cards, and progress tests of the Computational Skills Kit.

Name: Date:

BEHAVIORAL CRITERION TEST

COMPUTATIONAL SKILLS DEVELOPMENT KIT

		Yes	No
1. The child is administered the Survey Test (Part 1) and Diagnostic Test of the Computational Skills Development Kit.	1.		
2. The child is assigned to the appropriate exercise card in the Computational Skills Development Kit. Those exercises within the skill area in question are chosen from those recorded on page 29 of the Student Record Book.	2.		
3. The child is given one of the exercise cards needed for remediation and a paper is placed under the exercise card in position a or b.	3.		
4. The child is given 25 minutes for completion of the exercise card.	4.		
5. After completion of each exercise card, the child receives points, edibles, and praise for completion of work.	5.		
6. The child and lab manager then correct the exercise card (in position c or d) and the child receives an additional 1000 points and/or an edible for receiving 90% or above on the exercise card.	6.		
7. The lab manager and child then plot the percentage correct on the graph provided.	7.		

Supplementary Arithmetic Series

1) Sullivan Mathematics Series (California State Series)
   A) Contents
      1) Programmed workbooks in the following areas of mathematics:
         a) Book 1 (Basic Addition)
         b) Book 2 (Advanced Addition)
         c) Book 3 (Subtraction)
         d) Book 4 (Multiplication)
         e) Book 5 (Division)
         f) Book 6 (Fractions)
         g) Book 7 (Decimals)
         h) Book 8 (Measurement)

11) Commercially Sold Flashcards
   A) Contents
      1) Addition
      2) Subtraction
      3) Multiplication
      4) Division

APPENDIX 5

SYLLABLES

Say the word population. It is not just one sound. In saying it you stopped slightly three times in order to change sounds. The word is broken into four natural pieces:

pop u la tion

These natural pieces of a spoken word are called syllables.

Understanding the way syllables are made will help you in spelling and in learning to read new words. What rules can we find out about them?

Every syllable must have one vowel sound. Count the syllables in these words:

head ______	ledge ______
night ______	playing ______
nation ______	lovely ______
treatment ______	piano ______
fullness ______	beautiful ______
fiddle ______	weight ______
various ______	apple ______

Can you see that two or more vowels standing together and making one sound are part of one syllable? For example, ea in head, ea in treat, eau in beau/ti/ful, and ei in weight.

Can you see that the endings are syllables by themselves?

tion	ing	dle
ment	ly	ple
ness	ful	ous

(Cont.)

GENERAL RULES FOR DIVIDING WORDS INTO SYLLABLES:

1. If a word has only one vowel sound, it has only one syllable. Circle the words with only one syllable.

watch	plane	large
opal	dead	flight
height	deadly	slide
able	kitchen	caught

Write three one-syllable words:

________ ________ ________

2. Divide between two like or "twin" consonants standing together. For example, vc/cv. Also there's:

ap/ple	fid/dle
of/fer	nar/row

Can you divide these words?

common	banner	dollar
pattern	rotten	coffee
cotton	button	suppose

3. Usually we divide between two unlike consonants standing together (vc/cv) unless they make a blend as ch, sh.

pub/lish	con/test
car/pet	lum/ber

Divide these words into syllables:

cutlet	person	tablet
picture	signal	escape
harvest	members	perhaps

4. In words which have one consonant between two vowels (vcv), divide before the consonant if the vowel sound is long.

o/bey	e/ven	pi/rate
si/lent		

Divide these words into syllables:

pilot	open	among
spider	divide	select
behave	again	famous

APPENDIX 6

THE NUMBER LINE

0 1 2 3 4 5

1) 0 _ 2 _ 4 _ Write in the missing numbers

0 1 2 3 4 5 6 7 8 9 10

2) 0 1 _ _ _ 5 _ _ _ _ 10 Write in the missing numbers

20 21 22 23 24 25 26 27 28 29 30

3) 20 _ _ _ _ 25 _ _ _ _ 30 Write in the missing numbers

0 1 2 3 4 5 6 7 8 9 10

4) _ _ _ _ _ _ _ _ _ _ _ Write in the missing numbers.

70 75 80 85 90 95 100

5) _ _ _ 85 _ _ _ Write in the missing numbers

6) 0 __ __ 3 __ __ 6 Write in the missing numbers

7) __ __ 40 __ 50 __ 60 Write in the missing numbers

8) _ 10 __ 14 __ __ 20 Write in the missing numbers

9) 0 __ __ 15 __ __ 30 Write in the missing numbers

10) __ 20 __ 40 __ 60 __ __ Write in the missing numbers

11) 60 __ __ __ __ 70 __ __ __ __ 80 Write in the missing numbers

12) _ _ _ 9 __ __ __ Write in the missing numbers

13) 0 1/2 1 1 1/2 2 2 1/2 3

0 1 2 3 Write in the missing numbers

14) 0 1/4 2/4 3/4 1 1-1/4 1-1/2 1-3/4 2

0 ___ ___ ___ 1 ___ ___ ___ 2 Write in the missing numbers

15) 0 1/6 2/6 3/6 4/6 5/6 1

0 ___ ___ ___ ___ ___ 1 Write in the missing numbers

16) 1 _ 1-2/4 _ 2 Write in the missing numbers

17) 0 _ 1 _ 2 Write in the missing numbers

18) 0 ___ ___ 3/8 ___ ___ ___ ___ 1 Write in the missing numbers

19) 1 ___ ___ ___ ___ ___ ___ 2 Write in the missing numbers

20) 0 ___ ___ 1 Write in the missing numbers

NUMBER SYSTEMS

1) The numbers or digits in our decimal place value system are 0, 1, 2, 3, 4, 5, 6, 7, 8, 9.

Name the numbers in our decimal place value system.

_ _ _ _ _ _ _ _ _ _. How many numbers are there? ___

2) The numbers between 6 and 12 are 7, 8, 9, 10, 11. The number(s) between 9 and 11 are/is

3) The numbers between 20 and 30 are

__ __ __ __ __ __ __ __ __.

4) The numbers between 28 and 33 are

5) The number halfway between 20 and 30 is 25.

20 5 below __ __ 25 5 above __ __ 30

There are __ numbers above and __ numbers below __.

6) The number halfway between 30 and 40 is __.

30 __ __ __ __ 35 __ __ __ __ 40

7) The number halfway between 10 and 20 is __.

8) The number halfway between 60 and 80 is __.

9) The number halfway between 0 and 100 is __.

10) Numbers can be named in many ways. For example, two tens and eight ones can be named as 28. 28 can also be named as 28 ones.

Three hundreds, six tens, and eight ones can be named as 368.

Two hundreds, twelve tens, and six ones can be named as 236.

200 - two hundreds (2 x 100)
120 - twelve tens (12 x 10)
6 - six ones (6 x 1)
236

Sixty-five tens can be named as 650 (65 x 10)
Fifty-three tens can be named as ___ (53 x 10)

11) One hundred, sixteen tens and nine ones can be named as

100 one hundred (1 x 100)
160 sixteen tens (16 x 10)
9 9 nine ones (1 x 9)

___

12) Write the numeral for

Eighty-six tens ___

13) Six ones and nine tens ___

14) Three ones, eight hundreds, and no tens ___

15) One hundred, forty-eight tens, and zero ones ___

___ one hundred (1 x ___)
___ 48 tens (48 x ___)
___ zero ones (0 x ___)

___

16) Five thousands, six hundreds, zero tens, and six ones ___

17) Seven thousands, zero hundreds, eight tens, and five ones ___

18) Five hundred, eighteen tens, and six ones

500 five hundreds (5 x ___)
___ eighteen tens (18 x ___)
___ six ones (6 x __)

___

19) Nine hundreds, sixteen tens, and six ones

___ nine hundreds (__ x ___)
___ sixteen tens (__ x ___)
___ six ones (__ x __)

20) Nine thousand fifty-one ___

21) Count by fives starting with 80.

80, 85, 90, 95, ___

22) Count by fives starting with 50.

50 __ 60 __ 70 __ 80.

23) Count by fives starting with 16.

16 __ 26 __ __ 41

24) Count by tens starting with 18.

18 __ 38 __ __ __

25) Count by 30's starting with 8.

8 ___ ___ ___

26) Count by 20's starting with 22.

22 ___ ___ ___ ___

27) If a number is multiplied by 10, a zero is added. If a number is divided by 10, a zero is subtracted.

Examples:

$80 \times 10 = 800$
$6 \times 10 = 60$
$700 \times 10 = 7000$
$800 \div 10 = 80$
$60 \div 10 = 6$
$7000 \div 10 = 700$

If a number is multiplied by 10, how many zeros are added? ___

If a number is divided by 10, how many zeros are subtracted? ___

What is 20 x 10? ___

28) What is 62 x 10? ___

29) What is 59 x 10? ___

30) What is 103 x 10? ___

31) What is 80 ÷ 10? ___

32) What is 500 ÷ 10? ___

33) What is 8000 ÷ 10? ___

34) What is 10,000 ÷ 10? ___

35) If a number is multiplied by 100, two zeros are added. If a number is divided by 100, two zeros are subtracted.

Examples:

6 x 100 = 600	If a number is multiplied by 100, how many zeros are added? ____
80 x 100 = 8000	
48 x 100 = 4800	
600 ÷ 100 = 6	If a number is divided by 100, how many zeros are subtracted? ____
8000 ÷ 100 = 80	
4800 ÷ 100 = 48	

36) What is 9 x 100? ____

37) What is 50 x 100? ____

38) What is 68 x 100? ____

39) What is 200 ÷ 100? ____

40) What is 7000 ÷ 100? ____

41) What is 80,000 ÷ 100? ____

SUBTRACT

42) 100 - 10 = 100
−10

43) 1000 - 10 = ____

44) 2000 - 10 = ____

45) 3000 - 100 = ____

46) 4000 - 10 = ____

47) 5000 - 100 = ____

48) 6000 - 10 = ____

49) 7000 - 100 = ____

50) 8000 - 10 = ____

APPENDIX 7

Name:
Date:

We are interested in your feelings about the following statements concerning Behavior Modification. Reach each statement carefully and decide how you feel about it. Please respond to each item whether or not you have had direct experience with Behavior Modification.

If you strongly agree with the statement, encircle SA below the statement.
If you agree, encircle A below the statement.
If you are undecided or uncertain, encircle ? below the statement.
If you disagree, encircle D below the statement.
If you strongly disagree, encircle SD below the statement.

1. The benefits of Behavior Modification have been exaggerated.
   SA A ? D SD
2. Behavior Modification has unlimited possibilities.
   SA A ? D SD
3. I wish my education was accomplished under Behavior Modification methods.
   SA A ? D SD
4. Behavior Modification is unable to meet the demands of a complex social order.
   SA A ? D SD
5. The extra time involved in dispensing rewards is worth the improvement seen as a result of using Behavior Modification.
   SA A ? D SD
6. Behavior Modification causes too much friction among the children in the classroom.
   SA A ? D SD
7. Behavior Modification helps a child learn how to cope with his environment.
   SA A ? D SD
8. More money should be spent on Behavior Modification programs.
   SA A ? D SD
9. Behavior Modification makes a child stop working when rewards are not available.
   SA A ? D SD
10. Behavior Modification strengthens moral development.
   SA A ? D SD
11. Behavior Modification will advance education to a higher level.
   SA A ? D SD
12. More people would support (favor) Behavior Modification if they knew more about it.
   SA A ? D SD
13. Behavior Modification enables us to make the best possible use of our lives.
   SA A ? D SD

14. All teachers should be prohibited from using Behavior Modification in their classrooms.
    SA A ? D SD
15. Behavior Modification is just another name for tyranny.
    SA A ? D SD
16. The added expense involved in purchasing rewards is not worth the eventual gain from a program of Behavior Mofification.
    SA A ? D SD
17. Behavior Modification improves overall classroom conditions.
    SA A ? D SD
18. Behavior Modification aids learning.
    SA A ? D SD
19. Behavior Modification helps to improve relationships between children.
    SA A ? D SD
20. Behavior Modification helps to produce desired behavior.
    SA A ? D SD

APPENDIX 8

PRETEST

BEHAVIORAL PRINCIPLES, STANFORD DIAGNOSTIC TEST, AND CURRICULUM MATERIALS

1. Grandma's Rule involving activity reinforcers is called:
   a) Contingency Reinforcement
   b) The Fechnerian Principle
   c) Token Reinforcement System
   d) The Premack Principle

2. A stimulus that has not been previously paired with a reinforcer, is presented following a response, and increases the frequency of that response (strengthens the response) is:
   a) an unconditioned punisher
   b) an unconditioned reinforcer
   c) a conditioned punisher
   d) a conditioned reinforcer

3. How can children accidentally be trained into bad habits?
   a) by never reinforcing the child
   b) by giving in when the child misbehaves
   c) by reinforcing intermittently
   d) by continuously reinforcing the child

4. Shifting criteria and differential reinforcement are the essential features of:
   a) a token system
   b) behavioral analysis
   c) reinforcement of successive approximations
   d) none of these

5. Punichment causes:
   a) escape and avoidance behavior
   b) high rates of negative behavior
   c) high rates of positive behavior
   d) none of these

6. Contingency can best be defined as:
   a) Reinforcer or (punisher) B will be given for any response that occurs
   b) If and only if response A occurs will reinforcer B be given
   c) If and only if response A occurs will reinforcer or punisher B be given
   d) A rule or specified relationship

7. Activity reinforcers can best be defined as:
   a) enjoyable games
   b) privileges
   c) conditioned reinforcers
   d) none of these

8. What is time-out?
   a) isolating the child from other people for a period of time
   b) placing the child in the hall or sending him to the principle
   c) cutting off the possibility for all reinforcement for a period of time
   d) punishing the child for undesirable behavior

9. On what type of reinforcement schedule do slot machines pay off?
   a) variable interval
   b) variable ratio
   c) fixed interval
   d) fixed ratio

10. How can the teacher reduce the need for special reinforcement systems in the future?
    a) praise frequently and appropriately
    b) always pair the giving of tokens and payoffs with praise comments
    c) always use activity reinforcers with token reinforcers
    d) praise intermittently to build up responses strongly resistent to extinction

11. Scores on the Stanford Diagnostic Test are expressed as:
    a) raw scores, age scores, and stanines
    b) raw scores, percentiles, and grade equivalents
    c) raw scores, percentiles, and grade scores
    d) raw scores, grade scores, and stanines

12. The Stanford Diagnostic Reading Tests do not measure:
    a) blending
    b) syllabication
    c) sound discrimination
    d) spelling

13. The reading comprehension subtest of the Stanford Diagnostic Test is divided into two portions. These are:
    a) rate of reading and factual
    b) literal and word usage
    c) literal and inferential
    d) none of these

14. The rate of reading subtest is scored by:
    a) counting the number of correct responses
    b) counting the number of responses
    c) subtracting the number of errors from the number correct
    d) none of these

15. Time limits for the Stanford Diagnostic Test:
    a) can be extended
    b) must be rigidly adhered to, but the test can be terminated early if all pupils have completed the given subtest
    c) must be rigidly adhered to and cannot be extended or shortened under any circumstance
    d) none of these

16. The two subtests of the Stanford Diagnostic Test in which grade scores are provided are:
    a) conceptualization and fractions
    b) computation and number facts
    c) computation and conceptualization
    d) none of these

17. All subtests of the Stanford Diagnostic Tests should be given:
    a) at one time
    b) in separate sittings
    c) in two days
    d) none of these

18. Which of these areas are <u>not</u> tested in the Number Facts subtests of the Stanford Diagnostic Arithmetic Test?
    a) addition
    b) fractions
    c) carrying
    d) division

19. Which subtests of the Stanford Diagnostic Arithmetic Test will fourth to sixth grade children find most difficult?
    a) common fractions - understanding
    b) common fractions - computation
    c) decimal fractions and percent
    d) algebraic operations

20. What scoring system is particularly meaningful for the Stanford Diagnostic Arithmetic Test?
    a) stanines
    b) grade equivalents
    c) grade scores
    d) raw scores

21. The Reading Checks of the Reading Attainment Systems evaluate:
    a) word usage
    b) comprehension
    c) word attack skills
    d) vocabulary

22. The Reading Attainment Systems are color coded according to:
    a) interest area
    b) skill
    c) reading level
    d) vocabulary

23. A student using the Computational Skills Development Kit first takes the:
    a) diagnostic test
    b) survey test
    c) progress test
    d) none of these

24. Using the Computational Skills Kit, the student answers the exercise cards:
    a) in his record book
    b) on a piece of paper placed under the example
    c) on the disposable exercise card
    d) on the pad provided

25. After the student takes the placement guide of the SRA Spelling Laboratory, he is assigned to:
    a) tracks
    b) lettered learning wheels
    c) check tests
    d) alphabetization exercises

26. Additional components of the SRA Spelling Laboratory do <u>not</u> include:
    a) tricky words
    b) homonyms
    c) synonyms
    d) word usage and alphabetization

27. The SRA Reading Laboratory should be used with students in grades:
    a) 2-4
    b) 3-6
    c) 7-9
    d) all levels

28. The Enrich Arithmetic Involvement System uses:
    a) Learning Wheels
    b) Telor programmed learning aids
    c) Student Record Books
    d) none of these

29. What does the Consonant and Vowel Sounds Kits utilize after the completion of each lesson?
    a) a learning wheel
    b) a cassette lesson evaluator
    c) a duplicating master evaluator
    d) none of these

30. Which of these arithmetic kits contains a conceptualization unit?
    a) Arithmetic Involvement Series (Fractions)
    b) Arithmetic Involvement Series (Decimals)
    c) Computational Development Kit
    d) None of these

FINAL CRITERION TEST

Name:

Date:

1. A stimulus that has not been previously paired with a reinforcer, is presented following a response, and increases the frequency of that response (strengthens the response) is:
   a) an unconditioned punisher
   b) an unconditioned reinforcer
   c) a conditioned punisher
   d) a conditioned reinforcer

2. Activity reinforcers can best be defined as:
   a) enjoyable games
   b) privileges
   c) conditioned reinforcers
   d) none of these

3. The reinforcement schedule in which the organism receives a reinforcer after a fixed number of responses is called:
   a) fixed interval
   b) variable ratio
   c) fixed ratio
   d) variable interval

4. Which is not a major criterion for a good behavioral objective?
   a) accomplishable
   b) observable
   c) socially relevant
   d) functional

5. Extinction is said to have occurred when:
   a) there is a withholding of reinforcement for a response
   b) the response is prevented from occurring for a period of time
   c) there is a gradual reduction in the rate of a conditioned response as a result of the withholding of reinforcement for that response
   d) the response is allowed to occur with reinforcement

6. Target behaviors can be measured as:
   a) pre and posttreatment behaviors
   b) frequency and duration targets
   c) frequency and observable targets
   d) simultaneous and sequential targets

7. Negative reinforcement is:
   a) punishment
   b) removal of a negative reinforcement contingency upon a behavior
   c) removal of a positive reinforcer upon punishment
   d) escape and avoidance behavior

8. Extinction occurs most rapidly when:
   a) unpredictable intermittent reinforcement is administered
   b) predictable intermittent reinforcement is administered
   c) continuous reinforcement is administered
   d) fixed interval reinforcement is administered

9. How can punishment be effectively utilized?
   a) avoid the use of an aggressive model; give a warning signal; punish infrequently
   b) prevent escape and avoidance from the source of punishment; use time-out; avoid the use of an aggressive model
   c) minimize the need for future punishment; avoid an aggressive model; use reinforcement most of the time
   d) prevent escape and avoidance from the source of punishment; minimize the need for future punishment; avoid the use of an aggressive model

10. Two features of this reinforcement schedule are, below:
   1) once the organism makes the response, he responds as fast as he can until he completes the requirements; and
   2) there is a post reinforcement pause.

   Answers:
   a) fixed interval
   b) fixed ratio
   c) variable interval
   d) variable ratio

11. The Reading Attainment System does not consist of:
   a) graded reading selections
   b) Reading Checks
   c) Spelling Checks
   d) A pronunciation wall chart

12. The Reading Attainment System does not test the following comprehension skills:
   a) understanding of the story as a whole
   b) factual information
   c) inferential information
   d) none of these

13. The Survey Test in the Computational Skills Kit directs the child to:
   a) the Diagnostic Tests
   b) exercise cards
   c) Progress Tests
   d) the Student Record Book

14. The answers to the exercise cards in the Computational Skills Kit are found:
   a) in the a or b position
   b) in the c or d position
   c) next to each item
   d) none of these

15. The Check Tests of the SRA Spelling Laboratory are assigned:
    a) after the child completes each learning wheel
    b) after the child completes each set of lettered wheels
    c) after the child responds correctly to 90% of the items on an oral spelling test
    d) none of these

16. The SRA Spelling Laboratory contains:
    a) lettered learning wheels
    b)) exercise cards
    c) audio-visual materials
    d) cartridges

17. The duplicating masters of the Arithmetic Involvement Series are coordinated with specific:
    a) cartridges
    b) frames
    c) units
    d) exercises

18. The SRA Vocabulab III should be used with students in grades:
    a) 4-6
    b) 7-9
    c) all levels
    d) none of these

19. Which of these arithmetic kits contains a conceptualization unit?
    a) Arithmetic Involvement Series (Division)
    b) Arithmetic Involvement Series (Fractions)
    c) Computational Skills Development Kit
    d) none of these

20. The Consonant and Vowels Sounds Kit does not contain:
    a) cassettes
    b) cartridges
    c) keyed duplicating masters
    d) learning wheels

21. The Vocabulary subtest of the Stanford Diagnostic Reading Test is administered:
    a) through written instructions
    b) orally
    c) the Stanford Diagnostic Test does not measure Vocabulary <u>per se</u>
    d) none of these

22. The Syllabication subtest of the Stanford Diagnostic Tests asks the pupil to indicate:
    a) all the syllables contained in the word
    b) only the initial syllable
    c) the first and last syllables
    d) none of these

23. The Sound Discrimination subtest requires that the pupil:
    a) find the sound designated in one word, in one of three others
    b) recognize the sounds of designated letters
    c) find the beginning and ending sounds of designated words
    d) none of these

24. The Blending subtest is:
    a) the easiest word recognition skill tested in the battery
    b) the most difficult word recognition skill tested in the battery
    c) measured in grade equivalents
    d) none of these

25. The Stanford Diagnostic Test in Reading provides:
    a) a total grade score for the entire test
    b) a total stanine score for the entire test
    c) separate scores for each subtest and no total score
    d) none of these

26. In administering the Stanford Diagnostic Test in Arithmetic, if the child encounters words that are difficult for him to read:
    a) the administrator should tell him that no help on the test can be given
    b) the administrator should help the child with the words
    c) the administrator should help him with the words as well as the arithmetic process involved
    d) none of these

27. The ratings used with the Number Facts subtest of the Stanford Diagnostic Arithmetic Test are:
    a) stanines
    b) grade scores
    c) verbal descriptions
    d) grade equivalents

28. Which of the following areas are <u>not</u> covered in the Number Systems and Operations subtest of the Stanford Diagnostic Arithmetic Test?
    a) number line
    b) properties of operations
    c) identity elements
    d) none of these

29. The arithmetic areas that are combined in one subtest of the Stanford Diagnostic Arithmetic Test - Level II are:
    a) addition and subtraction
    b) multiplication and division
    c) addition and multiplication
    d) division and subtraction

30. Grade equivalents are given for which of the subtests in the Stanford Diagnostic Arithmetic Test?
    a) Fractions
    b) Number Systems and Operations
    c) Computation
    d) Division

APPENDIX 9

TUTOR TRAINING PACKAGE

LEARNING LAB RULES

1. No child is to be left alone in the Learning Lab at any time.

2. No child is to take or replace any materials from the shelves. The lab manager must take and replace materials at all times.

3. No child is to operate the cassette player without the lab manager's assistance.

4. No child is to touch the air conditioner at any time.

5. The Learning Lab should be locked at all times when not in use.

6. No child, except the youngsters being tutored or serving as peer monitors, should be in the Learning Lab at any time.

7. No materials should be taken out of the Learning Lab by any child.

8. No curriculum materials, except Teacher Manuals and the books on behavioral principles, should be removed from the Learning Lab by lab managers or college tutors.

9. No more than 5 children and 3 adults should be in the Learning Lab at one time.

10. Lab managers and college tutors should sign in and out after each session in the Learning Lab.

11. If a lab manager or college tutor cannot attend a session, they should call either the project director or Learning House at least 2 hours before the scheduled time period.

12. The lab manager, and college tutor when serving as lab assistant, should report point totals and child's behavior to the teaching parents. All incidents of positive or negative behavior should be reported.

13. The lab manager or assistant must record the appropriate data in the child's folder after each session.

LEARNING LAB VIGNETTES

1. The child who refuses to do the work assigned, e.g., bangs on the table, stares out the window, plays with his pencil, etc.

2. The child who works extremely slowly and has not completed an assignment in 3 days.

3. The child who starts a conversation with the lab manager and refuses to get started with his work.

4. The child who says he is sick, tired, or "not feeling well" and wants to skip the day's session.

5. The child who says "this is too hard for me" and throws the assignment on the floor.

6. The child who stamps, pouts, and tantrums because he does not get his 5000 points for completion of assignment.

7. The child who continuously says, "I can't do this," for every assignment he is given.

8. The child who continuously gets wrong answers, even though the material is at his achievement level.

9. The child who constantly complains about, "how boring my assignments are."

10. The child who "takes a dislike" to a particular lab manager, calls him names, curses, speaks in a sarcastic manner, etc.

11. The child who begins to physically fight with another child in the Learning Lab.

12. The child who talks loudly, gets up from his desk, etc., and disrupts other children in the Learning Lab.

13. The child who argues about the time he's supposed to come to the Learning Lab.

14. The child who argues that <u>his</u> answer is correct and the key is wrong.

15. The child who says, "You didn't tell me what you wanted me to do and that's why my assignment is not completed."

16. The child who makes excuses to leave the Learning Lab, e.g., to get a drink of water, go to the bathroom, look for a pencil, etc.

17. The child who has something else planned at the time of tutoring.

TEACHING-INTERACTION COMPONENTS

After completion of assignments or on correction of advancement tests:

1. Initial Praise: "You get many right today. Excellent." "Boy, you really worked hard on your assignment. Gee, you got 90%, that's great."

2. Description of Inappropriate Behavior: "This answer is not correct. Let's go back to the story and see if we can find the correct answer." "You were banging on the table for five minutes, so you didn't get to complete your multiplication examples."

3. Rationale: "You must read the story more carefully in order to get more answers correct." "Banging on the table prevents you from doing the computations carefully and correctly."

4. Description of the Appropriate Behavior: "The correct answer to the question is c, because it says in the passage that the boy's favorite game is football." "When you multiply, you must carry the ten's place number like this:

   $$\begin{array}{r} 17 \\ \underline{x2} \\ 34 \end{array}$$"

5. Point Consequences: "You did an excellent job in completing your assignment, so you get 5000 points and a piece of candy." "Because you banged on the table for 5 minutes, you did not complete your assignment, so today you will not get your 5000 points. But you can try again tomorrow."

6. Request for Acknowledgement: "I showed you how to carry the 10's place number when multiplying. Do you understand how to do it now?" "Do you see why the answer is b instead of c?"

7. Practice and Feedback: "Show me if you can do this multiplication problem in which you carry the 10's place number.

   $$\begin{array}{r} 17 \\ \underline{x2} \\ 34 \end{array}$$

   Very good, you really learned it." "Do you see why the answer is not d? Can you tell me what the correct answer would be? No, not c. Let's look at the story again. Good, it's a. You found the right answer."

8. Final Praise: "Great job. You got 5000 points and a candy for completing your assignment." "This is really excellent. You got an additional 1000 points and a candy for receiving 90% on your reading and skill checks." "You tried really hard and you got 5000 points and a candy. That's excellent. Tomorrow I'm sure you'll get the extra candy and 1000 points for reaching 90% criterion on your advancement test. You're really getting to understand the material."

Name: Date:

BEHAVIORAL CRITERION TEST

TEACHING-INTERACTION COMPONENTS

			Yes	No
1.	Initial Praise	1.		
2.	Description of Inappropriate Behavior	2.		
3.	Rationale	3.		
4.	Description of Appropriate Behavior	4.		
5.	Point Consequences	5.		
6.	Request for Acknowledgement	6.		
7.	Practice and Feedback	7.		
8.	Final Praise	8.		

Criterion Score - 8/8

LABORATORY MANAGERS' TIME AND ACTIVITY SCHEDULE

Week 2 (June 9-13)

June 7 (Sat.) Three-hour meeting to discuss materials and general procedures. Kits to be introduced: Reading Attainment Systems 1 and 2, Computational Skills Kit, and Arithmetic Involvement Series.

Time: 7-10, place: Learning House

June 9 (Mon.) Review of procedures and materials; role playing of procedures and potential problems. (Dan and Sharri) Time: 10-1 (3 hours), place: Learning House

June 10 (Tues.) Learning Lab opens. Project director models required procedures. (Dan and Sharri observe) Time: 3:30-6:00, 7:00-7:30 (4 hours) (3 hours). Place: Learning House.

June 11 (Wed.) Review of procedures and materials; role playing of procedures and potential problems (Dan, Sharri, Chris, Stan). Time: 10-1; project director models required procedures; Dan and Sharri rehearse procedures: Time: 3:30-6:00, 7:00-7:30 (4 hours) Stan and Chris observe. Place: Learning House.

June 12 (Thurs.) Chris and Stan rehearse required procedures. Sharri, Dan, and project director observe. Time: 3:30-6:00, 7:00-7:30 (4 hours).

June 13 (Fri.) Learning Lab closed. First Learning Lab meeting. Time: 11-12 noon, place: Learning House.

COLLEGE TUTORS' TIME AND ACTIVITY SCHEDULE

Weeks 2 and 3 (June 9-23)

Continue serving as observer at Learning House (or child's home or school) for three 2-hour blocks per week. Initiation of collection of ABC data. Time: 3 hours per week.

Attend one weekly seminar (with Stan) - Week 2. First Learning Lab meeting 11-12 noon, June 13.

Attend two weekly seminars, 1) with Stan; 2) at Learning Lab - Week 3.

Note: Marilyn and David - follow the above observation procedure from weeks 2-5 (June 9-July 14): attend the above seminars.

Weeks 4 and 5 (June 23-July 7)

Observe at Learning Laboratory (using ABC Check List) for three 1-hour blocks per day (five days per week) - 15 hours per week.

Attend two 1-hour seminars per week (General Meeting - Stan; Learning Lab Seminar - project director and lab managers).

Note: Marilyn and David - follow the above observation procedure from weeks 6-7 (July 14-28); attend Observer, General, and Learning Lab meetings.

Weeks 6-11 (July 14-August 22)

Serve as lab assistants, i.e., assist lab managers in administering Learning Lab program. Time: 15 hours per week.

Attend two 1-hour seminars per week (General Meeting - Stan; Learning Lab Seminar - project director and lab managers).

Note: Marilyn and David - serve as lab assistants - weeks 8-11 (July 28-August 22); attend General Meeting and Learning Lab Seminar.

OBSERVATIONAL PROCEDURES

1. Both observers of dual collect frequency data (one hour).
2. While $observer_1$ in dual collects frequency data, $observer_2$ collects ABC (Antecedent-Behavior-Consequent) data (one hour).
3. Dual switches roles: $observer_2$ collects frequency data; $observer_1$ collects ABC data (one hour).

LEARNING HOUSE

Observation Division

LH,BTY 6/25/73

OBSERVATION SUMMARY FOR: ____________________

BY: ____________________, submitted: __/__/__

DATE OF OBSERVATION: __/__/__; DAY OF WEEK: ____________________

TIME OF OBSERVATION: ___m to ___M

LOCATION OF OBSERVATION: ____________________

PEOPLE PRESENT DURING OBSERVATION: ____________________

____

____

____

DESCRIPTION OF OBSERVATION ENVIRONMENT:

EXTERIOR: ____________________

____

____

INTERIOR: ____________________

____

____

ABC BEHAVIOR SUMMARY

Time (Approx.)

ANTECEDENT	BEHAVIOR	CONSEQUENCE
What happened before		What happened after

As compared to previous interactions with child, his/her behavior was: Poor Fair Average Good Excellent

LEARNING LAB PROCEDURES

1. Pre and posttreatment testing
2. Prescriptive curriculum
3. Programmed materials
4. College tutors
5. Peer monitoring
6. Points and edibles
7. Self-charting of progress

TIME SCHEDULE

Week 1 (June 2-6)

Diagnostic testing and construction of Learning Lab

Week 2 (June 9-12)

Child spends two 30-minute blocks per day in Learning Lab

Weeks 3-7 (June 16-July 18)

Child spends two 45-minute blocks per day in Learning Lab

Weeks 8-12 (July 21-Aug. 22)

Child spends two 60-minute blocks per day in Learning Lab

Week 13 (August 25-29)

Posttreatment diagnostic testing

ORDER OF PRESENTATION

Weeks	Time in Laboratory	Material	Time to Completion
2-4	Two 30-minute blocks per day (5 days/week)	Reading Attainment or Macmillan Series	30 minutes
		Arithmetic Involvement Series	30 minutes
5-7	Two 45-minute blocks per day (5 days/week)	Reading Attainment or Macmillan Series,	30 minutes
		SCORE, Enrich, or Macmillan Phonetics Series	30 minutes
		Arithmetic Involvement Series	30 minutes
8-12	Two 60-minute blocks per day (5 days/week)	Reading Attainment or Macmillan Series	40 minutes
		SCORE, Enrich, Macmillan Spectrum of Skills Phonetics Series	40 minutes
		Arithmetic Involvement Series	40 minutes

Order of presentation of materials will be counterbalanced between and within Ss for each session and each period.

SCORING ON STANFORD DIAGNOSTIC TEST
IN READING AND ARITHMETIC

Scores are represented in three forms:

1) Raw Scores: number correct on each subtest

2) Stanines: a value on a nine-point scale of standard scores (sta = standard, nine = nine-point scale). Scores are expressed along a scale ranging from 1 (low) to 9 (high), with the value of 5 representing average performance for the child's grade level.

Levels of Performance Represented by Each Stanine

Stanine	Percentile (No. of Scores below Given Stanine)	Level of Performance
1	4	Poor
2	11	Poor
3	23	Below Average
4	40	Average
5	60	Average
6	77	Average
7	89	Above Average
8	96	Superior
9	Above 96	Superior

In other words, stanines 1-3 represent below average performance (compared to the child's grade mates); stanines 4-6 represent average performance (compared to the child's grade mates); and stanines 7-9 represent above average performance (compared to the child's grade mates.

3) Grade Equivalents: a grade equivalent specifies the educational level (from grades 1-12) of a group of pupils for whom a given performance is typical. Is the child performing at the same level as other pupils in the same grade, or is he performing above or below his grade level? For example, a grade equivalent of 5.7 is typical for pupils in the seventh month of the fifth grade. A child (receiving this score) in the seventh month of the fourth grade would be performing a year ahead of his grade level. A child (receiving this score) in the seventh month of the sixth grade would be performing a year below his grade level.

Type of Score Used for Subtests of Stanford Diagnostic Test in Reading:

1) Reading Comprehension - Stanines and Grade Equivalents

2) Vocabulary - Stanines

3) Syllabication - Stanines

4) Sound Discrimination - Stanines

5) Auditory Discrimination and Beginning and Ending Sounds (Level I only) - Stanines

6) Blending - Stanines

7) Rate of Reading (Level II only) - Stanines

Type of Score Used for Subtests of Stanford Diagnostic Test in Arithmetic:

1) Arithmetic Conceptualization - Stanines and Grade Equivalents

2) Arithmetic Computation - Grade Equivalents and Stanines

   a) Addition - Stanines

   b) Subtraction - Stanines

   c) Multiplication - Stanines

   d) Division - Stanines

3) Common Fractions (Level II only) - Stanines

4) Decimal Fractions and Percent (Level II only) - Stanines

5) Number Facts - Qualitative Scores

   A = Mastery, B = Near Mastery, C = Needs Instruction

PEER MONITORING

1) For two days, have child observe while lab manager corrects and charts another child's progress.

2) When two children are working in the lab at the same time, call one child over when the second child completes his work, for the above observation.

3) Show the child how to correct the exercises. Illustrate the manner in which children are given a chance to go back and correct their work if they do not obtain 90% criterion on the first try.

4) On the third day, have the child duals correct each other's work (the lab manager should carefully monitor the child's accuracy).

5) If the child does not reach 90% criterion, have him go back and correct his work. The lab manager should explain any wrong answers to the child (that he cannot correct himself). The peer monitor again corrects the child's work for the second time, then assists in charting the child's percentage correct (the lab manager should help in computing percentages).

6) When peer monitoring is completed, the child receives an additional 500 points and a chocolate for this task.

BEHAVIORAL CONSULTATION

TAKE HOME CRITERION REFERENCE TEST

1. The microconsultation model requires:
   a) identification of skills, modeling, and videotaped rehearsal
   b) lecture, discussion, and demonstration
   c) identification of skills, modeling, and discussion

2. The four main steps in behavioral analysis are:
   a) 1) selecting a target behavior, 2) identifying environmental events sustaining the behavior, 3) planning a strategy for change, 4) evaluating the program for change
   b) 1) selecting a target behavior, 2) identifying the child's critical reinforcers, 3) describing the acceleration and deceleration targets, 4) observing the rate of behavior over time
   c) 1) planning a strategy for change, 2) observing the acceleration and deceleration targets, 3) describing the antecedent and consequent events, 4) identifying the child's critical reinforcers
   d) 1) identifying environmental contingencies, 2) gathering data from teachers and parents, 3) selecting additional behaviors for change, 3) observing the rate of behavior over time

3. The main objective of assessment is:
   a) to clarify and summarize teacher observations
   b) to record teacher comments on the Contingency Analysis Chart
   c) to record child behavior on the Rate Tabulation Chart
   d) to determine what events are preceding and following target behaviors

4. The Teacher Pupil Interaction Scale (TPIS) measures teacher and pupil behavior:
   a) subsequently
   b) sequentially
   c) simultaneously
   d) none of these

5. The Premack Principle can be defined as:
   a) First you play then you work
   b) You can do what you want, then do what I tell you to do
   c) First you work, then you play
   d) To teach a child to carry out his responsibilities, require a preferred activity to come before a less preferred activity

6. Contingency can best be defined as:

   a) Reinforcer or (punisher) B will be given for any response that occurs

b) If and only if response A occurs will reinforcer B be given
c) If and only if response A occurs will reinforcer or punisher B be given
d) A rule or specified relationship

7. Extinction is said to have occurred when:
   a) there is a withholding of reinforcement for a response
   b) the response is prevented from occurring for a period of time
   c) there is a gradual reduction in the rate of a conditioned response as a result of the withholding of reinforcement for that response
   d) the response is allowed to occur with reinforcement

8. Target behaviors can be measured as:
   a) pre and posttreatment behaviors
   b)
   c) frequency and observation targets
   d) simultaneous and sequential targets

9. Unpredictable and predictable intermittent reinforcement can be differentiated by the fact that:
   a) in unpredictable intermittent reinforcement, time periods or number of correct responses between reinforcements are fixed
   b) in predictable intermittent reinforcement, time periods or number of correct responses between reinforcement are varied
   c) predictable and unpredictable intermittent reinforcement are the same
   d) in unpredictable intermittent reinforcement, time periods or number of correct responses between reinforcements are varied

10. The four rules to keep in mind when setting up a token system are:
   a) 1) set up the conditions before hand, 2) select a variety of reinforcers for which the tokens can be exchanged, 3) never use punishment, 4) praise frequently
   b) 1) select tokens that are easily given, 2) select a variety of reinforcers for which the tokens can be exchanged, 3) reinforce frequently in the beginning and gradually reinforce less, 4) praise when you give out tokens
   c) 1) praise when you give out tokens, 2) use only basic reinforcers initially, 3) select a variety of reinforcers, 4) always reinforce intermittently
   d) 1) select reinforcers that are easily given, 2) change reinforcers frequently, 3) reinforce gradually in the beginning and more as time goes on, 4) remember to praise when you give out tokens

11. Negative reinforcement is:
    a) punishment
    b) escape and avoidance behavior
    c) removal of a negative reinforcement contingency upon a behavior
    d) removal of a positive reinforcement upon punishment

12. The two essential aspects of shaping are:
    a) differential reinforcement and defining the target behavior
    b) shifting criterion for reinforcement and differential reinforcement
    c) establishing a reinforcer and shifting criterion for reinforcement
    d) satiation and differential reinforcement

13. Examples of activity reinforcers are:
    a) 1) teaching younger children, 2) having extra lunch time, 3) choosing songs to sing
    b) 1) make-up kits, 2) gum, 3) marks on the blackboard
    c) 1) marbles in a jar, 2) candy, 3) ice cream
    d) 1) prizes, 2) blocks, 3) chocolate kisses

14. What is time out?
    a) isolating the child from other people for a period of time
    b) placing the child in the hall or sending him to the principal
    c) cutting off the possibility for all reinforcement for a period of time
    d) punishing the child for undesirable behavior

15. On what type of reinvorcement
    a) variable interval
    b) variable ratio
    c) intermittent reinforcement
    d) fixed ratio

16. The post reinforcement scalloping is characteristic of the
    a) fixed ratio schedule
    b) fixed interval schedule
    c) variable ratio schedule
    d) variable interval schedule

17. The basic paradigm involved in the stimulus control of behavior is:
    a) 1) in the presence of concept instances, reinforce some other response; 2) in the presence of not-instances, reinforce one response consistently
    b) 1) in the presence of concept instances, reinforce one response consistently; 2) in the presence of not-instances, reinforce some other response
    c) 1) reinforce the critical concept characteristics; 2) reinforce the relevant characteristics
    d) none of these

18. Double discrimination can be defined as:
    a) stimulus generalization
    b) generalization
    c) stimulus discrimination
    d) none of these

19. The three major criteria for good behavioral objectives are:
    a) behavioral objectives should be time-consuming, functional, and vague
    b) behavioral objectives should be observable, measurable, and understandable
    c) behavioral objectives should be observable, functional, and semi-accomplishable
    d) none of these (observable, measurable, functional, and accomplishable)

20. An example of an effective prompt is:
    a) the teacher says, "Oh, you know that word. I just told you on the last page."
    b) the teacher says, "I'll bet you can think of the word if I tell you it's an animal that says quack, quack."
    c) in physical prompting of a written response, the teacher gradually uses less pressing in moving the child's hand as the child begins to move it more correctly
    d) the teacher presents an instance of blue and asks, "Is the ball blue?" She prompts, "yes" by nodding her head up and down

BEHAVIORAL CONSULTATION CRITERION REFERENCE TEST #2

1. The main function of the behavioral consultant is to:
   a) assist teachers in improving the learning opportunities for all children
   b) assume full responsibility for the treatment of the referred child
   c) identify classroom conditions responsible for maintaining nonadaptive behavior and to recommend changes leading to an increase in adaptive behaviors
   d) to increase the teacher's ability to correct adjustment problems of children in her classroom

2. The microconsultation procedure is based on several principles of learning, including:
   a) generalization learning, feedback, shaping, and imitation modeling
   b) discrimination learning, feedback, shaping, and imitation modeling
   c) planning a strategy, feedback, shaping, and imitation modeling
   d) discrimination learning, feedback, shaping, and operant conditioning

3. The main objective of the strategy is:
   a) to develop a plan for changing target behaviors in desired directions
   b) to relate to teachers in a way that "you can't tell who's the teacher and who's the consultant
   c) to discuss mechanics of how reinforcement is to be delivered and recorded
   d) to explore teacher and pupil behavior in order to correct portions of the classroom environment causing pupil behavioral deficits

4. The Teacher Pupil Interaction Scale can be analyzed:
   a) statistically
   b) qualitatively and quantitatively
   c) through the reinforcement contingencies provided by the teacher
   d) none of these

5. Functional definitions of stimuli have three parts:
   a) an event, a procedure, a behavior effect
   b) a response, a procedure, a behavioral effect
   c) an operational definition, an observable, and measurable behavioral effect
   d) none of these

6. Three types of secondary reinforcers are:
   a) praise, attention, and food
   b) token, contingent, and social
   c) token, social, and activity
   d) activity, social approval, and token

7. Extinction occurs most rapidly when:
   a) unpredictable intermittent reinforcement is administered
   b) predictable intermittent reinforcement is administered
   c) continuous reinforcement is administered
   d) fixed interval reinforcement is administered

8. The reinforcers most preferred for classroom use are:
   a) token reinforcers
   b) unconditioned reinforcers
   c) conditioned reinforcers
   d) activity reinforcers

9. Three ways which could enable the teacher to give immediate reinforcement to the entire class are to use:
   a) activity, social, and token reinforcers
   b) teaching machines, small group work, and verbal reinforcement
   c) predictable, unpredictable, and continuous reinforcement
   d) none of these

10. Why do reinforcers that have previously been effective subsequently lose their effectiveness?
   a) because of teacher disorganization, competing reinforcers, and loss of effectiveness associated with new tasks
   b) because of competing reinforcers, satiation of reinforcers, and less of effectiveness associated with new tasks
   c) because the reinforcers are no longer paired with primary reinforcers, competing reinforcers, and satiation of reinforcers
   d) none of these

11. The behavior that shows the least change under token reinforcement systems is:
   a) social behavior
   b) academic behavior
   c) depressive behavior
   d) hypochondriachal behavior

12. When should shaping be utilized?
   a) to install a new behavior in the subject's repertoire
   b) to maintain a behavior already in the subject's repertoire
   c) when there are no prompts that can be used to produce the target behavior
   d) none of these

13. An example of a "reinforcement trap" is:
   a) to reduce thumbsucking, the child is reinforced for taking his thumb out of his mouth
   b) to increase homework behavior, each child receives a gold star if he brings in his homework
   c) to increase Jane's doing the dishes, Jane's mother lets her watch her favorite TV program after she washes the dishes
   d) none of these

14. How can the teacher reduce the need for special reinforcement systems in the future?
   a) praise frequently and appropriately
   b) always pair the giving of tokens and payoffs with praise comments
   c) always use activity reinforcers with token reinforcers
   d) praise intermittently to build up responses strongly resistant to extinction

15. A limited hold feature of a reinforcement schedule dictates that:
   a) reinforcement is always available
   b) reinforcement is available for only a limited time
   c) reinforcement is limited to a designated number of responses
   d) reinforcement is limited only under an interval schedule

16. Two features of this reinforcement schedule are: 1) once the organism makes the response, he responds as fast as he can until he completes the requirements; 2) there is a post reinforcement pause. What is the reinforcement schedule?
   a) fixed interval
   b) fixed ratio
   c) variable interval
   d) variable ratio

17. Engelmann's definition of concepts involve:
   a) shared characteristics, instances, and a universe of concepts
   b) S^-, S^+, S^o
   c) relevant characteristics, instances, and non-instances
   d) none of these

18. Teaching has to insure that responding pays off only in the presence of:
   a) concept instances
   b) the discriminative stimulus
   c) critical concept characteristics
   d) none of these

19. How can punishment be effectively utilized?
    a) avoid the use of an aggressive model, give a warning signal, punish infrequently
    b) prevent escape and avoidance from the source of punishment, use time out, avoid an aggressive model
    c) minimize the need for future punishment, avoid an aggressive model, use reinforcement most of the time
    d) prevent escape and avoidance from the source of punishment, minimize the need for future punishment, avoid the use of an aggressive model

20. An example of passive shaping is:
    a) a rat is reinforced each time it moves closer to the lever
    b) the teacher reaches out, raises the child's left hand, and gives her food
    c) the teacher demonstrates hopping by first standing on one foot, then the other, and finally having the class demonstrate this response
    d) Johnny did one arithmetic problem and received a candy reinforcer from his teacher

BEHAVIORAL CONSULTATION CRITERION REFERENCE TEST #3

J. Paulus

1. The method of training behavioral consultants involving identification of skills, modeling, and video-taped rehearsal is called:
   a) microteaching
   b) behavioral analysis
   c) microconsultation
   d) none of these

2. Which of these steps is not involved in the behavioral analysis approach?
   a) identifying environmental events sustaining the target behavior
   b) selecting a target behavior for change
   c) interviewing the child before consultation begins
   d) planning a strategy for change

3. The behavior analysis interview structure consists of:
   a) objectives, method, and criteria
   b) target behaviors, clarification, and criteria
   c) objectives, strategy, and evaluation
   d) none of these

4. The scale that simultaneously measures teacher and pupil behavior is:
   a) Contingency Analysis Chart
   b) Teacher Pupil Interaction Scale
   c) Rate Tabulation Chart
   d) Operant Analysis Chart

5. "Grandma's Rule," involving activity reinforcers, is called:
   a) Contingency Reinforcement
   b) The Fechnerian Principle
   c) Token Reinforcement System
   d) The Premack Principle

6. A stimulus that has not been previously paired with a reinforcer is presented following a response, and increases the frequency of that response (strengthens the response) is:
   a) an unconditioned punisher
   b) an unconditioned reinforcer
   c) a conditioned punisher
   d) a conditioned reinforcer

7. Which one of the following statements is not one of the rules about when to reinforce?
   a) in teaching new tasks, reinforce (or punish) immediately rather than permit a delay between the response and reinforcement

b) in the early stages of learning, use intermittent reinforcement
c) avoid the use of predictable reinforcement for paying attention, persistance in the face of failure, and working on task
d) none of these

8. How can children be accidentally trained into bad habits?
a) by never reinforcing the child
b) by giving in when the child misbehaves
c) by reinforcing intermittently
d) by continuously reinforcing the child

9. A formerly neutral thing, given as a response consequence, that strengthens behavior and can be exchanged for other reinforcers, is:
a) a competing reinforcer
b) a token reinforcer
c) an activity reinforcer
d) a conditioned reinforcer

10. Shifting criteria and differential reinforcement are the essential features of
a) a token system
b) behavioral analysis
c) reinforcement of successive approximations
d) none of these

11. The child stands up. The teacher says, "Sit down." The child sits down. This is an example of:
a) positive reinforcement
b) negative reinforcement
c) punishment
d) the criticism trap

12. Activity reinforcers can best be defined as:
a) enjoyable games
b) privileges
c) conditioned reinforcers
d) none of these

13. Punishment causes:
a) escape and avoidance behavior
b) high rates of negative behavior
c) high rates of positive behavior
d) a suppression of all responses

14. One way in which teaching can be made fun for children is:
a) never punishing children for mistakes
b) using a laissez faire method of teaching
c) taking the children on many trips
d) deliberately making mistakes

15. The reinforcement schedule in which the organism receives a reinforcer after a fixed number of responses is called:
    a) fixed interval
    b) variable ratio
    c) fixed ratio
    d) variable ratio

16. Stimulus Response

Stimulus	Response
	Square
	Not Square
	Not Square
	Square

In this instance, shape is the:
    a) shared characteristic
    b) critical concept characteristic
    c) essential characteristic
    d) none of these

17. Which is not a major criterion for good behavioral objectives?
    a) accomplishable
    b) observable
    c) socially relevant
    d) functional

18. When someone responds to a new stimulus in the same way he responds to a previously taught target stimulus having some of the same characteristics, the event is called:
    a) response generalization
    b) stimulus generalization
    c) response discrimination
    d) stimulus discrimination

19. The gradual withdrawal of prompts is called:
    a) shaping
    b) fading
    c) S-prompts
    d) none of these

20. The two ways in which responses can be conditioned in the presence of new task signals are:
    a) reinforcement and shaping
    b) shaping and fading
    c) prompting and shaping
    d) none of these

APPENDIX 10

May 1, 1975

Dear Parent,

I am organizing a remedial learning laboratory for children. This laboratory will operate at a treatment center for children with academic and social difficulties. We hope to make important gains in reading and arithmetic skills for students in the laboratory. If students do make gains, the materials can be used to help other youngsters. However, in order to know if the program is really effective, we need to compare what happens to students in our program with students who are not in our program. Therefore, we want to administer standardized achievement tests to local students who are not in our program.

We would like your permission to test your child using the Stanford Diagnostic Tests in Reading and Arithmetic. The tests will be administered at Addison School after school hours. Your child would be tested three times:

1. May 14-16
2. June 25-27
3. August 18-20

Specific times and places will be established when consent forms are returned. Testing takes about 2-1/2 hours. After each part of the test your child will receive a bite-sized chocolate, and a small toy will be given to each child at the end of each testing session. Your child's educational program will not be affected in any way be this learning laboratory.

Please sign and return the bottom of this form if you will permit your child to be tested. If you wish, test scores will be given to you after each test is administered. Your child will not be identified in any report of this study. If you have any questions concerning the testing, please call me at the number below.

Leslie Chernen
324-8274

Please check the appropriate items and return this form in the stamped envelope provided by May 6, 1975.

___ My child will participate in your testing program. Please inform me of times and places.
___ My child can participate, but will not be available on ______. Contact me to make other arrangements.
___ Do not give my child chocolates.

Child's Name: ______________ Parent's Signature: ______________
Telephone Number: ______________ Address: ______________

APPENDIX 11

CONTRACT
(COLLEGE TUTORS)

I, (name) ______________________, accept the National Science Foundation Project position of College Tutor contingent on my participation as Laboratory Manager at Learning House during the Fall Quarter, 1975. I will receive my last week's salary check on the first day of my participation as Laboratory Manager at Learning House during the time specified above. During the Fall Quarter, 1975, I will man the Learning Laboratory for three hours per week and attend two one-hour weekly seminars. I will also assist in the training of the Laboratory Managers taking over my position during the Autumn Quarter, 1975.

I agree to the terms of this contract and will fulfill its obligations.

Date:

College Tutor: ______________________

Project Director: ______________________

Student Involvement Director:

____

APPENDIX 12

Stanford Diagnostic Reading Test

Comprehension Stanines Lit.	Comprehension Stanines Inf.	Total Grade Equiv.	Vocabulary Stanine	Syllabication Stanine	Sound Disc. Stanine	Blending Stanine	Rate Stanine
W X	W X	W X	W X	W X	W X	W X	W X

Working Scores

Comprehension Grade Equivalent	Vocabulary Stanine	Word Analysis Stanine

Curriculum Prescription

Reading

	Date Begin	Date End	Materials	Notes
Comprehension	6/11		Reading Attainment	
Vocabulary	6/11		System 1 (Red) 3.0-3.2	
Word Analysis				

Stanford Diagnostic Arithmetic Test

Computation

Addition and Subtraction Stanine	Multiplication Stanine	Division Stanine	Total Grade Equiv.
W X	W X	W X	W X

Working Scores

Addition and Subtraction Stanine	Multiplication Stanine	Division Stanine	Total Grade Equiv.

Curriculum Prescription

Arithmetic	Date Begin	Date End	Materials	Notes
Addition				
Subtraction				
Multiplication	6/11		Arithmetic Involvement Series - multiplication E02-11-E02-20. Survey Test, Diagnostic Test in multiplication, p.8 (Computational Skills Kit - Record Book)	
Division				

DAILY TUTORING SCHEDULE

WEEK OF:

	Monday	Tuesday	Wednesday	Thursday
6:00/6:45				
6:45/7:30				
7:30/8:00				
8:00/8:30				
8:30/9:00				

Amount of Time Taken Until Completion	Task Completed Yes	Task Completed No	Academic & Social Behavior	Further Programming	Initial

Date	Time	Materials	Score on Assignment	Number of Points Received

APPENDIX 13

GENERAL COURSE OUTLINE
LEARNING HOUSE TUTORIAL SYSTEM

Pretutoring: introduction of tutoring forms and activity reinforcers

Week 1: introduction of kits - Distar
selection of meeting times and tutoring days

Week 2: introduction of kits - Reading Attainment System 1 and 2
SRA Reading Lab 3A
introduction of point cards

Week 3: initiation of tutoring program
introduction of kits - Arithmetic Involvement Series
Computational Skills Development Kit
Sullivan Series
Flash Cards
discussion of activity reinforcers

Week 4: introduction of kits: SRA Vocabulab
Enrich Consonants and Vowels Kit
SRA Spelling Lab
discussion of general tutoring program and activity reinforcers

Week 5: programming of children for current week
discussion of readings
introduction to peer monitoring
discussion of general tutoring program and activity reinforcers

Week 6: programming of children for current week
discussion of readings
introduction to test construction
(development of posttests for Enrich Sports Series and Arithmetic Involvement Series (Conceptualization)
discussion of general tutoring program and activity reinforcers

Week 7: programming of children for current week
discussion of readings
introduction to strategies of teaching reading
discussion of general tutoring program and activity reinforcers

Week 8: programming of children for current week
discussion of readings
introduction to self-monitoring of social behavior in learning laboratory
discussion of general tutoring program and activity reinforcers

Week 9: programming of children for current week
discussion of readings
evaluation of children's academic progress
assignment of tasks for introduction of tutorial program to incoming tutors
discussion of final paper

Week 10: introduction of tutorial format to incoming tutors

TUTOR RESPONSIBILITIES

Attend tutor meetings Thursdays at 2:30. Call Kay Thoresen at 494-0338 if you must be absent.

Tutor in the lab one night per week from 6:00 to 9:00 pm through March 11.

1. In the beginning, you will need to come in earlier to familiarize yourself with the materials for each child.
2. Check children's boards for homework. This takes precedence over lab assignments and should be noted in the child's folder.
3. When you cannot tutor, you must make arrangements for a substitute and make up the hours.
4. If last-minute problems arise, always call Learning House, 328-6069, and inform the teaching parents.

Plan and carry out a reinforcement activity for one child each week.

1. This should be educational as well as enjoyable.
2. Always make prior arrangements with the teaching parents.
3. Call the child the night before your outing to remind him so that he may look forward to it.
4. This should be something special for both of you. Being freifriendly, positive, and on time are important.

A Tutor Information Sheet should be completed for each tutoring session (one for each child). These may be turned in to the folder in the office not later than 2:30 each Thursday.

Schedule of Readings

Homme, L., How to Use Contingency Contracting in the Classroom, Research Press, 1974.

Jan. 12-16	Introduction and Chapters 1-3
Jan. 19-23	Chapters 4-6
Jan. 26-30	Chapters 7-8
Feb. 2-6	Chapters 9-10

Mahoney, M. and Thoresen, C. Self Control: Power to the Person, Brooks Cole, 1974.

Feb. 9-13	Chapters 1-2
Feb. 16-20	Chapters 3-4
Feb. 23-27	Chapters 5-6
Mar. 1-5	Article 3
Mar. 8-12	Article 4

Names and Telephone Numbers of Tutors:

Stephen Banuelos	327-6069
June Cancell	771-0521
Lorraine Gutierrez	321-6058
Cheryl Fujimoto	327-1083
Debbie Paul	326-6695

FINAL PAPER

LEARNING HOUSE TUTORING PROGRAM

Directions: This paper should be between two to four double-spaced, type-written pages. Due date is March 18. Discuss each of the three topics.

1. Changes need to be made in the reinforcement procedure in the Learning Lab. Tell how you think the system might be modified to make working in the lab more rewarding for the children. Now describe how it could be made more rewarding for the tutors.

2. Using Power to the Person as a reference, design a program for Rob with the aim of increasing his participation in curriculum planning and his responsibility for control of his own behavior in the lab.

3. Evaluate the Tutoring Program. Be as specific as possible. What was especially helpful, interesting, or enjoyable? What should be changed, eliminated, or added to the program?

RE MENU

THINGS I WOULD LIKE TO DO WITH MY TUTOR

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

CURRICULUM ASSIGNMENT

Name:

Week of:

Assignment sheet completed by:

Day of Week	Material	Kit No.	Frame, Page, Cartridge, or Level

LEARNING HOUSE TUTORING INFORMATION SHEET

Tutoring of: Date of Tutoring:

by: Date Report in:

Time of tutoring:

Materials:

Task completed: Yes No

Number of points received:

Score on assignment:

Description of Academic Performance

Description of Social Behavior

Further Academic Programming

Special Reinforcement or Punishment Contingencies Utilized

As compared to previous interactions with child, his/her behavior was:

poor fair average good excellent

SYLLABUS FOR READINGS

Mahoney, M., & Thoresen, C. Self control: power to the person. Monterey, California: Brooks/Cole Publishing Co., 1974.

Oct. 13-17	Chapters 1-2, pages 3-27
Oct. 20-24	Chapters 3-4, pages 27-48
Oct. 27-31	Chapters 5-6, pages 48-71
Nov. 3-7	Article 3, pages 111-129
Nov. 10-14	Article 4, pages 129-144

Homme, L. How to use contingency contracting in the classroom. Champaign, Illinois: Research Press, 1974.

Nov. 17-21	Introduction, page vii. How to use this book, page ix Chapters 1-3, pages 3-30
Nov. 24-28	Chapters 4-6, pages 31-70
Dec. 1-5	Chapters 7-8, pages 71-94
Dec. 8-12	Chapters 9-10, pages 95-118

APPENDIX 14

EXPERIMENT 2

EVALUATING THE ACQUISITION OF SPELLING AND FRACTIONAL SKILLS: A MULTIPLE BASELINE APPROACH

Leslie Chernen
San Jose State University

METHOD

Subject

The subject was a 12½ year old, sixth grade male residing at Learning House, a residential treatment center for predelinquent and dependent-neglected youth. The subject had previously spent two years at Deveroux, a residential school for learning disabled youngsters. His baseline target behaviors, upon arrival at Learning House, were: extreme slowness in responding to adults and other children, social isolation, complaining and whining, requests for unneeded attention, and arguing with peers (lack of social skills). His intelligence scores, as measured by the Lorge Thorndike Intelligence Scale (Houghton Mifflin, 1964), indicated a Nonverbal percentile rank of 1 for both national and local norms, and a Verbal percentile rank of 5 for national norms and 1 for local norms. The subject's scores on the Stanford Diagnostic Tests in Reading and Arithmetic (Harcourt, Brace, & World, Inc., 1968) were as follows: Reading Comprehension (Grade Equivalent) - 4.80; Word Analysis (Stanine) - 3.50; Arithmetic Conceptualization (Grade Equivalent) - 6.65; Arithmetic Computation (Grade Equivalent) - 4.85; and Fractions (Stanine) - 2.

The subject participated in a National Science Foundation granted project during the summer, 1975. The objectives of this project were threefold: 1) the remediation of reading and arithmetic deficits of youngsters residing at Learning House; 2) the training of paraprofessional and peer tutors through a systematized method of verbal presentation of skills, modeling, rehearsal, and evaluation; and 3) the creation of a learning laboratory based on diagnosis, individualized prescription, programmed materials, and edible and point reinforcers. After 92 hours of tutorial instruction, the subject's posttreatment scores on the Stanford Diagnostic Tests were: Reading Comprehension (Grade Equivalent) - 5.80; Word Analysis (Stanine) - 5.67; Arithmetic Conceptualization (Grade Equivalent) - 8.60; Arithmetic Computation (Grade Equivalent) - 6.70; and Fractions (Stanine) - 4.0. Thus, within the three-month treatment period, the subject's scores rose 1 year in Reading Comprehension, 2.17 stanines in Word Analysis, 1.95 years in Arithmetic Conceptualization, 1.85 years in Arithmetic Computation, and 2 stanines in Fractions.

Materials

A) SRA Spelling Word Power Laboratory 2b (Parker and Walker, 1966). Contents: 1) student record book (containing placement guide, program chart, spaces for the recording of responses, alphabetization, and word usage exercises); 2) 60 different learning wheels divided among 11 color coded ability levels (each wheel presents specific spelling problems, elements of phonics, and word analysis skills); 3) check tests (which are taken by the student after completion of a color level); 4) check test key cards; and 5) Spelling Achievement Surveys (Forms X, Y, and Z) designed to examine acquisition of spelling rules covering all 11 ability levels in kit (see Appendix 1A for Spelling Survey Tests).

B) Enrich Arithmetic Involvement Series (Enrich, 1974). Fractions: a visual, kinesthetic approach to the teaching of fractional operations and concepts. The kit utilizes hand-held individualized instructional devices and interchangeable visual cartridges, providing immediate reinforcement for correct responding. The Fractions kit consists of the following topic areas: 1) Introducing Fractions, 2) Word Problems and Improper Fractions, 3) Addition and Subtraction of Fractions, 4) Multiplication and Division of Fractions, 5) Equivalent Fractions, 6) Reducing Fractions and Mixed Numbers, 7) Multiplication and Division of Mixed Numbers, 8) Multiples, 9) Unlike Denominators, 10) Practice with Fractions. Posttests are administered after completion of two to three cartridges, to test acquisition of concepts presented. A Fractions Test was constructed, utilizing similar problems to those presented on posttests, for daily administration to the subject (see Appendix 2A for Fractions Test).

Procedure

A staggered, multiple baseline design was utilized to evaluate the effectiveness of spelling and fractions instruction. The experimental conditions were as follows:

1) Spelling Baseline: the subject was administered the Spelling Survey Tests (Forms X, Y, and Z), counterbalanced daily for order of presentation over a 7-day period. No spelling treatment was provided at this time.

2) Spelling Treatment/Fractions Baseline: the subject received the spelling placement guide, was assigned to those wheels corresponding to items missed, took daily oral spelling tests designed to examine the acquisition of skills presented in the wheels, and was administered check tests when appropriate. The subject continued to receive the Spelling Survey Tests daily for 12 consecutive days during the treatment period. At the same time, the Fractions baseline was introduced. The subject received the single form of the Fractions Test each day for 9 consecutive days. No fractions treatment was administered during this time.

3) Spelling Follow-Up/Fractions Treatment: the subject continued to receive the Spelling Survey Tests for 4 consecutive days after withdrawal of spelling treatment. The fractions treatment, which consisted of 10 cartridges and posttests designed to teach elementary fractional concepts and operations, was presented at this time. The subject also received the Fractions Test each day of fractions treatment, covering a 5-day period.

4) Fractions Follow-Up: fractions treatment was completed and the subject continued to receive the Fractions Test over a 4-day period, after termination of fractional instruction. (See Appendices 3A and 4A for instructions concerning the administration of Spelling Survey and Fractions Tests.)

The subject received an edible reinforcer after the administration of each test during all experimental conditions. Throughout the 28-day period in which the multiple baseline design was conducted, the subject received instruction in reading comprehension, multiplication, division, and arithmetic conceptualization (not including fractions). This design was also attempted with a second subject, but due to the fact that she had progressed to the Homeward Bound treatment step of the Learning House promotion hierarchy, multiple testings during the latter treatment stages were precluded and she was dropped from the study. The original design, utilizing both selected subjects, is included in Appendix 5A.

RESULTS

The results indicated that during the spelling baseline, the subject received a mean percentage of 25.4% correct responses; during spelling treatment he received a mean percentage of 33; and during spelling follow-up, a mean percentage of 46.75. Thus, an 8% increase in correct responding was shown from baseline to treatment, and a 21% increase from baseline to follow-up.

Even greater gains, however, were shown after treatment on the Fractions Test. During baseline, the subject received 29.3% correct responses; during fractions treatment, 78.4%; and during follow-up, 97% correct responding. The subject thus showed a 49% increase from baseline to treatment, and a 68% increase from baseline to follow-up (see Table 1A and Figure 1A, following this page).

DISCUSSION

The subject depicted less variability and a far greater degree of correct responding in fractions than in spelling for several reasons: 1) from comparison of the subject's reading and

TABLE 1A

DAILY PERCENTAGE ON SPELLING SURVEY AND FRACTIONS TEST FOR MULTIPLE BASELINE DESIGN

Spelling

Baseline

Day	Percentage
1	19
2	29
3	17
4	23
5	38
6	19
7	23

Mean Baseline:
8-25.43

Treatment

Day	Percentage
8	35
9	23
10	25
11	27
12	25
13	46
14	29
15	46
16	32
17	33
18	42
19	33

Mean Treatment:
8-33

Follow-up

Day	Percentage
20	25
21	54
22	50
23	58

Mean Follow-up:
8-46.75

Fractions

Baseline

Day	Percentage
8	32
9	68
10	32
11	24
12	40
13	16
14	20
15	16
16	16

Mean Baseline:
8-29.3

Treatment

Day	Percentage
20	80
21	52
22	100
23	64
24	96

Mean Treatment:
8-78.4

Follow-up

Day	Percentage
25	96
26	100
27	96
28	96

Mean Follow-up:
8-97

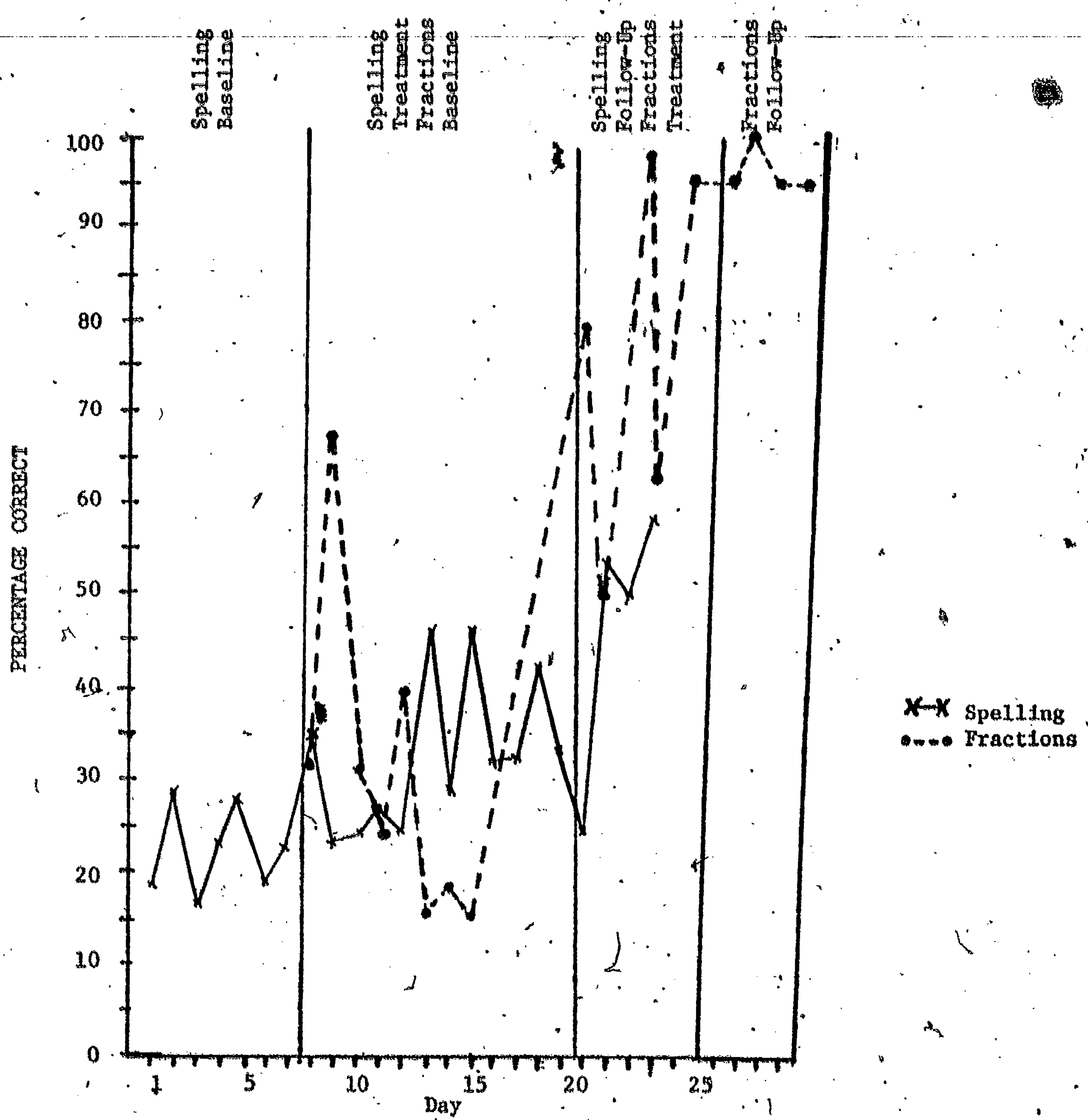


Figure 1A. Daily Percentage on Spelling Survey and Fractional Test for Multiple Baseline Design arithmetic scores, it is clear that the subject has greater arithmetic ability (grade equivalents of 8.6, conceptualization, and 6.7, computation) than reading ability (grade equivalent of 5.8, reading comprehension); 2) the subject's improvement over the summer tutorial session was greater in arithmetic (1.95 years, conceptualization; 1.85 years, computation) than in reading (1.00 years, reading comprehension), indicating that the tutorial procedures utilized were more effective in remediating arithmetic than reading deficits for this subject; 3) the Spelling Survey Tests consisted of 48 items from all 11 graded ability levels; however, the subject's scores on the placement guide indicated that he needed to complete learning wheels at the lowest level. Thus, during the 12-day treatment period, he only completed four of the eleven levels (and in addition, one set of wheels from the syllabication unit of a lower grade kit--SRA Spelling Lab 2a--as he showed severe deficits in this area; 4) the subject completed all 10 cartridges from the fractions instructional kit, and passed each posttest at 90% criterion level or above within a 5-day period. Thus, he had received instruction in all areas examined on the fractions test while he had only been instructed in 36% of the items tested on the Spelling Survey Tests; 5) the subject received the same form of the Fractions Test each day, but different forms of the Spelling Survey Test, which should account for the greater variability in spelling. Also, once all problems on the Fractions Test could be solved correctly, the subject may have memorized the correct response to each item.

However, despite the fact that the subject was responding correctly to only 47% of the items on the Spelling Survey Test during the follow-up period, he nevertheless showed a posttreatment improvement of 2.17 stanines on the Word Analysis subtests (syllabication, sound discrimination, and blending) of the Stanford Diagnostic Reading Test, depicting at grade level performance in this area. The subject also improved 2 stanines from pre to posttesting on the Fractions subtest of the Stanford Diagnostic Arithmetic Test, also indicating near grade level achievement.

This subject continued to display academic progress upon return to his home. The last report received by the investigator indicated that he received B's in all subject areas except Science (in which he received a D) in the regular seventh grade class in which he was placed. It should be recalled that this child was originally diagnosed as learning disabled, but at this time appears to be functioning quite ably in most academic areas.

APPENDIX 1A

SPELLING ACHIEVEMENT SURVEYS

Dictate each word in the order given. After a brief pause, read the illustrative sentence. Pause, and say the word again.

The words are to be written by the students on the Spelling Achievement Survey pages, which are in the Student Record Book.

To correct the survey, circle the wheel designation wherever a word is misspelled.

Whenever a pupil spells a word incorrectly, he should study the words on that wheel even though he has studied the material before.

Some teachers may desire a more complete analysis of the student's problems at the outset. The following method is more accurate, but it incurs the danger of overwhelming poor spellers with the number of their errors. This method requires that the teacher analyze the types of errors made in each word. Note that on the Achievement Survey the most likely error in the testing word is underlined. At the end of the sentence, other types of errors are indexed to the appropriate Learning Wheels. For example, on Form X, *escort* is used to test knowledge of the spelling skill covered by Learning Wheel C-2--the sounds of *ar* and *or*. The expected error is the misspelling of the *or*; hence the letters *or* are underlined. If the student misspells this portion of the word (*escoart*), he must study Learning Wheel C-2. At the end of the sentence, the *c* in *escort* is indexed to Learning Wheel D-1, which deals with /k/. If both portions of the word are misspelled (*eskoart*), both Learning Wheels should be circled on the Program Chart.

SPELLING ACHIEVEMENT SURVEY

FORM X

A-1	soft	The puppy's fur is soft. soft
A-2	soot	The snow is dirty with soot. soot
A-3	tube	The glue is in a tube. tube
A-4	nuisance	John is a big nuisance. nuisance (ance I-5)
A-5	Speech	We heard the President's speech. speech (sp E-1, ch D-4)

cont.

B-1	bough	A squirrel jumped from the bough. bough (gh F-3)
B-2	saunter	I saw him saunter by. saunter (er G-6)
B-3	oyster	I've never tasted an oyster. oyster ((st E-1, er G-6)
B-4	jealous	The old dog was jealous. jealous (ous I-3)
B-5	gypsy	The old gypsy told our fortunes. gypsy
C-1	heartily	We all ate heartily. heartily (i-y I-4)
C-2	escort	You will need an escort. escort (c-D-1)
C-3	igloo	They found shelter in the igloo. igloo
C-4	veil	Mary wore a lace veil. veil
C-5	utensil	A skillet is a kitchen utensil. utensil
D-1	crocodile	He was eaten by a crocodile. crocodile (le C-5)
D-2	accept	I cannot accept it. accept
D-3	asphalt	The road is made of asphalt. asphalt
D-4	coaxed	Don't wait to be coaxed. coaxed
D-5	response	I didn't hear his response. response
E-1	prompt	I hope they are prompt. prompt
E-2	stretch	I'd like to get up and stretch. stretch
E-3	brochure	Send for the club's brochure. brochure
E-4	advise	That is not what I would advise. advise (ad H-6)
E-5	midget	At the carnival we saw a midget. midget
F-1	Write the abbreviation for *Maryland*. (Md.)	
F-2	Write the contraction for the words *I would*. (I'd)	
F-3	gnaw	Mice are destructive because they gnaw. gnaw
F-4	rhythm	That song has good rhythm. rhythm
F-5	raspberry	I prefer lemon or raspberry. raspberry
G-1	acid‡	He was burned by the acid. acid
G-2	travel‡	He likes to travel by train. travel
G-3	baggage	She lost most of her baggage. baggage
G-4	habit	Being late can become a habit. habit
G-5	cashier	Please pay the cashier. cashier
G-6	nourish	This milk will nourish the kitten. nourish
H-1	forcible	He is a very forcible speaker. forcible
H-2	radio + s (radios)	Our club has several radios. radios
H-3	prescription	This is a doctor's prescription. prescription
H-4	engage	I don't think they will engage him. engage
H-5	despite	He will win despite his enemies. despite
H-6	approve	I certainly hope you approve. approve

‡ Have the students write the word and underline the last syllable.

cont.

I-1	clumsily	They danced clumsily. clumsily
I-2	druggist	Get it from the druggist. druggist
I-3	dangerous	Careless driving can be dangerous. dangerous
I-4	definitely	Mary spoke very definitely. definitely
I-5	abundance	They have fruit in abundance. abundance
I-6	ambition	Jack has no ambition. ambition

SPELLING ACHIEVEMENT SURVEY

FORM Y

A-1	win	The boys thought their team might win. win
A-2	poor	At Christmas we collect money for the poor. poor
A-3	blame	When the dish broke, his little brother got the blame. blame
A-4	portrait	On the wall we saw the woman's portrait. portrait (or C-2)
A-5	cheat	When the boys played cards, he would sometimes cheat. cheat (ch D-4)
B-1	drowsy	As the hour got later, the scouts became more drowsy. drowsy (dr E-1, s E-4, y C-3)
B-2	vault	All of the jewels were locked inside the vault. vault (lt E-1)
B-3	avoid	Do you know what street to avoid? avoid
B-4	sweat	On a hot day you can see the horse sweat. sweat (sw E-1)
B-5	favorite	Which color is your favorite? favorite (or G-6)
C-1	swear	The angry old man started to swear. swear (sw E-1)
C-2	chorus	There are forty boys in the chorus. chorus (ch D-1, us I-3)
C-3	system	We studied the city's water system. system
C-4	believe	I believe the man is innocent. believe
C-5	miracle	An unbelievable event is called a miracle. miracle (ir G-5)
D-1	heroic	The deeds of King Arthur and his knights were very heroic. heroic
D-2	exist	There is no way for our plant life to exist on Mars. exist
D-3	sheriff	The outlaws were brought to the sheriff. sheriff
D-4	laughed	The TV show was so funny that we all laughed. laughed
D-5	mercy	When the third ghost appeared, old Scrooge begged for mercy. mercy (er G-6)
E-1	score	What was the final score in the game? score
E-2	clutch	He held the pencil in his clutch. clutch
E-3	chute	The boxes went sliding down the chute. chute
E-4	reason	What was Bill's reason for leaving? reason
E-5	fragile	The role is fragile. fragile

cont.

F-1	Write the abbreviation for the word *Florida*. (Fla.)	
F-2	Write the contraction for the words *are not*. (aren't)	
F-3	haughty	A very proud girl is said to be haughty. haughty (au B-2)
F-4	rhubarb	Most people like sugar on their rhubarb. rhubarb
F-5	hustle	At the railroad station you see people hustle. hustle
G-1	success†	Do you think Dan will be a success? success
G-2	startle†	The sudden noise might startle him. startle
G-3	madam	He said, "Excuse me, madam." madam
G-4	arrive	The bus from the city did not arrive. arrive
G-5	cereal	I eat cereal for breakfast. cereal
G-6	conductor	On the train your ticket is taken by the conductor. conductor
H-1	continuous	The roar of the sea is continuous. continuous
H-2	piano + s (pianos)	On the big ocean liner they had fourteen grand pianos. pianos
H-3	presume	A word that means almost the same as *suppose* is the word *presume*. presume
H-4	enchant	The cruel witch said that she would enchant the castle. enchant
H-5	despite	There is no one whom I despise. despise
H-6	applause	The acrobats got all the applause. applause (au B-2, s E-4)
I-1	merciful	When the poor old man told his story, the king was merciful. merciful
I-2	grinning	The ugly parrot on his shoulder seemed to be grinning. grinning
I-3	mountainous	The village is in a mountainous area. mountainous
I-4	ordinarily	Tonight we went out to dinner, but we eat at home ordinarily. ordinarily
I-5	suspense	The movie was filled with suspense. suspense
I-6	revision	Have you seen the revision of the book? revision

†Have the students write the word and underline the last syllable.

SPELLING ACHIEVEMENT SURVEY

FORM Z

A-1	job	He worked for thirty years at the same job. job
A-2	stood	There were no more chairs, so the people stood. stood
A-3	behave	How does the little baby behave? behave
A-4	exclaim	To shout something with enthusiasm is to exclaim. exclaim (x D-2)
A-5	breeze	The strong wind died down to a small breeze. breeze (z E-4)
B-1	chowder	My favorite soup is clam chowder. chowder (er G-6)
B-2	applaud	When the singer finished, the people began to applaud. applaud (app H-6)
B-3	royal	The members of the king and queen's family are said to be royal. royal (al C-5)
B-4	steady	The flagpole was not very steady. steady (st E-1, y C-3)
B-5	spirit	Another word for *ghost* is *spirit*. spirit (ir G-5)
C-1	hardware	Nuts and bolts and tools are all considered hard-ware. hardware
C-2	reward	If you catch the thief, you will get a large reward. reward
C-3	humid	When the weather is hot at the beach, it is apt to be humid. humid
C-4	receive	How many copies of the book did he receive? receive
C-5	dismal	It rained all day and was very dismal. dismal (s E-4)
D-1	slick	The freezing rain made the roads slick. slick (sl E-1)
D-2	tuxedo	A type of formal suit for a man is called a tuxedo. tuxedo
D-3	trophy	Our team won a big gold trophy. trophy (y C-3)
D-4	cracked	When we opened the box, we found the flasses were cracked. cracked
D-5	service	This restaurant is known for its good service. service (er G-6)
E-1	zebra	There are many black and white stripes on a zebra. zebra
E-2	pitch	When the wind began to blow, the boat started to pitch. pitch
E-3	chiffon	Her scarf was made of chiffon. chiffon
E-4	gauze	Another name for bandage material is gauze. gauze (au B-2)
E-5	legend	We read an Indian legend. legend

Cont.

F-1	Write the abbreviation for the word *Vermont*. (Vt.)	
F-2	Write the contraction for the word *cannot*. (can't)	
F-3	plumber	The man who fixed the pipes is called a plumber. plumber
F-4	gingham	A type of cloth from which dresses are made is called gingham. gingham
F-5	mistletoe	You must kiss a person if you are caught under the mistletoe. mistletoe
G-1	static†	The broadcast was hard to understand because of the static. static
G-2	nickel†	Five cents will make one nickel. nickel
G-3	banana	The monkey liked to eat a banana. banana
G-4	address	He very carefully wrote out his complete address. address
G-5	dreary	On a dark, gloomy day everything seems to be dreary. dreary
G-6	humor	The happy old gentleman was known for his sense of humor. humor
H-1	sincerity	He spoke with great sincerity. sincerity
H-2	tomato + s (tomatoes)	His mother brought home a bushel of tomatoes. tomatoes
H-3	predict	Our science teacher knows what the weatherman will predict. predict
H-4	endure	The silence was very difficult for the little boy to endure. endure
H-5	destroy	How many warships did the enemy destroy? destroy (oy B-3)
H-5	afford	That car is the best that we can afford. afford
I-1	angrily	When he cut his thumb he looked up angrily. angrily
I-2	splitting	The children laughed until they felt as though their sides were splitting. splitting
I-3	marvelous	Although it rained yesterday, the weather today is marvelous. marvelous
I-4	awfully	The old man looked awfully tired. awfully
I-5	elegance	The luxury of the hotel room gave them a feeling of elegance. elegance
I-6	insertion	The insertion of a comma can change the meaning of a sentence. insertion

†Have the students write the word and underline the last syllable.

APPENDIX 2A

NAME:
DATE:
SCORE:

FRACTIONS

CIRCLE THE CORRECT ANSWER

1) Which fraction is equal to 1? $\frac{1}{2}$ $\frac{2}{2}$ $\frac{3}{2}$

2) Which fraction is smaller than 1? $\frac{1}{2}$ $\frac{2}{2}$ $\frac{3}{2}$

3) Which fraction is larger than 1? $\frac{1}{2}$ $\frac{2}{2}$ $\frac{3}{2}$

4) $\frac{1}{6} + \frac{2}{6} + \frac{1}{6} =$

5) $\frac{6}{7} - \frac{6}{7} =$

6) $\frac{3}{4} \times \frac{1}{4} =$

7) $\frac{3}{8} \div \frac{1}{4} =$

FIND EQUIVALENT FRACTIONS

8) $\frac{-}{4} = \frac{}{20}$

9) $\frac{3}{4} = \frac{}{16}$

REDUCE

10) $\frac{6 \div 2}{12 \div 3} =$

11) $\frac{5}{15} =$

12) ADD $2\frac{3}{4}$ $+5\frac{2}{4}$

13) $3\frac{1}{2}$ $+2\frac{1}{2}$

14) SUBTRACT $6\frac{3}{5}$ $-2\frac{1}{5}$

15) CHANGE MIXED NUMBERS TO IMPROPER FRACTIONS

$3\frac{3}{5} =$

16) MULTIPLY

$\frac{6}{7} \times 4 =$

17) $2\frac{2}{3} \times 7 =$

18) DIVIDE

$4 \quad \frac{3}{5} =$

19) $3\frac{1}{2} \quad 1\frac{2}{5}$

20) ADD

$$\begin{array}{r} \frac{1}{3} \\ + \\ \underline{\frac{1}{2}} \end{array}$$

21)

$$\begin{array}{r} \frac{1}{5} \\ + \\ \underline{\frac{2}{6}} \end{array}$$

22) $\frac{1}{4} + \frac{3}{5} =$

23) SUBTRACT

$\frac{2}{3} - \frac{1}{2} =$

24) $\frac{4}{5} - \frac{3}{6} =$

25)

$$\begin{array}{r} \frac{3}{4} \\ - \\ \underline{\frac{2}{3}} \end{array}$$

APPENDIX 3A

DIRECTIONS FOR THE ADMINISTRATION OF THE SPELLING ACHIEVEMENT SURVEY

Dictate each word in the order given. After a brief pause, read the illustrative sentence. Pause, and say the word again. The words are to be written by the children on the answer sheet provided. After completion, correct the test, and place the score (number correct) in the place provided on the answer sheet. The Spelling Achievement Test for Kit 2b is on pages 22-23 of the Teachers Manual; for Kit 2c, pages 24-25 of the Teachers Manual. Familiarize yourself with the test before administering, paying particular attention to the items with asterisks. Do not allow the child to see the corrected paper under any circumstances, since he will be administered this test each day before, during, and after spelling remediation. Do not tell him the score that he receives. Inform the child that he will be receiving this test each day to see if he improves in spelling. Each day he will receive an edible for completion of the spelling test. Also inform the child that there are three forms of the spelling test and that he will receive different forms each day. Praise the child for being so patient in taking the test each day.

APPENDIX 4A

DIRECTIONS FOR THE ADMINISTRATION OF THE FRACTIONS TEST

Administer Fractions Test at child each day. Use designated answer sheets. Do not help the child with any of the problems. Do not allow the child to see the corrected paper under any circumstances, since he will be administered this test daily before, during, and after fractions instruction. Do not tell him the score that he receives. Each day the child should receive an edible and 2500 points for completion of the fractions test. Praise the child for being so patient in taking the test each day.

APPENDIX 5A

PROPOSED INTENSIVE DESIGN SPELLING & FRACTIONS

Subjects 1 and 2

Tammy and Brian

Spelling

June 30 - July 11, 2-week base	July 14-25, 2 week intervention	July 28 - Aug. 8 2-week base

Fractions

July 14-25, 2-week base	July 28 - Aug. 8, 2-week intervention	Aug. 11-22 2-week base