



University of Nebraska at Omaha
DigitalCommons@UNO

Student Work

8-1-1979

Self-Instructional Training to Increase Independent Work Skills in Preschoolers

Lorrie E. Aubert

University of Nebraska at Omaha

Follow this and additional works at: <https://digitalcommons.unomaha.edu/studentwork>

Recommended Citation

Aubert, Lorrie E., "Self-Instructional Training to Increase Independent Work Skills in Preschoolers" (1979). *Student Work*. 2421.
<https://digitalcommons.unomaha.edu/studentwork/2421>

This Thesis is brought to you for free and open access by DigitalCommons@UNO. It has been accepted for inclusion in Student Work by an authorized administrator of DigitalCommons@UNO. For more information, please contact unodigitalcommons@unomaha.edu.



SELF-INSTRUCTIONAL TRAINING TO INCREASE
INDEPENDENT WORK SKILLS IN PRESCHOOLERS

UNIVERSITY LIBRARY
UNIVERSITY OF NEBRASKA AT OMAHA

A Thesis
Presented to the
Department of Psychology
and the
Faculty of the Graduate College
University of Nebraska

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts
University of Nebraska at Omaha

by
Lorrie E. Aubert
August 1979

UMI Number: EP73967

All rights reserved

INFORMATION TO ALL USERS

The quality of this reproduction is dependent upon the quality of the copy submitted.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if material had to be removed, a note will indicate the deletion.



UMI EP73967

Published by ProQuest LLC (2015). Copyright in the Dissertation held by the Author.

Microform Edition © ProQuest LLC.

All rights reserved. This work is protected against unauthorized copying under Title 17, United States Code



ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 - 1346

THESIS ACCEPTANCE

Accepted for the faculty of the Graduate College, University of
Nebraska, in partial fulfillment of the requirements for the degree
Master of Arts, University of Nebraska at Omaha.

Thesis Committee

| Name | Department |
|------------------|-------------|
| Karen Budd | Psychology |
| Joseph P. LaVoie | Psychology |
| Michael Lebowitz | Psychology |
| Helen Howell | Elem. Educ. |

Karen Budd
Chairman

July 19, 1979
Date

ACKNOWLEDGEMENTS

I would like to express my appreciation and thanks to Drs. Karen Budd, Helen Howell, Joseph LaVoie, and J. Michael Leihowitz for serving on my thesis committee and for their critical suggestions. Special thanks are extended to Dr. Budd for her support and advice in the planning and implementation of the study as well as her suggestions in the preparation of this manuscript. I would also like to express my thanks to Vivian Ungles for her cooperation in implementing the special procedures in the classroom, and her continued support throughout the duration of the study. Thanks are also extended to my reliability observers, Denise Bauersachs and Mona Casey, for their assistance. Special thanks also to Sam Bryant for his patience, understanding and support throughout the duration of the study and preparation of this manuscript.

TABLE OF CONTENTS

| | Page |
|---|------|
| Abstract | 1 |
| Introduction | 2 |
| Method | 11 |
| Results | 29 |
| Discussion | 35 |
| Reference Note | 42 |
| References | 43 |
| Tables | 47 |
| Figures | 51 |
| Appendix A: Samples of worksheets | 55 |
| Appendix B: Checklists | 61 |

Abstract

The effects of cognitive self-instructional training on performance of independent work skills in three impulsive, disruptive preschool children was investigated using a multiple-baseline design across subjects. Behavioral observations of the children in the classroom indicated that, after the introduction of self-instructional training, there was an increase in on-task behavior and work completion for two subjects and an increase in accuracy of work for all three children. A second self-instructional training input had little effect on the children's classroom behavior; however, subsequent introduction of a mild incentive procedure directly into the classroom resulted in further improvement in two subjects rates of on-task behavior, as well as increases in accuracy and work completion for all three children. The subjects also increased their mean response latency and accuracy on the Matching Familiar Figures Test in comparison to other children in the preschool classroom.

Introduction

As early as preschool or kindergarten, some children have been identified as school behavior problems because of inattention, over-activity, or disruptive behaviors. The long-term impact of early school difficulties has been documented in follow-up studies showing that, without treatment, such children are likely to encounter serious adjustment and academic problems in later school years (Robins, 1972; Weiss, Minde, Werry, Douglas & Nemeth, 1971). One of the most active and promising areas for developing treatment procedures to deal with these inattentive, disruptive children has been that of applied behavior analysis.

The principles of applied behavior analysis have led to the development of several effective procedures for decreasing disruptive behavior and increasing attending behavior in classroom settings (Kazdin & Craighead, 1973; O'Leary & O'Leary, 1972). However, many of these treatments have been limited in the extent to which the new responses maintain after intervention, and have failed to obtain generalization of treatment effects to other settings (Bornstein & Hamilton, 1975; Kazdin & Bootzin, 1972; O'Leary & Kent, 1973; Stokes & Baer, 1977). Kazdin (1975) and others have proposed training subjects in self-control as a solution to the problems of generalization and responses maintenance, since this approach does not rely on outside agents for its continuation. The present study sought to teach a self-control procedure to young children as a means of increasing their appropriate independent work behavior, and examined the

generalization of training to everyday classroom performance.

Self-control has long been acknowledged as an important goal of formal education. John Dewey (1939) stated that "the ideal aim of education is the creation of power of self-control" (p. 75). Skinner (1953) described self-control, in behavioral terms, as the following:

When a man controls himself, chooses a course of action, thinks out the solution to a problem, or strives toward an increase in self-knowledge, he is behaving. He controls himself precisely as he would control the behavior of anyone else--through the manipulation of variables of which behavior is a function. (p. 228)

Skinner (1953) postulated that self-control often occurs when a response has conflicting consequences--short-term positive and long-term negative outcomes. An individual employs self-control to forego the short-term reinforcement and avoid the long-term negative consequences. D'Zurilla and Goldfried (1971) described self-control as occurring when an individual manipulates certain aspects of his behavior, over which he has good control, so as to stimulate or regulate other behaviors which are not under good control.

One type of self-control is that of verbally mediated self-control. Verbally mediated self-control involves the production of verbalizations to control the motor responses of a person by mediating between the stimulus situation and the target response. Verbally mediated self-control training has been employed by several investigators to reduce disruptive behaviors in the classroom (MacPherson, Candee & Hohman, 1974; Monahan & O'Leary, 1971). Since the individual is the

source of behavioral control within the verbal mediation paradigm, it is assumed that response maintenance and generalization will be facilitated (Meichenbaum & Cameron, 1973). Luria (1961) proposed that verbally mediated self-control had implications for use with disruptive children because it limits their talking out in class, decreases the opportunity for disruption of their goal-directed behavior, and facilitates the organization of their own activities.

One technique for training verbally mediated self-control is that of cognitive self-instruction (Meichenbaum & Cameron, 1974). This procedure consists of fading a set of prompts, instructions, and reinforcement regarding one's own behavior from an overt, external response to a covert, self-produced response. Meichenbaum (1974) has stated that self-instructional verbalizations on tasks may facilitate behavior by: (1) organizing information in the task and assisting the subject in generating alternative solutions, (2) aiding the subject in evaluating feedback by providing verbal mediators to distinguish relevant and irrelevant dimensions, and (3) enhancing a positive task orientation, reinforcing and helping maintain task-relevant behaviors, and providing ways of coping with failure and self-reinforcing success.

Among the first researchers to undertake an investigation of this type of verbal behavior was Luria (1961). Luria hypothesized that the internalization of behavior control in children develops in three progressive stages. First, the verbalizations of others (other-external) exert control over the child's behavior. By the time the child reaches 3 years, the child's own audible verbalizations

(self-external) gain control over his/her responses. Luria proposed that when the child reaches 4½ years, his/her verbalizations have become covert and assume more control over responding (self-internal). This model for the development of self-control has dominated much of the subsequent research in this area (Mahoney, 1974).

An early application of Luria's model was made by Bem (1967), who demonstrated that this three-stage progression of verbal self-instruction could be taught to improve performance of 3-year-olds engaged in number tasks. Bem's study indicated that a fading procedure, from external stimulus control to verbal self-instruction, is effective in teaching children to use speech to control their own behavior.

Investigators in the area of self-instruction have established that training in self-instruction has relevance for the remediation of problems of hyperactive children (Douglas, Parry, Marton & Garson, 1976; Kendall & Finch, 1978; Meichenbaum & Cameron, 1973; Meichenbaum & Goodman, 1969, 1971). Keogh (1971) hypothesized that hyperactive children have disturbed and speeded up decision-making processes. These children make decisions too rapidly and are considered to lack thoughtfulness, to lack ability to think things through and unable to delay responses. Palkes, Stewart and Kahana (1968) described hyperactive behavior as "heedless and slapdash" (p. 817). These descriptions of hyperactive children are consistent with Kagan's (1966a, 1966b) definitions of impulsive children. He uses the terms impulsivity and reflectivity to describe individual differences in children's tendency toward fast or slow decision time. The impulsive child characteristically has a shorter response latency and makes

more errors than the reflective child. These children's conceptual tempo is usually judged by the child's performance on the Matching Familiar Figures Test, which is presumed to reflect how carefully a child evaluates his or her cognitive products before offering a response (Kagan, 1966a). Reflective children take longer than impulsive children to respond on the test and make fewer errors.

The research literature offers at least six illustrations of the effect of self-instructional training with hyperactive children. Palkes et al. (1968) trained hyperactive 9-year-old boys to use self-instruction to "slow down" while solving Porteus Maze problems. Training involved the use of visual reminder cards with instructions and self-directed commands printed on them to remind the children to stop, listen, look and think before beginning a task. This training resulted in improved performance on the Porteus Maze, an untrained measure, and increased ability to "stay put" and attend to the task during training sessions. Palkes, Stewart and Freedman (1972a) employed the same procedure to train hyperactive boys, aged 7 to 13 years, in two 1-hour sessions. They were seeking to determine the relative effectiveness of reading self-directed commands silently versus vocalizing the self-directed commands. Their results indicated that vocalizing the command was more effective in improving the boys performance on the Porteus Maze than silent reading of the same commands.

Meichenbaum and Goodman (1971) trained second-grade hyperactive children to use self-instruction in four $\frac{1}{2}$ -hour sessions over a 2-week period. They hoped to train impulsive children to produce verbal commands or self-instructions and to respond to them appropriately in

order to increase problem solving behavior. Training consisted of fading a set of prompts, instructions and reinforcement of one's own behavior. This training was successful in modifying the children's behavior on a variety of psychometric measures that assess cognitive impulsivity but produced no decrease in inappropriate, not-task-specific behavior in the classroom. Bornstein and Quevillon (1976) employed the same training format with impulsive preschool children as a means to increase appropriate problem solving behavior. Training was accomplished in one 2-hour session with M & M's as reinforcers for correct behaviors. In contrast to Meichenbaum and Goodman's findings, the latter investigators found that the self-instructional training resulted in generalized treatment effects to the classroom with an increase in on-task behavior. Kendall and Finch (1978) also used the Meichenbaum and Goodman (1971) procedure, along with a response cost procedure, to train impulsive 10-year-olds to use self-instruction in six 20-min sessions. The children in the cognitive training group showed improvement on performance, self-report and rating scale measures after training as compared to a control group.

Modeling, self-verbalization, and self-reinforcement were also employed by Douglas et al. (1976) to train hyperactive 6- to 10-year-old boys to more effectively solve cognitive tasks, academic problems and social situations in 24 1-hour sessions over a 3-month period. The self-instructional training significantly improved the children's scores on several evaluative measures at posttesting and on a follow-up evaluation as compared to a control group which received no training.

While these studies demonstrate that self-instructional training can be used successfully with hyperactive children, they have several shortcomings. First, most studies have focused on children in middle elementary school grades, with scant investigation of self-instructional training of preschoolers. Second, the tasks employed by previous investigators to teach the self-instructional procedure have been largely experimental in nature. For example, the Matching Familiar Figures Test, Embedded Figures Test, Trial Making Test, portions of the Stanford-Binet, Wechsler Intelligence Scale for Children and Ravens-Matrices Test have been used in training self-instruction. While these tasks are appropriate for research purposes, the experimental nature of the tasks along with lengthy (20-min to 2-hour) training sessions do not seem appropriate for use by regular classroom teachers who may wish to train children to use self-instruction. If self-instruction merits the attention of educational personnel as a skill to be taught, it is important that more naturalistic training procedures be developed that will enable classroom teachers or resource specialists to use them with children needing special help.

Third, regarding generalization of self-instructional training to the classroom, most of the previous research has not looked at the issue to determine if the training is successful in increasing on-task behavior. Abikoff (Note 1) stated that most studies have relied on teacher rating scales to assess generalization effects of training to the classroom, as was done by Douglas et al. (1976), Kendall and Finch (1978) and Meichenbaum and Goodman (1971), and otherwise have limited their measures of improvement to the experimental measures (Douglas et al., 1976; Kendall & Finch, 1978; Meichenbaum &

Goodman, 1971; Palkes et al., 1968, 1972). When rating scales are used, the teachers rate the children's behavior before and after training with any improvement in ratings after training being considered generalization. Douglas et al. (1976), Kendall and Finch (1978) and Palkes et al. (1968, 1972) did not measure actual on-task behavior in the class to determine whether changes occurred after training. Meichenbaum and Goodman (1971) collected direct observational data in continuous time intervals of inappropriate classroom behavior, defined as any behavior which was not task specific, two days before and two days after training. They found no systematic change in the rate of inappropriate behavior across the two measurement periods; however, the vagueness of the behavioral definition and the small amount of classroom observation time makes it difficult to ascertain whether or not there were any generalized effects of self-instructional training in the classroom. Bornstein and Quevillon (1976) did observe on- and off-task behavior in the classroom using a 10-sec interval recording system while the children were drawing figures and reading stories, and they found that on-task behavior increased after instructional training. However, their definition of off-task behavior included only highly disruptive behaviors such as leaving the room, fighting and playing with toys rather than working at a task, while on-task behavior included both actively working and passively sitting during the class period. Thus, the measurement system did not clarify whether or not self-instructional training actually led to increased task performance by the children, but only whether it resulted in lower rates of disruptive behavior.

Considering that the research to date on self-instruction with young children is both incomplete and somewhat contradictory, additional study appears needed. The present investigation sought to develop a naturalistic training procedure for cognitive self-instruction so that the procedure could be employed by classroom teachers to increase on-task behavior of preschool, disruptive, impulsive children. The training sessions were short and spread over several days in contrast to previous investigations. The training tasks were worksheets of the type that are employed in regular classrooms rather than experimental tasks with which a child would only come in contact when being tested. The standard self-instructional training was also expanded to include components that would assist children in completing several worksheets at a time, rather than concentrating on completing only one row and then stopping for feedback. A classroom intervention, which could be easily employed by a teacher, was also instituted in the latter portion of the study for those children who appeared to need additional incentive to finish their work. Several classroom measures of child performance were collected in order to assess generalization of the skills trained to worksheets in the classroom, rather than relying on teacher rating scales as in previous research. In addition, the actual verbalizations of the subjects in the classroom were measured to determine if they were verbalizing the steps the experimenter taught them in order to complete the tasks with increased accuracy.

Method

Subjects

Three children, two male and one female, aged 4 and 5 years, served as subjects. A fourth subject also was observed but it was found that his rate of on-task behavior increased without intervention. His behavior continued to be monitored throughout the study as a normative subject. The subjects, along with three other children, were students in a remedial classroom that met four afternoons a week for 2½ hours in a large university clinic classroom, following the same 9-month schedule as the public schools in the area. The program, entitled PASS (an acronym for Programmed Activities for School Success), is an experimental early intervention program for young children who are experiencing disciplinary problems in preschool or kindergarten. The major problems of the children who are referred for the special classroom include aggression, not following instructions, a defiant or negative attitude, poor work habits, frequent moving around the classroom without permission and disruptive talking out.

One of the subjects, Cindy, had begun kindergarten in the fall but was dismissed after two months because of noncompliance in the classroom and poor independent work skills. The other two subjects, Edward and Josh, were referred to the program because of problems in preschool. They were described as being noncompliant and inattentive.

The three children were selected to serve as subjects for a variety of reasons. All were of average academic ability, which was assessed during a screening evaluation before admission to the classroom. The subjects were described by the PASS teacher as highly distractable and requiring a great deal of assistance to complete

worksheets. During preliminary observations by the experimenter with an interval recording system similar to that employed during the experiment, the three subjects displayed the lowest rate of appropriate on-task behavior during independent work time.

In addition to these observational measures, the children's performance on Kagan's Matching Familiar Figures (MFF) test (Kagan, 1966a) was used as a measure of cognitive impulsivity to select subjects. In this test, the child is shown a single picture of a familiar object (the standard) and four similar variants, only one of which is identical to the standard, and asked to find the one that is the same. The tendency toward fast or slow decision times and the number of errors are used to identify the degree of cognitive impulsivity. Meichenbaum and Goodman (1969) have reported a positive relationship between a child's relative inability to verbally control his motor behavior by means of covert self-instructions and an impulsive conceptual tempo on the MFF test. The subjects were found to make more errors and have a shorter response latency than the other children in the classroom on the MFF pretest, thus suggesting their appropriateness for self-instructional training. The test was repeated after training to determine if the subjects increased their response latency and decreased the number of errors in relation to the other children in the class who did not receive the training.

Six of the children in the class also were given the "Think it Through (Problem Solving)" subtest of the CIRCUS (1974). The CIRCUS is designed to provide teachers with information about children's competencies in a variety of areas. "Think it Through" concentrates

on the child's ability to identify problems; to classify and sort objects by their physical properties and functions; to evaluate problem solutions; and to identify the first event in a time sequence. On the pretest the subjects performed at a lower level than the other children. (One of the children in the class was not given the subtest because the subtest was above his cognitive capabilities.) "Think it Through" was repeated after training.

General Classroom Procedures

The PASS program employs structured activities and procedures of learning theory and behavior analysis to decrease the children's inappropriate behaviors and teach essential school skills. Each school day, the children participated in several educational and recreational activities similar to those in a kindergarten classroom. An experienced teacher was responsible for planning and carrying out the children's daily activities, and graduate and undergraduate psychology students served as aids. Typically there were two adults (one teacher and one aide) present in the class at all times. Seven activity periods were conducted daily: free play, large group lesson, independent work, recess, small group lesson, art, snack and storytime.

Settings and Activities

Independent work time was selected as the period to observe the children for this research because during this activity the children worked individually on worksheets similar to those used in preschool and kindergarten classrooms. This type of activity required the children to use problem solving skills to complete the worksheets.

Independent work time was a 20-min period in which the seven

children sat at a round table to do the worksheets. The table was located in a corner of the classroom. The subjects were seated adjacent to one another around half of the table. The teacher displayed samples of the worksheets for the day on a stand so that all of the children could view them as she described how to complete them and could refer back to the samples while doing their work.

Five different worksheets were assigned to the children each day for the period throughout the study. The teacher selected four worksheets that related to lessons she had planned for other periods of the class day. The worksheets dealt with number concepts, letter writing, color labels, fine motor skills and putting objects into categories. The teacher informally judged the difficulty level of the worksheets in an effort to keep them generally comparable across days, but with gradual increases in difficulty as the children acquired new skills. The fifth worksheet was chosen by the experimenter and was one of the types used for self-instructional training or generalization assessment. These worksheets included: (1) finding the same, (2) mazes, (3) size sequencing, (4) sequencing to tell a story, and (5) finding what is missing from a picture of a familiar object. These five types of worksheets were selected because they had been used in previous investigations of self-instruction and problem solving (Meichenbaum & Goodman, 1971; Palkes, Stewart & Freedman, 1972), they were the type of skills measured by the "Think it Through" subtest of CIRCUS (1974), and because these particular children appeared to have difficulty with these type tasks. A sample of each type of training worksheet is shown in the Appendix (see Appendix A).

The teacher displayed the five worksheets for the day with approximately 20-25% of each one completed. She gave the children initial instructions on how to complete the worksheets and then gave them their materials to begin their work. The teacher and aide provided attention periodically throughout the 20-min period. The procedures of independent work period are further described in the procedures section.

In addition to the daily independent work period, experimental observations were made of the self-instructional training sessions. These sessions took place during the first 10 min of the free play period, which occurred at the beginning of the class day. Approximately 40 min elapsed between training and independent work time. Training sessions were conducted in a classroom adjacent to the PASS classroom, with each subject trained individually by the experimenter. The child and experimenter sat side-by-side at a rectangular table facing a one-way mirror. The exact training procedure is explained in the experimental design and procedures section.

Observations, Performance Measures, and Reliability Procedures

Independent Work Time. Observations of 20 min were conducted each day during the independent work period by an observer equipped with a stopwatch and clipboard. The observer and an additional reliability observer were trained in the use of the stopwatch, appropriate observational techniques and how to record the child and teacher behaviors employing the operational definitions. The observer entered the classroom quietly and stood approximately 4 feet from the children and teachers, positioning herself so that it was possible to see and hear

all behaviors. The observer was responsible for recording the behaviors of all four children in a rotating 10-sec on, 5-sec off recording system. In this system an individual child was watched for 10 sec, then his/her behavior recorded during an intervening 5-sec interval; then the observer rotated to the second child for 10 sec of observation and 5 sec of recording; and this pattern was repeated across children throughout the period. In this way each child was observed for one 10-sec interval each minute of the period. If a subject was absent one of the other children in the class was observed in order to obtain normative data.

The observers recorded the occurrence of on-task behavior, self-instructional verbalizations, spontaneous talking, disruptive behaviors, positive teacher attention, instructional teacher comments and contingent observation. Only one instance of each behavior was recorded in each 10-sec interval.

On-task behavior was recorded during the initial explanation of how to complete the worksheets, whenever a child was looking at the teacher or task materials for a continuous 5-sec period or answering questions directed to the group. Once the children received all their work materials, a child was considered on-task if any instance of working at the task (e.g., marking, coloring, erasing) occurred in a 10-sec interval while the child was looking at the task paper. The child was not scored as on-task if he/she performed actions totally unnecessary to the task, such as coloring in a picture when asked to circle items.

Self-instructional verbalizations were scored whenever a child verbalized or whispered one of the steps involved in self-instructional

training. The verbalizations included: (1) telling oneself to stop and look, (2) asking self questions about the task, (3) answers to questions about the task, (4) self-instructions to guide through task, and (5) self-reinforcement or acknowledgement of work accomplished.

Spontaneous talking included any child verbalizations or noises that were not self-instructional and were not specifically instructed, requested or implied by the teacher. Spontaneous talking was not recorded when a child verbalized while the teacher was attending to him/her.

Three disruptive behaviors were also recorded. These behaviors included:

Off area: anytime the child was not at his/her assigned position at the task table and within reach of own task materials, or was in a position at the table that made work on the task impossible.

Aggression: a motor attack on another person or their materials that either made physical contact with or came within 1 foot of another person or their materials.

Destructive use of materials: any dangerous or damaging use of a child's own materials or those being used by no other child in particular.

In addition to the child behaviors, three teacher behaviors were scored, as defined below.

General praise was recorded whenever the teacher provided any verbal or physical attention to a specific child that approved of the child's behavior or acknowledged his/her accomplishments.

General instructional comments included any teacher instructions,

invitations, requests or suggestions for the child to complete the assigned task. This behavior also included asking the child questions about the task, explanatory or descriptive comments about the task and physical assistance to complete the task.

Contingent observation was the standard disciplinary procedure employed in the classroom. A child was removed from the group to "sit and watch" for 1 min whenever a disruptive behavior occurred. When a child would not sit and watch he/she was moved to a timeout area for 2 min. If a child was placed in contingent observation or timeout during independent work time, the occurrence of contingent observation or timeout was denoted and recording of child behaviors and teacher responses to that child suspended until the child returned to the task table.

Interobserver agreement data were collected on several occasions by having a second observer simultaneously but independently record the same behaviors. The records of the two observers were compared interval by interval and a percentage of occurrence agreement was calculated for each behavior by dividing the number of agreements by the total number of agreements plus disagreements, and multiplying this quotient by 100. An agreement was scored when both observers recorded the same behavior during the same 10-sec observation interval. Nonoccurrence agreement was also calculated for on-task behavior by examining 10-sec intervals in which on-task behavior did not occur. An agreement was scored when the two observers agreed that the subject did not display on-task behavior. Nonoccurrence reliability was calculated for this behavior because on-task behavior was expected to

occur at a relatively high frequency during some portions of the study, and in these cases computation of nonoccurrence reliability provided a more stringent measure of interobserver agreement.

Audiotapes of independent work time were also collected. A clip-on microphone was attached to the children's shirts in order to maximize the clarity of recording the verbalizations. Tapes were made of two subjects per day so that each child was recorded twice during the week. The experimenter listened to these tapes following the period and wrote out verbatim each instance of self-instructional verbalization. A reliability observer independently listened to the tapes twice a week to determine interobserver agreement. Each occurrence of a self-instructional verbalization, along with the corresponding denotation of the number on the tape recorder, was compared and agreement scored when both observers recorded the same verbalization and the same number. In order to be considered an agreement the verbalization could differ by no more than two words and the number by no more than five. A measure of interobserver agreement was obtained by calculating the number of agreements divided by the total number of agreements plus disagreements, and multiplying this quotient by 100.

The teacher judged work completion at the end of the 20-min period as an additional performance measure. The teacher judged the child as either completing the entire assignment or as completing none or only part of the assignment. Reliability of the teacher's judgments was assessed by having one of the teacher aides make independent judgments once a week. Percentage agreement between their

records was determined in the same manner as above.

The final measure collected during the independent work period was the grading of the children's worksheets by the experimenter to determine the percentage of correct responses. This grading occurred only on one of the five daily worksheets; specifically, on the one selected in advance by the experimenter, which paralleled the types or tasks used during self-instructional training sessions. The classroom teacher independently graded the papers to assess reliability of scoring. Reliability was calculated in the same manner as the other measures.

Training Sessions. Data relating to actual training sessions was collected on checklists. The Self-Instructional and Expanded Self-Instructional Checklists were scored by an observer during each training session. These checklists monitored the extent to which the experimenter and the child followed the prescribed self-instructional steps. Both the experimenter and child were scored on the checklists, depending on what phase of the training procedure was occurring (see Tables A and B in Appendix B for an example of the checklists). A reliability observer was present twice a week to complete the checklists and determine interobserver agreement.

In addition, the Experimental Procedure Checklist was scored by the experimenter from audiotapes following the training sessions. This checklist was completed to assure that the experimenter carried out the same procedure with each subject (see Table C in Appendix B for an example of this checklist). A reliability observer independently scored the checklist from the audiotapes twice a week. The components

#1 to #6 corresponded to the training phases and could be scored more than once in a session (Trials 1 to 5), or not at all in a session, depending on what phases of the procedure were being trained. The subcomponents under the first six components were also scored if that phase was being trained. Component #7 was scored at the end of each session. If the component or subcomponent occurred the observer placed a check on the line; if it did not occur a minus was recorded.

Interobserver agreement for the two checklists was calculated by dividing the number of occurrence agreements by the total number of agreements plus disagreements, and multiplying by 100. An agreement was scored when both observers recorded the same behavior on the same line of the checklist.

Experimental Design and Procedures

This study employed a multiple-baseline design across three subjects. The children were trained independently of each other, with self-instructional training being completed for one subject before it was initiated for a second subject, and then for a third. Similarly, a later classroom intervention procedure was introduced sequentially across the three subjects in a multiple-baseline design. This design controls for the effectiveness of the interventions by allowing an examination of the changes in child behavior during independent work that are correlated with the introduction of self-instructional training or classroom intervention for that child. While an increase in independent work skills might, for any one child, occur by chance at the same time treatment is begun for that child, a consistent pattern of improved independent work when treatment is provided

experimentally demonstrates the effect of the intervention (cf. Hersen & Barlow, 1976; Kratochwill, 1978; Sidman, 1960).

Baseline. Baseline continued for eight days for the first child undergoing training, 15 days for Subject 2, and 25 days for Subject 3. Behavioral observations and performance measures were collected daily during the independent work time. The teacher explained how to complete the five worksheets to the children as she referred to sample copies on the display board. The samples of the five worksheets were approximately 20-25% complete.

During baseline the observer cued the teachers at 3-min intervals (by two clicks of a hand-held counter) to provide attention to the subjects. The teachers were asked to spend 10 to 20 sec with each child praising his/her accomplishments, asking what needed to be done next, answering any questions and instructing the child to continue working. This procedure served to keep the amount of teacher attention each child received relatively constant across days and assured that one child did not receive more attention than the other children.

In addition, the children in the class were required to finish their worksheets before going outside for recess. Contingent observation, with a back-up timeout, was employed for children who exhibited disruptive behavior (e.g., aggression, off area and destructive use of materials). If a child was placed in contingent observation he/she was removed from the group for a brief period of time and then invited back to the work table to finish his/her papers. For a more detailed description of the contingent observation procedure see Porterfield, Herbert-Jackson and Risley (1976).

Self-Instruction Training I. Subjects received training individually for nine sessions, lasting 10 min each. The self-instructional training was similar to that described elsewhere (Meichenbaum & Goodman, 1971) and proceeded as follows: (1) the experimenter modeled the task while talking aloud to herself, (2) the subject performed the same type of task while the experimenter instructed aloud, (3) the subject performed the same type of task talking aloud to him/herself while the experimenter whispered, (4) the subject performed the same type of task whispering while the experimenter made lip movements but no sound, (5) the subject performed the same type of task making lip movements without sound, and (6) the subject was asked to say the words to him/herself while performing the same type of task. Three of the phases were covered each day of training: on Day 1, phases 1, 2 and 3; Day 2, phases 2, 3 and 4; Day 3, phases 4, 5 and 6. The entire procedure was repeated three times with each subject. The procedure was trained in its entirety for three types of worksheets: finding the same, mazes and size sequencing.

The self-instructional verbalizations that were modelled were of five types: (a) stop and look (e.g., "First I must stop and look at my worksheet."); (b) questions about the task (e.g., "What does the teacher want me to do?"); (c) answers to questions about the task (e.g., "That's right, I'm supposed to put these in order from smallest to largest."); (d) self-instruction to guide through task (e.g., "This is the first picture in the story, I'll mark it green. . ."); and (e) self-reinforcement or acknowledgement of work accomplished (e.g., "I really did a good job on this one.").

More specifically, the self-instructional procedure consisted of the experimenter initially instructing the child, "_____ (child's name), watch what I do and listen to what I say." If the child listened and kept his/her eyes on the worksheet, the experimenter verbally praised. If the child did not listen and watch the experimenter prompted the child that it was necessary to listen to what she said and watch what she did and then the experimenter repeated the phase. After the phase was completed, and the child had been praised, the experimenter then said to the child, "_____ (child's name), this time you do it while I say the words." The child was then praised if he/she followed all of the instructions of the experimenter. If the child did not follow all of the instructions, he/she was prompted to do so and phase 2 was repeated until the child correctly followed all of the instructions. If the child found the correct answer he/she was praised. If an incorrect answer was marked the experimenter showed the child what would have been correct and told him/her that it was alright to make mistakes. Later in the training sequence, when the child was asked to verbalize on his/her own (e.g., "Now you say the words while you do the paper."), the child was praised for saying all of the steps and for finding the correct answer. If a child missed a step, the experimenter again modelled the five self-instructional steps while completing the worksheet. Then the child returned to the phase where he/she erred. If the child refused to comply, the experimenter repeated her instructions and again modelled an appropriate response. When the child successfully completed a phase, he/she was given instructions for the next phase in the training

sequence. When all six phases were completed for one type of worksheet, the experimenter presented a new type of worksheet and again modelled its completion while talking aloud to herself (e.g., phase 1). At the end of each training session the child was told that saying the things he/she had been practicing would help in the classroom when doing the worksheets that the teacher gave them; however, no overt instructions, prompts, or feedback was given regarding use of the self-instructional procedure in the independent work period.

Independent work time was carried out in the classroom just as it was during baseline. The children continued to be instructed by the teacher to complete five worksheets, one of which was a type that was trained or a generalization worksheet. The teachers were cued to attend to the subjects at 3-min intervals. The teachers were asked to not make any comments about the self-instructional procedure while the children were in the classroom.

Post-Training I. At the conclusion of the self-instructional training each subject was observed during the independent work time for several sessions to determine if the training had any delayed effects on the children's behavior. Independent work time was conducted the same as during the baseline period.

Self-Instructional Training II. The purpose of this additional training procedure was to (1) provide additional exposure to the self-instructional procedure; (2) incorporate into the self-instructional training emphasis on beginning work immediately, not watching the other children, and moving down the page when finished with one line or moving on to the next worksheet when one was completed; and

(3) introduce a positive incentive into the self-instructional training sessions. This condition was introduced sequentially across two of the subjects. The training procedure was the same as during the initial training described above except that two phases were trained each day for five days: on Day 1, phases 1 and 2; Day 2, phases 2 and 3; Day 3, phases 3 and 4; Day 4, phases 4 and 5; and Day 5, phases 5 and 6. For each training phase the experimenter and/or subject completed three worksheets, one of each type trained: finding the same, mazes, and size sequencing.

As an incentive procedure, a kitchen timer and stickers were introduced into the training sessions. The timer was set for 10 min and if the child completed all three worksheets before the bell rang, he/she received one sticker for each worksheet. Rainwater and Ayllon (1976) introduced a timer in the math and reading periods for four first-grade subjects who were rated as the poorest achieving students by their teacher. With the introduction of the timer the correct number of problems the children completed per minute increased dramatically.

The self-instructional verbalizations that were modelled were of eight types: (a) finish before the timer (e.g., "I must work so I can finish before the timer."); (b) stop and look (e.g., "As soon as I get my worksheets I must look at my paper."); (c) questions about the task (e.g., "What does the teacher want me to do?"); (d) answers to questions about task (e.g., "I'm supposed to find the same."); (e) self-instruction to guide through task (e.g., "I put an X on this one."); (f) move to next one (e.g., "Now I move

right to the next one."); (g) self-reinforcement and go to next page (e.g., "Good I got this page all finished, now I go right to the next page."); and (h) finish before timer (e.g., "I finished before the timer so now I get my stickers.").

Specifically the expanded self-instructional procedure was the same as the initial training except for the addition of the two components. Before beginning each phase the experimenter said, "_____ (child's name), I'm setting the timer and if you finish before the bell rings you can have three stickers on this card to take home." After the child completed all three worksheets the experimenter asked the subject if he/she finished before the bell rang. If the child said yes, and the experimenter agreed, the child was allowed to select three stickers. If the child said yes, and the experimenter did not agree, then he/she was told, "No _____ (child's name) you did not get done before the bell rang so you cannot have your stickers. You'll have to try harder next time." If the child didn't finish before the timer rang, and he/she realized this, the experimenter instructed the subject to try harder the next time and work more quickly. When each phase and three worksheets were completed, the child was given three more worksheets and instructions for the next phase. This procedure was continued until three worksheets had been completed for each of the six phases. At the end of each training session the child was told that saying the steps he/she had been practicing would help in the classroom when doing the worksheets the teacher gave them; however, no overt instructions, prompts, or feedback was given regarding the use of the expanded self-instructional procedure

in the independent work period. Independent work time was carried out in the classroom just as during baseline.

Post-training II. At the conclusion of Self-Instruction II each subject was again observed during the independent work time for several sessions to determine if the training would have any delayed effects. Independent work time was carried out the same as during the baseline period.

Classroom Intervention. In order to further facilitate the subjects completing their worksheets in the independent work period, the incentive system used in training sessions was introduced directly into the classroom. At the beginning of the independent work period the subject was taken aside and told that he/she would not receive stickers on a card for completing all the worksheets in the classroom before the bell on the timer rang. The child was instructed to use the self-instructional steps that the experimenter had taught and given examples, such as, "I go right to the next one," or, "I put an X here." The child was shown the timer and told that it would be set for 15 min when he/she had all the worksheets.

During the independent work time the teacher explained how to do the worksheets and then passed out the worksheets and necessary writing materials, just as she had done previously. When the subject had his/her worksheets the teacher aide showed him/her the timer as she set it for 15 min. The rest of the independent work period continued as before. The teachers were cued at 3-min intervals to attend to the children. Again, the teachers were asked to not make any comments about the self-instructional steps or the timer.

At the end of the 20-min work period the teacher went to the subject and asked him/her whether the child had finished before the bell rang. If the subject said yes, and the teacher agreed, then the child was allowed to choose one sticker for each worksheet and place them on a card to take home. If the teacher judged that the child had not completed the assigned worksheets, she told the child that he/she would have to try harder tomorrow and work more quickly. If the teacher heard the child using the self-instructional steps during the period, he/she was praised for saying the steps at the end of the period.

Results

Reliability of measurement for the study averaged 91% for all observed behaviors. The range and mean reliability percentages are shown in Table 1 for all behavior categories of interest. No range is given for two behaviors for which identical percentages of agreement were obtained throughout all conditions.

Insert Table 1 about here

The lower reliability percentages for some sessions obtained for self-instructional verbalizations, spontaneous talking, disruptive behavior, teacher attention and correct performance on worksheets were due primarily to a low rate of occurrence for these behaviors. If the observers disagreed on even one occurrence of the behavior that session, the interobserver agreement was low for the session. However, the high mean reliabilities show that, overall, the recordings were quite accurate.

Independent Work Time. Because of the large number of sessions in this study, the data are summarized into session blocks in Figures 1, 2 and 4. Most blocks are composed of data from two classroom sessions. However, some blocks contain data from only one session. These are Session Blocks 3, 28, 37 and 40 for Edward; Blocks 6, 13, 22, 25, 27 and 36 for Cindy; and Blocks 3, 4, 7, 11, 12, 16, 18, 22, 28, 29, 30, 32, 35, 37 and 40 for Josh. Only one day is included in these blocks because the child was absent on one of the two days included in the particular block, or because there were an uneven number of days in the experimental condition.

Figure 1 presents individual subjects' rates of on-task behavior in the classroom during the independent work period across all conditions.

Insert Figure 1 about here

This figure shows that all three children increased their rates of on-task behavior as a function of one or more treatment conditions. Edward's mean rate of on-task improved from 47% during baseline to 65% during the Self-Instruction II. However, he was provided with the Classroom Intervention to determine if this would further increase his on-task behavior. His mean rate improved to 75% and the upward trend in his data suggests that there may have been a greater increase if more time had been available in the Classroom Intervention condition.

Cindy's mean rate of on-task behavior did not show a systematic increase from the baseline rate of 40% to a Self-Instruction I rate of 41%. She did have some days of high on-task behavior during this condition, but her behavior was generally unstable. Her mean rate

of on-task behavior increased slightly during Self-Instruction II condition to 45%. It seemed that Cindy needed a stronger intervention during the actual independent work time in the classroom in order to improve her rate of on-task behavior. Following the Classroom Intervention, Cindy's mean rate of on-task behavior increased to 60%.

The Self-Instruction I condition resulted in an increase in Josh's rate of on-task behavior from the baseline mean rate of 48%, to a mean of 63%. However, his behavior was unstable, so Self-Instruction II was initiated. Following Self-Instruction II and the Classroom Intervention, his mean rate of on-task increased only slightly to 67%, and 68% respectively.

Chad, the normative subject, averaged 67% on-task behavior throughout the duration of the study. Two other children in the class, who were observed when a subject was absent, had mean rates of on-task behavior of 71% and 73%.

The children's use of self-instruction during the independent work period, and the percentage of sessions they were judged by the teacher as completing their worksheets in each session block, is shown in Figure 2.

Insert Figure 2 about here

All three children produced self-instructions on occasion, with Edward using them the most frequently following Self-Instruction I, although this rate decreased over time. There does not seem to be a strong relationship between using self-instruction and finishing their worksheets.

The three subjects show a definite improvement in completing their work following the introduction of the Classroom Intervention condition. All three subjects began completing their work at a more consistent rate, and on more occasions when the Classroom Intervention was introduced.

Figure 3 presents daily rates for each subject of correct responses on the one worksheet per day assigned by the experimenter.

Insert Figure 3 about here

This graph shows that on the three types of worksheets used in self-instructional training (finding the same, mazes, and size sequencing), the three subjects improved their percentage correct in the independent work period after Self-Instruction I. There also was improvement in the untrained worksheets (story sequencing and finding what is missing), indicating some generalization, but it is not as consistent as the improvement in the trained worksheets. For Edward and Josh, performance on the "finding what is missing" (the right of two bars in grouping on Figure 3) untrained worksheet was consistently better than on the untrained "story sequencing" worksheet. Edward improved from a baseline performance mean of 22% on the trained worksheets, and 0% on the untrained, to 78% and 50% correct, respectively, during Self-Instruction I; and 90% on trained and 88% on the untrained worksheets during Classroom Intervention. Cindy's baseline mean performance was 31% correct on the trained, and 21% for the untrained worksheets. During Self-Instruction I and II combined, she increased her correct response rate to 61% and 53% for trained and untrained worksheets,

respectively. Her mean rates during Classroom Intervention were 89% correct for trained, and 62% for the untrained worksheets. Josh's mean percentage correct on trained and untrained worksheets was 60% and 55%, respectively during baseline. During Self-Instruction I and II, Josh's mean improved to 93% on the trained, and 64% on the untrained. During the Classroom Intervention, his mean for the trained worksheets was 100% correct, and 67% correct for untrained worksheets.

The amount of teacher attention to each child was monitored during the independent work time to assure that it remained constant across baseline and treatment conditions. The percentage of teacher attention for each child is shown in Figure 4.

Insert Figure 4 about here

The rate of attention is slightly variable for the subjects because of the data collection technique. Since each child was observed only once every minute, and teacher help was scheduled to occur every three minutes, it was possible to observe all occurrences of attention to a subject one day, and only some occurrences in other sessions. As this figure shows, there was no systematic change in the rate of teacher attention to the subjects as a function of treatment.

Table 2 presents mean percentages of target child and teacher behaviors across treatment conditions for individual subjects as well as for the group of three subjects. Means for Self-Instruction II condition are not presented for Edward as he did not receive this training condition.

Insert Table 2 about here

The mean rate of on-task behavior improved for Edward and Josh after Self-Instruction I, and slightly for Cindy and Josh after Self-Instruction II. The Classroom Intervention further increased the mean rate of on-task behavior for Edward and Cindy. The overall mean for the subjects increased slightly with the introduction of each treatment condition. The mean rate of self-instruction per minute showed slight but variable gains after Self-Instruction I for Edward and Cindy, and after Self-Instruction II for Josh. The overall mean for all subjects shows a modest increase in the use of self-instruction throughout the study. The proportion of work completed increased for all three subjects, with the most dramatic improvement after the introduction of Classroom Intervention. Accuracy on both trained and untrained worksheets also showed a steady improvement for the three children across treatment conditions. Teacher attention was relatively constant across subjects and treatment conditions.

Training. The subjects appear to have learned the steps trained during self-instructional training. Edward correctly used the components during training 94% of the time; Cindy, 93%; and Josh, 97%. The experimenter used the components of the Self-Instructional and Expanded Self-Instructional Training, as outlined on the Self-Instructional and Expanded Self-Instructional Checklists (see Appendix B, Tables A and B), a mean rate of 97% and 100%, respectively.

The experimenter employed the same training procedure for each child, as assessed by the Experimental Procedure Checklist (see Appendix B, Table C), a mean rate of 97% correct component use.

Pre- and Postmeasures. Six of the children in the class were

evaluated on the Matching Familiar Figures (MFF) test and a CIRCUS problem solving subtest. The scores they received on these tests are presented in Table 3.

Insert Table 3 about here

The three subjects increased their mean response latency, and decreased the number of errors, on the MFF following treatment, suggesting that they were being more reflective before responding. However, Cindy reduced her errors by only one, which is not a significant decrease. By contrast, two of the other children, Jake and Shawn, decreased their mean response latency substantially, while Chad's mean response latency stayed about the same. Chad, Jake and Shawn all decreased the number of errors they made on the MFF, but not as dramatically as Edward and Josh, two of the subjects. On the Think it Through subtest of the CIRCUS, five of the children improved their scores, and Shawn decreased his score slightly.

Discussion

This study evaluated the generalization of self-instructional training sessions outside the classroom to modify on-task behavior of impulsive children while completing worksheets in the classroom. The present results indicate that preschool, impulsive children can be taught to use self-instruction in a training setting on worksheets similar to those used in a normal classroom. The training procedure for teaching cognitive self-instruction was designed to be naturalistic and simple enough so that it could be employed by classroom teachers. Results indicated that the initial self-instructional training was

mildly effective in increasing classroom on-task behavior and work completion in two of three children. The training increased their mean rate of on-task behavior to approximately the same level as three normative children in the classroom. The self-instructional training also produced an obvious improvement in all subjects' accuracy on worksheets done in the classroom similar to those used during training, as well as some improvement to untrained worksheets, indicative of generalization. The second self-instructional training input appeared to have little effect on the children's classroom behavior. However, the introduction of a mild incentive procedure for work completion directly into the classroom led to increased on-task rates for two of three children and clear-cut improvements in work completion for all subjects. The use of a multiple-baseline design across subjects experimentally demonstrates the effects of training. Specifically, the successive application of the self-instructional training and classroom intervention, and the subsequent increase in on-task behavior, work completion, and improved performance on worksheets, support the demonstration of a relationship.

These results lend support to those of Bornstein and Quevillon (1976), who found a much stronger relationship than the present investigation between self-instructional training and increased on-task behavior in preschool children. Their definition of on-task behavior was not as strict as in the present study, where a child had to be actively marking, coloring, or erasing on the worksheet to be scored as on-task. In fact, it is possible that the present study's definition was too conservative, because it excluded from on-task behaviors such

as counting and phonetically sounding out pictures, which often were necessary for completion of the worksheets. Also, the present subjects were never highly disruptive, even in baseline; thus, their increases in on-task did not represent simply a reduction in acting out behaviors, which might have been the case in Bornstein and Quevillon's experiment. The differences in definitions, and possible differences in subject population, could account for Bornstein and Quevillon's subjects' greater change in on-task behavior.

The present study questions the results of Meichenbaum and Goodman (1971), who did not obtain generalization to the classroom after self-instructional training. They were, however, looking for decreases in non-task-specific behavior. The present study found increases in task-specific behavior, indicative of generalization, but since disruptive behaviors occurred at a low rate throughout the study it is not possible to say that there was a decrease in off-task responses. If Meichenbaum and Goodman had measured on-task behavior they may have found an increase similar to the present study and Bornstein and Quevillon (1976).

In addition to improvement in classroom performance measures, the subjects also increased their response latency and accuracy on the Matching Familiar Figures test (Kagan, 1966a) as compared to other children in the class. This is consistent with findings of previous investigators of cognitive self-instruction (Douglas et al., 1976; Kendall & Finch, 1978; Meichenbaum & Goodman, 1969, 1971), and suggests that the children were more reflective in solving problems after self-instructional training. The subjects also improved their

scores on the Think it Through subtest of CIRCUS (1974) as did the other children in the class. Because of the generalized improvement on this subtest by most children, it is not clear whether the subjects improved because of training or because of the experiences received in the classroom.

The findings of this study extend those of previous investigations in that the actual tasks employed to train self-instruction and assess generalization could be found in a normal preschool or kindergarten classroom, rather than the experimental tasks used by others (Bornstein & Quevillon, 1976; Douglas et al., 1976; Kendall & Finch, 1978; Meichenbaum & Goodman, 1969, 1971; Palkes et al., 1968, 1972). Because the training procedure was found to increase on-task behavior in the classroom setting and improve accuracy on worksheets, it could be used by a classroom teacher to train students who have difficulty attending to and accurately completing work during class.

Another important result of this investigation is that it measured actual generalization to the classroom work setting rather than relying on rating scales and standardized test items. Previous researchers (Douglas et al., 1976; Kendall & Finch, 1978; Meichenbaum & Goodman, 1969; Palkes et al., 1968, 1972) found improvements on rating scales and standardized test scores, as did the present study, but did not measure improvements in behavior in the classroom. The results of this study show definite improvements in classroom behavior which further substantiate the conclusion of others that self-instruction can increase appropriate behavior. The increase in on-task behavior, however, is not as strong as the improvement in accuracy and completion

of work, which raises the question of whether on-task is the appropriate behavior to measure. It could be argued that improvements in the appropriate classroom behaviors of accuracy on worksheets and work completion are more important than increases in on-task behavior, which strengthen the results of this study.

All three subjects were observed to employ self-instructional verbalizations on occasion during the study, but not at a high rate or on a consistent basis. This behavior could only be recorded if the child whispered or spoke the self-instruction outloud. It is possible that the children were using the trained self-instructing to complete worksheets. Unfortunately, there presently is no behavioral means to observe covert verbalization.

It is difficult to conclude what specific components of self-instructional training were responsible for the improvements in the subjects independent work skills. Since only two subjects showed a definite increase in on-task behavior following training, and the subjects did not use self-instructional verbalizations at a very high rate in the classroom, it is not clear that changes in behavior were due to verbal mediation of actions. All subjects increased their accuracy on the trained worksheets, which suggests that the practice on the worksheets similar to those used in the classroom in the one-to-one situation brought about behavioral improvement. However, the subjects also improved their accuracy in the classroom on the untrained worksheets, which could indicate that the children learned a more general skill of approaching worksheets, whether or not they were similar to those used in training. It also opens the

possibility that changes are due, at least somewhat, to verbal mediation of actions by the children's use of covert self-instruction which was not observable to the experimenter.

Future research could compare two procedures to determine which has the greatest effect on young children's behavior. One training procedure could employ the self-instructional training paradigm, without taking the children to the covert phase of training, and assess generalization to the classroom for improvement in on-task behavior and accuracy on worksheets not at all similar to those used during training. The second procedure would involve practice in a one-to-one situation completing worksheets without training on self-instruction. Generalization would be assessed in the same way as the first procedure suggested above. This comparison could answer the question more thoroughly as to whether changes in behavior are due to verbal mediation or practice. At this time, however, a fair conclusion about the worth of self-instructional training cannot be reached. More research is needed.

It is not the feeling of the experimenter that since a classroom intervention was needed to increase one subject's on-task behavior and all subjects' work completion that there is no value in self-instructional training. The self-instructional training did increase the on-task behavior of two of the subjects which lends some support to its value. It is possible that self-instructional training is effective only for certain types of children and not for others. Future research needs to investigate this possibility to determine what type of child can benefit, and what individual differences of

the subjects play a role in the effect of self-instructional training.

It is not possible to acknowledge firmly the treatment components responsible for the behavior change of two subjects when the Classroom Intervention condition was introduced. The treatment package involved instruction, an antecedent stimulus of the timer, and reinforcement. Future research could look at each of these components separately after self-instructional training to determine which facilitate generalization.

One direction for further investigation is that of group training of self-instruction. Since all three subjects in this study performed very well during training sessions with the investigator, it is possible training could have been completed simultaneously across a group of children. This format would increase the similarity of training sessions to the everyday classroom environment, and might help the children learn to work better among the distractions of a regular classroom setting.

In conclusion, the positive results obtained in the present research indicate that further investigation of self-instructional training is warranted. Future studies should attempt to demonstrate the effectiveness of the training using different behaviors, in a variety of situations, and with different children. More research also is indicated with pre-school children to further substantiate the finding of this study, and Bornstein and Quevillon (1976), that young children can be trained to use self-instruction to help in their school work.

Reference Note

1. Abikoff, H. Cognitive training in hyperactive children. Paper presented at the Second National Conference on Cognitive Behavior Therapy Research, New York, October, 1978.

References

- Bem, S. L. Verbal self-control: The establishment of effective self-instruction. Journal of Experimental Psychology, 1967, 74, 485-491.
- Bornstein, P. H., & Hamilton, S. B. Token rewards and straw men. American Psychologist, 1975, 30, 780-781.
- Bornstein, P. H., & Quevillon, R. P. The effects of a self-instructional package on overactive preschool boys. Journal of Applied Behavior Analysis, 1976, 9, 179-188.
- CIRCUS. Princeton, New Jersey: Educational Testing Service, 1974.
- Dewey, J. Experience and education. New York: Macmillan, 1939.
- Douglas, V. I., Parry, P., Marton, P., & Garson, C. Assessment of a cognitive training program for hyperactive children. Journal of Abnormal Child Psychology, 1976, 4, 389-410.
- D'Zurilla, T. J., & Goldfried, M. R. Problem solving and behavior modification. Journal of Abnormal Psychology, 1971, 78, 107-126.
- Hersen, M., & Barlow, D. H. Single case experimental designs: Strategies for studying behavior change. New York: Pergamon Press, 1976.
- Kagan, J. Reflection-impulsivity and reading ability in primary grade children. Child Development, 1965, 36, 609-628.
- Kagan, J. Reflection-impulsivity: The generality and dynamics of conceptual tempo. Journal of Abnormal Psychology, 1966, 71, 17-24. (a)
- Kagan, J. Developmental studies in reflection and analysis. In A. H. Kidd & J. H. Rivoire (Eds.), Perceptual and conceptual development in children. New York: International Universities Press, 1966. (b)
- Kazdin, A. E. Behavior modification in applied settings. Homewood, Illinois: Dorsey Press, 1975.

- Kazdin, A. E., & Bootzin, R. R. The token economy: An evaluative review. Journal of Applied Behavior Analysis, 1972, 5, 343-372.
- Kazdin, A. E., & Craighead, E. Behavior modification in special education. In L. Mann & D. Sabatino (Eds.), First review of special education, II. Philadelphia: Buttonwood Farms Press, 1973.
- Kendall, P. C., & Finch, A. J., Jr. A cognitive-behavioral treatment for impulsivity: A group comparison study. Journal of Consulting and Clinical Psychology, 1978, 49, 110-118.
- Keogh, B. K. Hyperactivity and learning disorders: Review and speculation. Exceptional Children, 1971, 37, 101-109.
- Kratochwill, T. R. Single subject research: Strategies for evaluating change. New York: Academic Press, 1978.
- Luria, A. R. The role of speech in the regulation of normal and abnormal behavior. New York: Liveright, 1961.
- MacPherson, E. M., Candee, B. L., & Hohman, R. J. A comparison of three methods for eliminating disruptive lunchroom behavior. Journal of Applied Behavior Analysis, 1974, 7, 287-297.
- Mahoney, M. J. Cognition and behavior modification. Cambridge, Mass.: Ballinger, 1974.
- Meichenbaum, D. Self-instructional training: A cognitive prosthesis for the aged. Human Development, 1974, 17, 273-280.
- Meichenbaum, D., & Cameron, R. Training schizophrenics to talk to themselves: A means of developing attentional controls. Behavior Therapy, 1973, 4, 515-534.
- Meichenbaum, D. H., & Cameron, R. The clinical potential of modifying what clients say to themselves. In M. J. Mahoney & C. E. Thoresen (Eds.), Self-control: Power to the person. Belmont, California: Wadsworth, 1974.

- Meichenbaum, D. H., & Goodman, J. The developmental control of operant motor responding by verbal operants. Journal of Experimental Child Psychology, 1969, 7, 553-565.
- Meichenbaum, D. H., & Goodman, J. Training impulsive children to talk to themselves: A means of developing self-control. Journal of Abnormal Psychology, 1971, 77, 115-126.
- Monahan, J., & O'Leary, K. D. Effects of self-instruction on rule-breaking behavior. Psychological Reports, 1971, 29, 1059-1066.
- O'Leary, K. D., & Kent, R. Behavior modification for social action: Research tactics and problems. In L. Hamerlynck, L. Handy & E. Mash (Eds.), Behavior change: Methodology, concepts, and practice. Champaign, Illinois: Research Press, 1973.
- O'Leary, K. D., & O'Leary, S. G. Classroom management: The successful use of behavior modification. New York: Pergamon Press, 1972.
- Palkes, H., Stewart, M., & Freedman, J. Improvement in maze performance of hyperactive boys as a function of verbal-training procedure. Journal of Special Education, 1972, 5, 337-343.
- Palkes, H., Stewart, M., & Kahana, B. Porteus maze performance of hyperactive boys after training in self-directed verbal commands. Child Development, 1968, 39, 817-826.
- Porterfield, J. K., Herbert-Jackson, E., & Risley, T. R. Contingent observation: An effective and acceptable procedure for reducing disruptive behavior of young children in a group setting. Journal of Applied Behavior Analysis, 1976, 9, 55-64.
- Rainwater, N., & Ayllon, T. Increasing academic performance by using a timer as antecedent stimulus: A study of four cases. Behavior Therapy, 1976, 7, 672-677.

Robins, L. N. Follow-up studies of behavior disorders in children.

In H. C. Quay & J. S. Werry (Eds.), Psychopathological disorders of childhood. New York: John Wiley, 1972.

Sidman, M. Tactics of scientific research: Evaluating data in psychology.

New York: Basic Books, Inc., 1960.

Skinner, B. F. Science and human behavior. New York: Macmillan

Company, 1953.

Stokes, T. F., & Baer, D. M. An implicit technology of generalization.

Journal of Applied Behavior Analysis, 1977, 10, 349-367.

Weiss, G., Minde, K., Werry, J. S., Douglas, V., & Nemeth, E. Studies

on the hyperactive child. VIII. Five-year follow-up. Archives of General Psychiatry, 1971, 24, 409-414.

Table 1
Reliability Percentages

| Behavior | Range | Mean Percentage Agreement Across all Sessions |
|---|---------|---|
| On-task behavior | 81-100% | 97% |
| Nonoccurrence of on-task behavior | 73-100% | 92% |
| Self-instructional verbalizations | 0-100% | 88% |
| Spontaneous talking | 40-100% | 82% |
| Disruptive behavior | 0-100% | 75% |
| Teacher attention | 33-100% | 88% |
| Contingent observation | -- | 100% |
| Timeout | -- | 100% |
| Audiotapes of self-instructional verbalizations | 63-100% | 90% |
| Teacher judgment of work completion | 60-100% | 96% |
| Correct performance on worksheets | 0-100% | 82% |
| Self-instructional checklist | 88-100% | 98% |
| Experimental Procedure checklist | 87-100% | 97% |

Table 2
 Mean Levels Across Conditions
 of Target Child and
 Teacher Behaviors

| | Baseline | Self-Instruction I | II | Classroom Intervention |
|--------------------------------------|----------|-----------------------|------|---------------------------|
| On-Task Behavior | | | | |
| Edward | 47% | 65% | -- | 75% |
| Cindy | 40% | 41% | 45% | 60% |
| Josh | 48% | 63% | 67% | 68% |
| All Subjects | 45% | 51% | 56% | 68% |
| Self-Instruction per minute | | | | |
| Edward | 0.02 | 0.10 | -- | 0.02 |
| Cindy | 0.00 | 0.03 | 0.04 | 0.06 |
| Josh | 0.03 | 0.02 | 0.10 | 0.16 |
| All Subjects | 0.01 | 0.07 | 0.07 | 0.08 |
| Work Completion | | | | |
| Edward | 33% | 21% | -- | 83% |
| Cindy | 0% | 4% | 0% | 48% |
| Josh | 8% | 17% | 22% | 86% |
| All Subjects | 9% | 16% | 12% | 72% |
| Accuracy (Trained Worksheets) | | | | |
| Edward | 22% | 78% | -- | 90% |
| Cindy | 31% | 52% | 93% | 89% |
| Josh | 60% | 97% | 82% | 100% |
| All Subjects | 43% | 71% | 87% | 93% |

Table 2 (continued)

| | Baseline | Self-Instruction | | Classroom |
|---------------------------------|----------|------------------|-----|--------------|
| | | I | II | Intervention |
| Accuracy (Untrained Worksheets) | | | | |
| Edward | 0% | 50% | -- | 88% |
| Cindy | 21% | 40% | 86% | 62% |
| Josh | 55% | 75% | 45% | 67% |
| All Subjects | 41% | 52% | 66% | 72% |
| Teacher Attention | | | | |
| Edward | 11% | 15% | -- | 15% |
| Cindy | 15% | 17% | 20% | 19% |
| Josh | 10% | 13% | 12% | 14% |
| All Subjects | 12% | 15% | 16% | 16% |

Table 3
Pre- and Postmeasure Scores for Matching Familiar
Figures Test and Think it Through Subtest

| <u>Child</u> | <u>MFF</u> Mean Response Latency in Seconds | | <u>MFF</u> Number of Errors | | <u>Think it Through</u> Percentage Correct on | |
|--------------|---|------|--------------------------------|------|---|------|
| | Pre | Post | Pre | Post | Pre | Post |
| Edward | 3.1 | 5.1 | 11 | 3 | 38% | 59% |
| Cindy | 3.1 | 4.9 | 9 | 8 | 50% | 56% |
| Josh | 2.3 | 3.3 | 9 | 1 | 59% | 65% |
| Chad | 3.2 | 3.3 | 6 | 3 | 38% | 66% |
| Jake | 6.0 | 3.0 | 5 | 4 | 63% | 75% |
| Shawn | 4.5 | 3.9 | 3 | 1 | 81% | 75% |

Figure Caption

Figure 1. Percentage of intervals of on-task behavior for each subject during independent work period per two-day session blocks. The dots surrounded by open circles indicate session blocks during which self-instructional training occurred for that subject.

ON-TASK BEHAVIOR

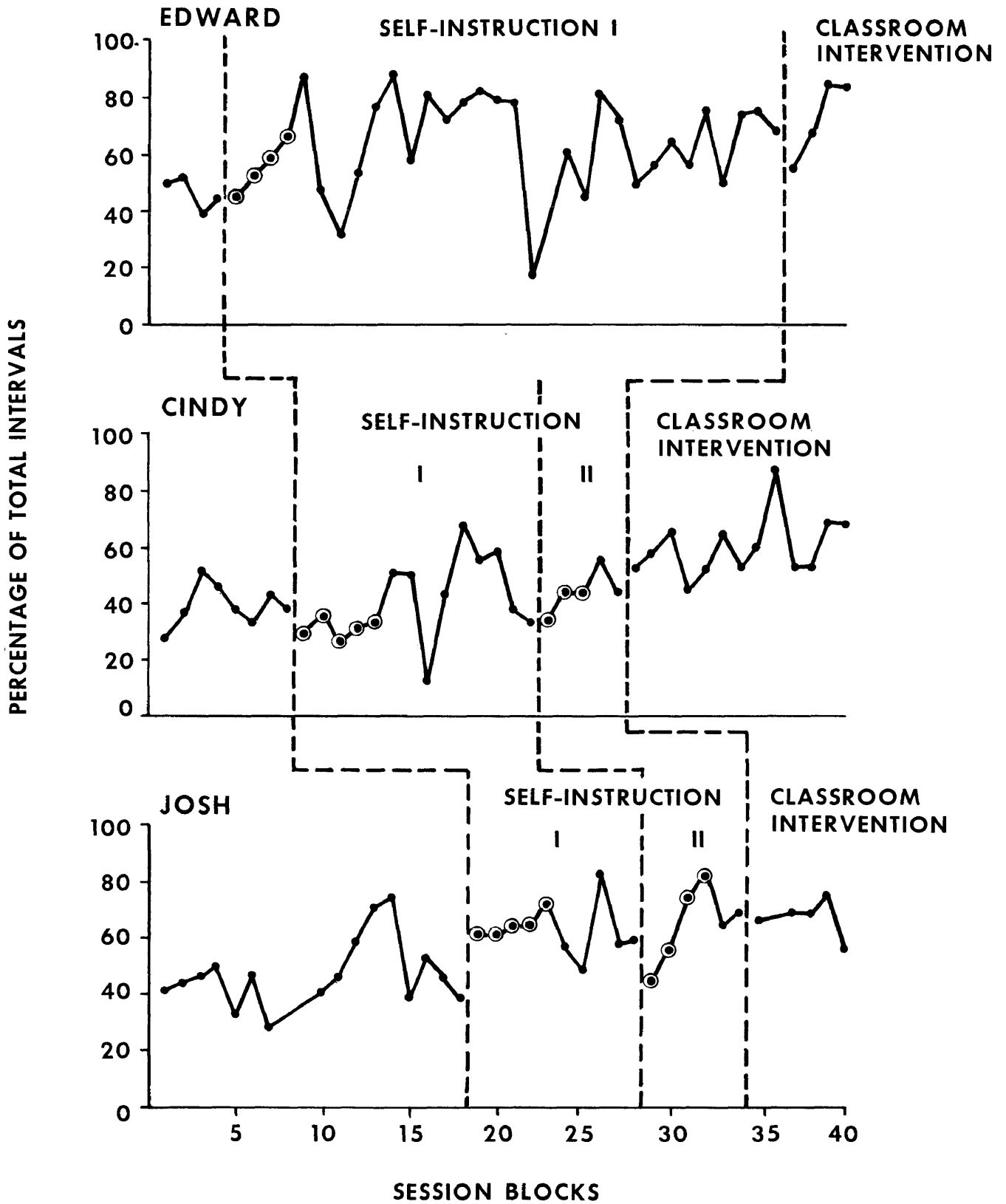


Figure Caption

Figure 2. Rate per minute of self-instructional verbalizations (the solid dots) and proportion of days work completed (the bars) during independent work period per two-day session blocks for the three subjects. The dots surrounded by open circles indicate session blocks during which self-instructional training occurred for that subject. There is not one-to-one correspondence between dots and session blocks because the subjects were taped only once every two sessions to record self-instructional verbalizations and if a child was absent the schedule was not kept consistent; thus, it is possible that a child was not recorded either of the two days included in the session block.

SELF-INSTRUCTIONAL VERBALIZATIONS —●—
AND WORK COMPLETION ▨

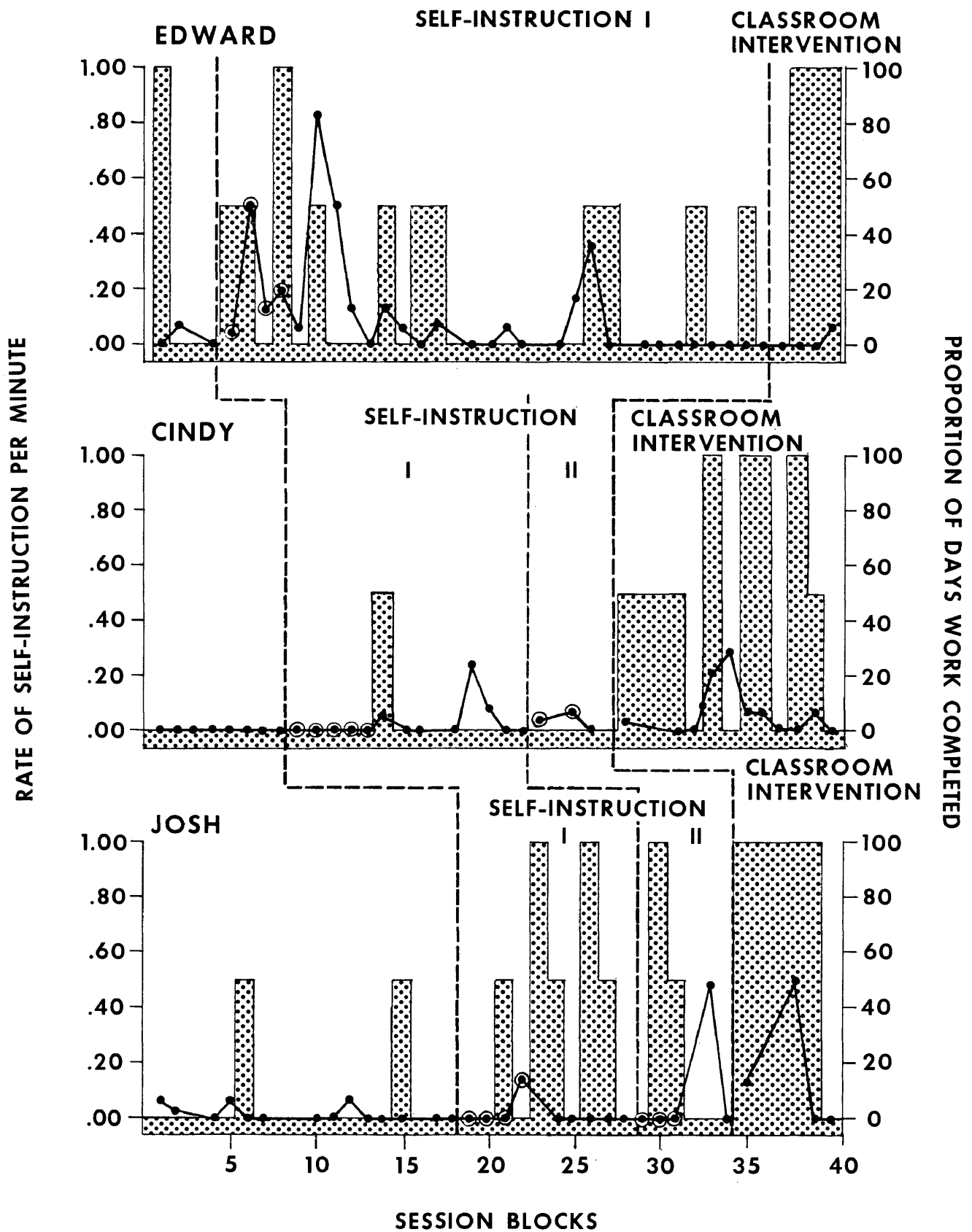


Figure Caption

Figure 3. Percentage correct of the total possible items on the experimenter-provided worksheets completed during independent work period, computed daily for the three subjects. Worksheets similar to those used in self-instructional training are indicated by solid dots; untrained worksheets are denoted by shaded bars. The order of worksheet presentation is: (1) finding the same, (2) mazes, (3) size sequencing, (4) story sequencing, and (5) finding what is missing. The first three types in this sequence were similar to the trained worksheets; the latter two types of worksheets were never trained.

ACCURACY ON WORKSHEETS

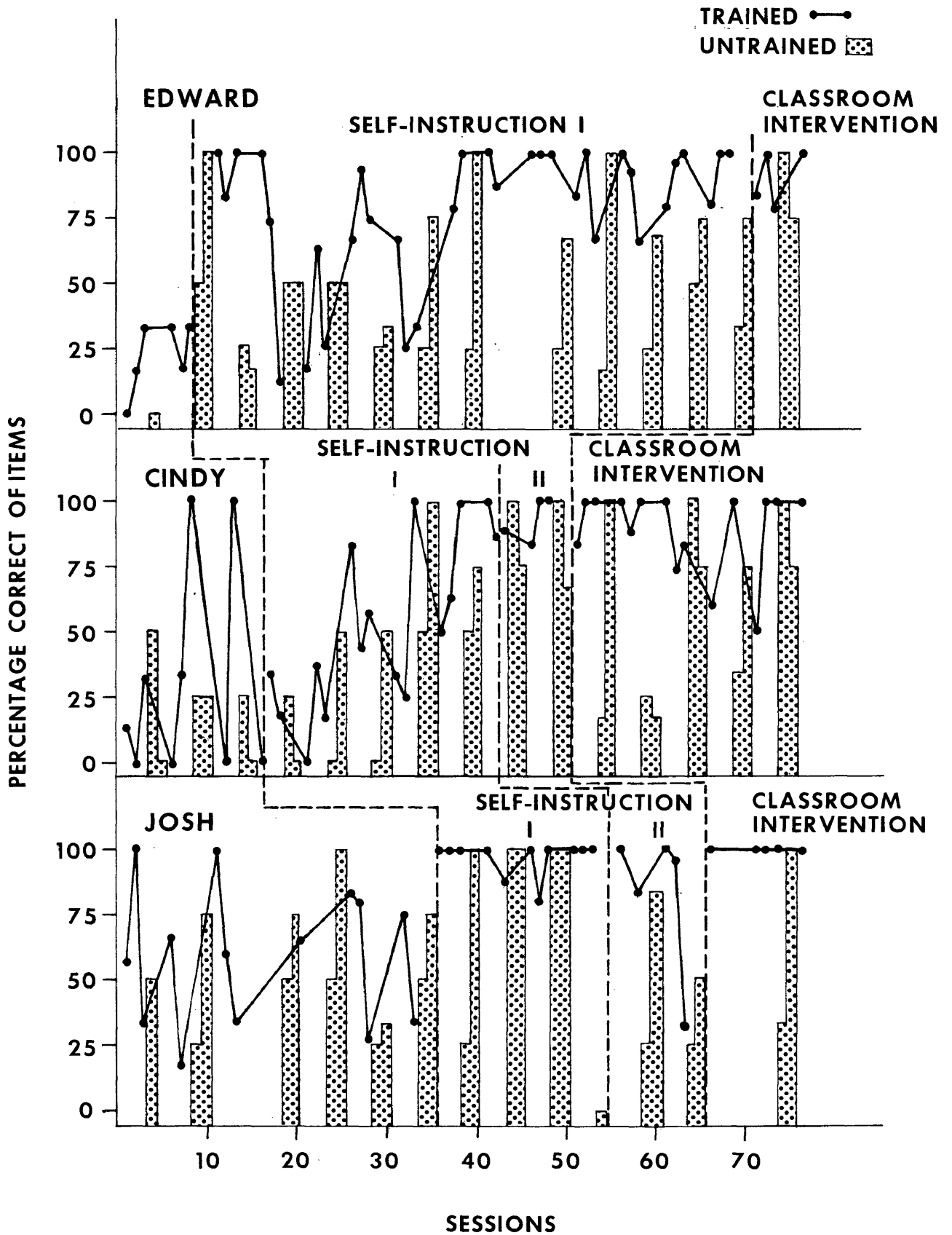
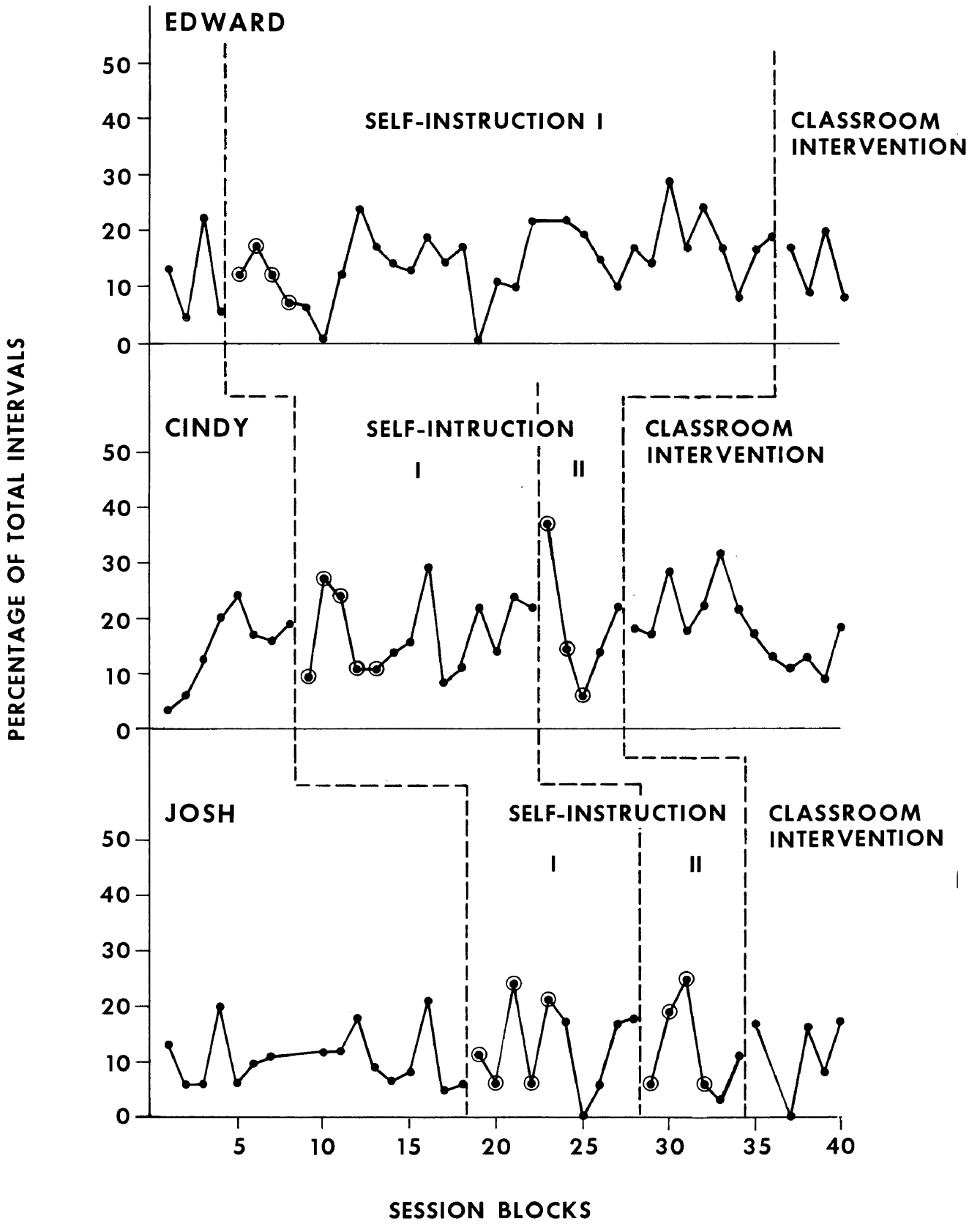


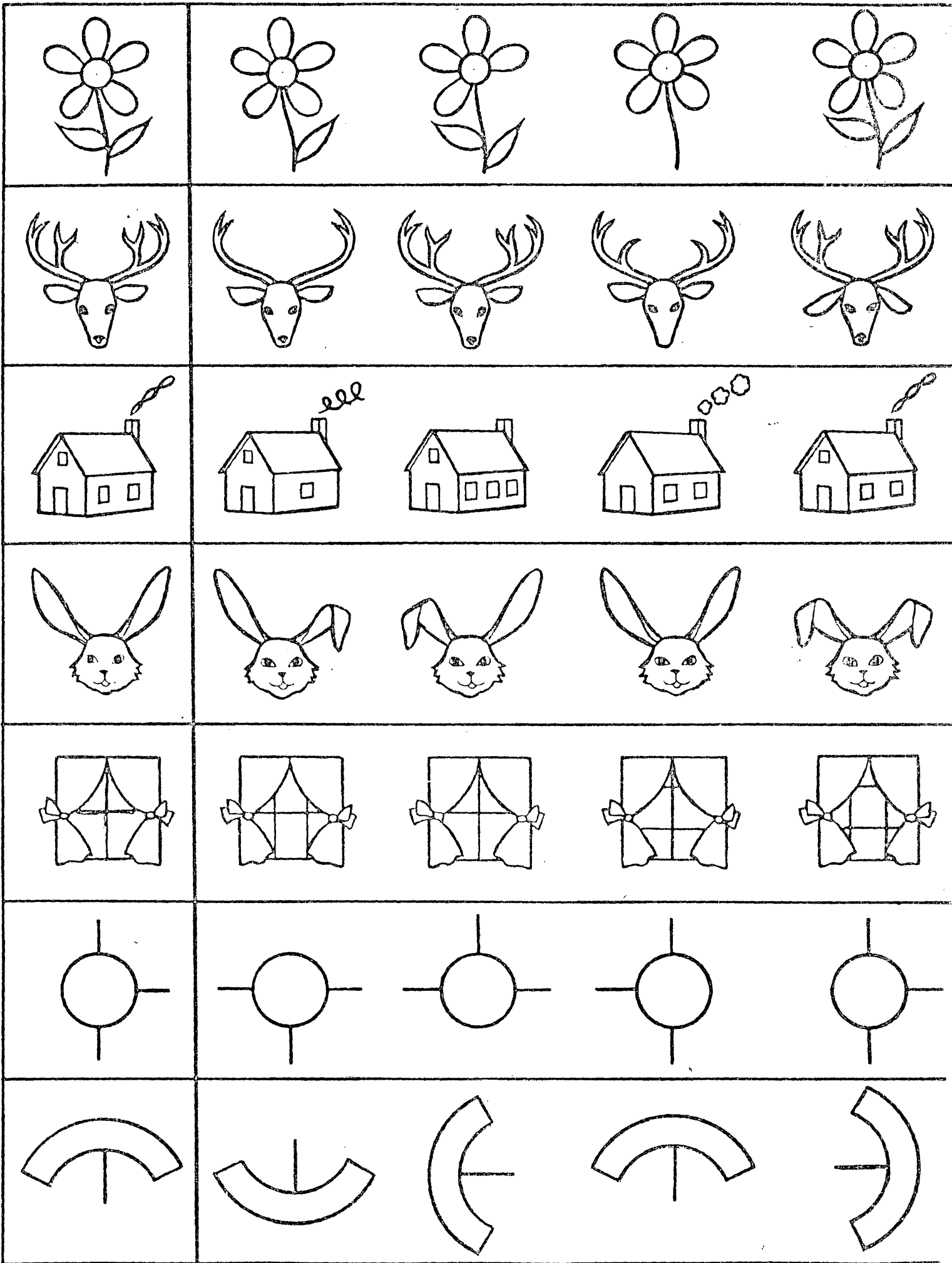
Figure Caption

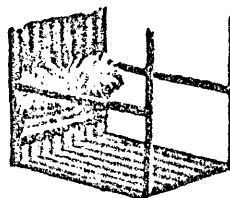
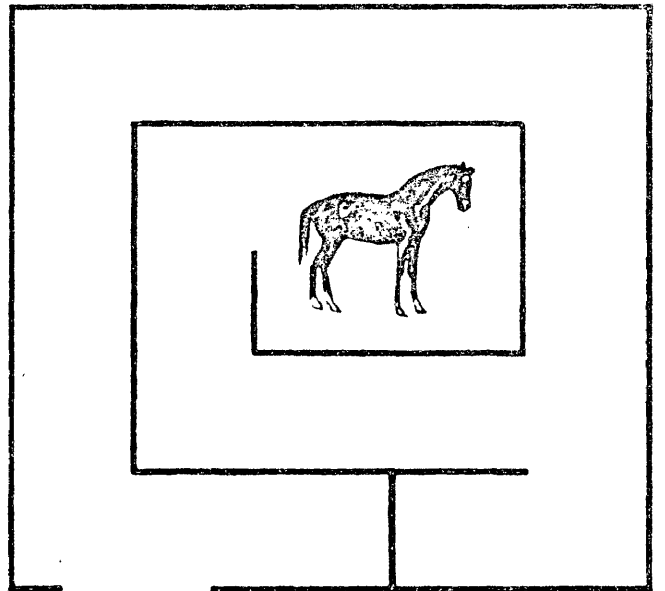
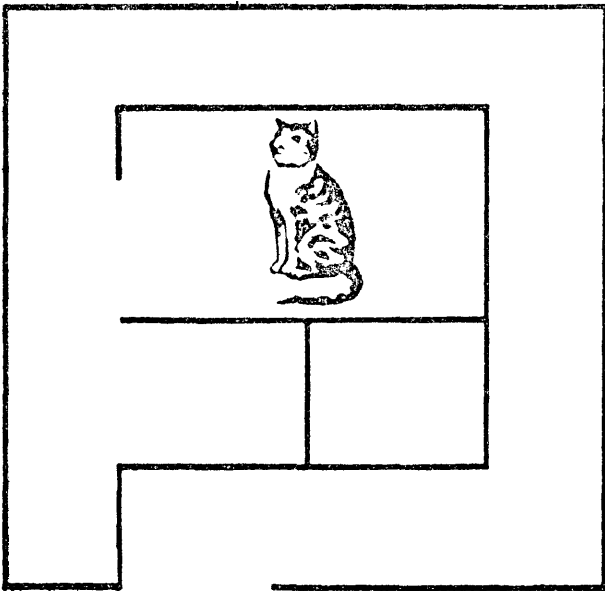
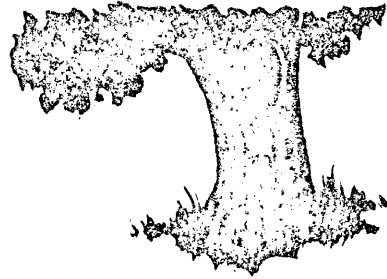
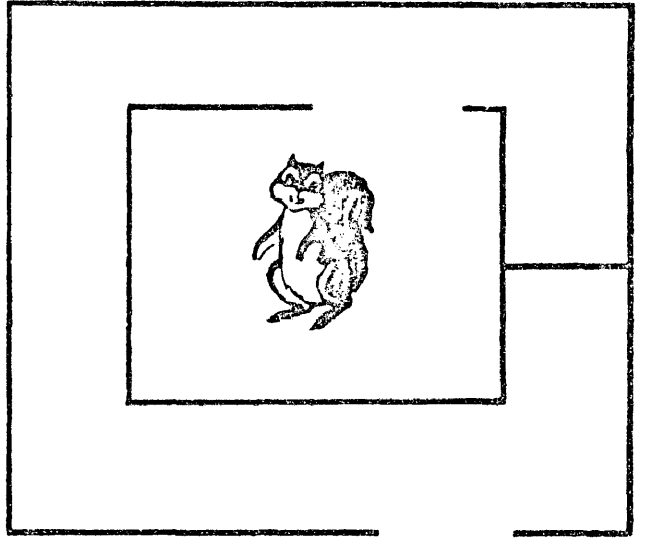
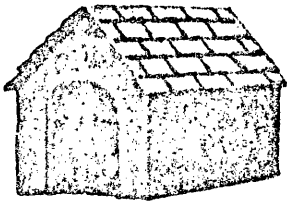
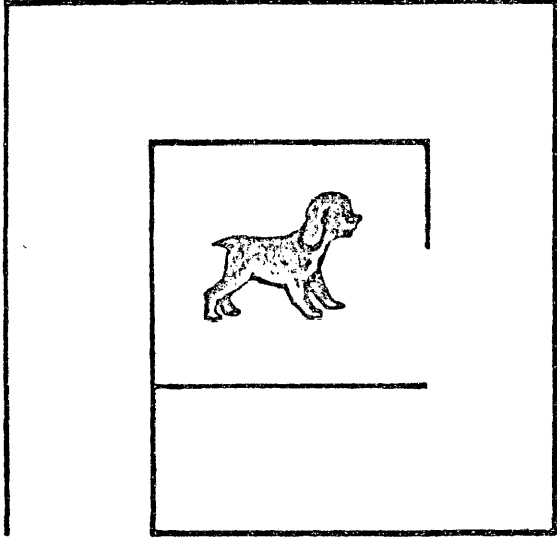
Figure 4. Percentage of intervals during which teacher attention to the subjects occurred during independent work period per two-day session blocks. The dots surrounded by open circles indicate session blocks during which self-instructional training occurred.

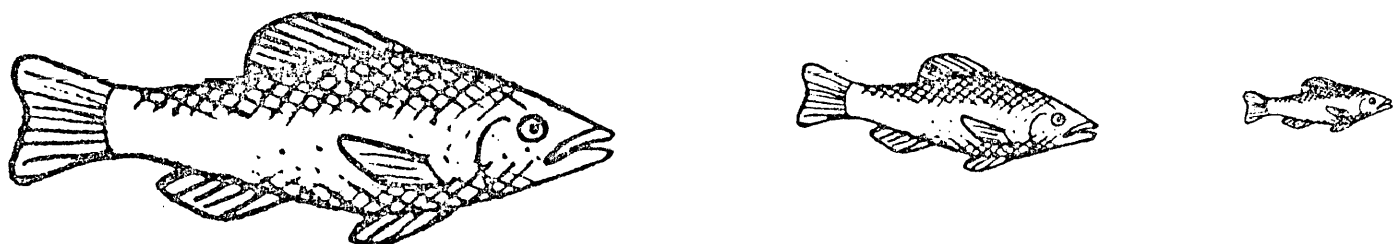
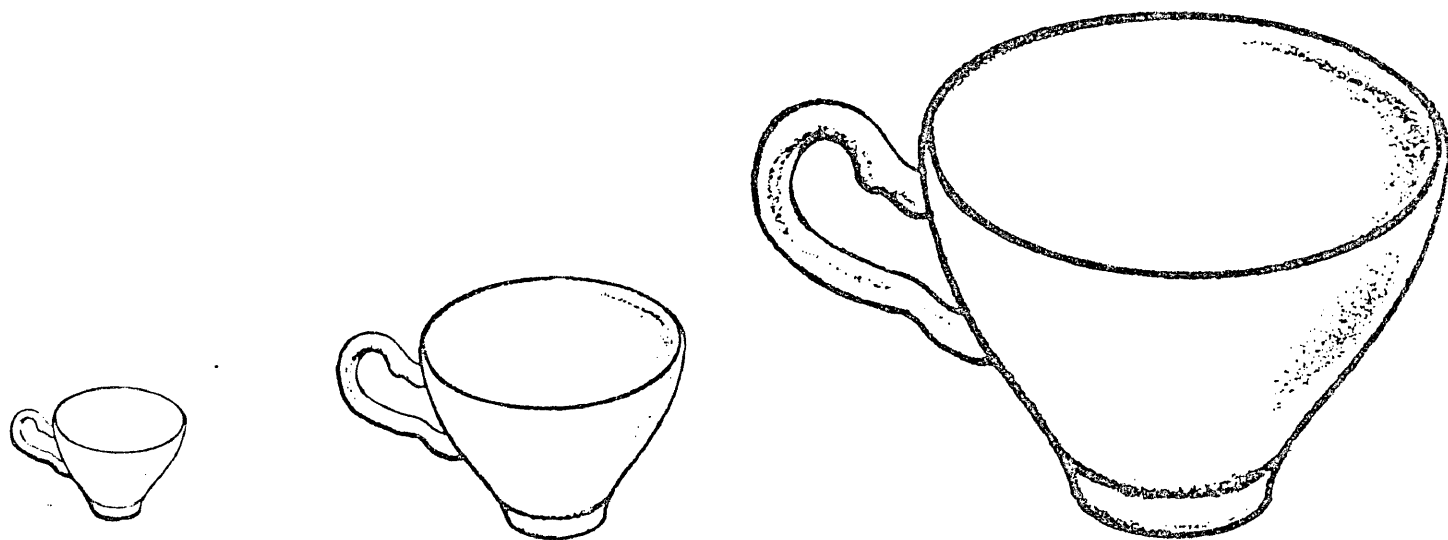
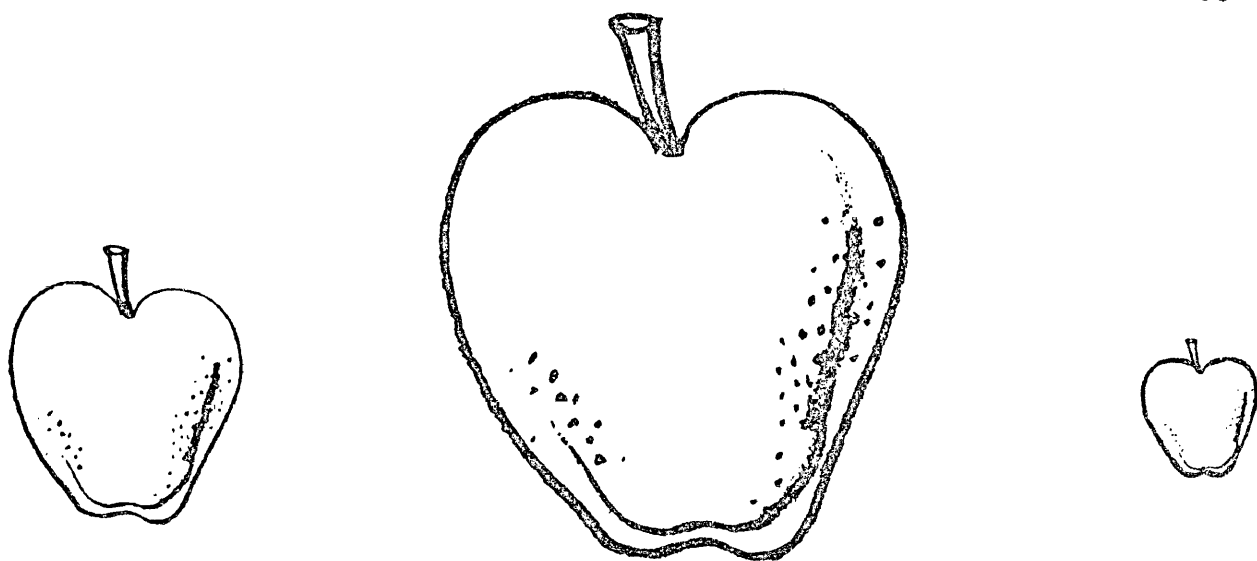
TEACHER ATTENTION

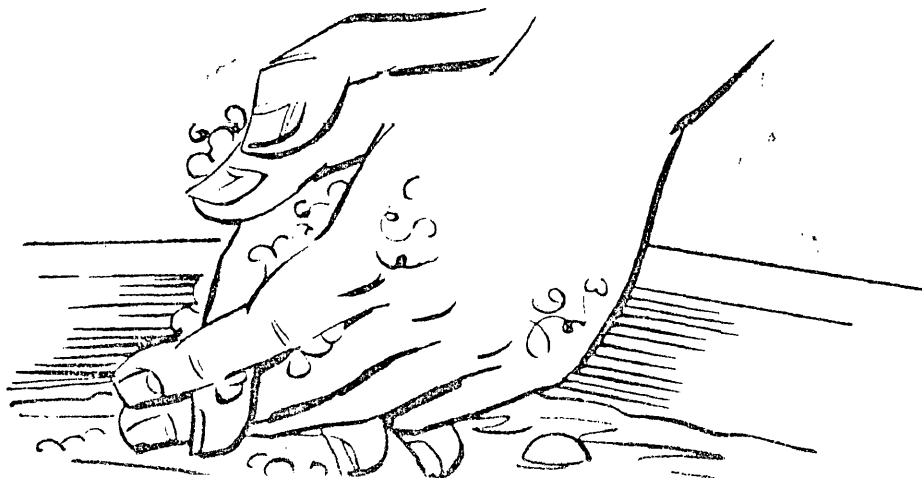
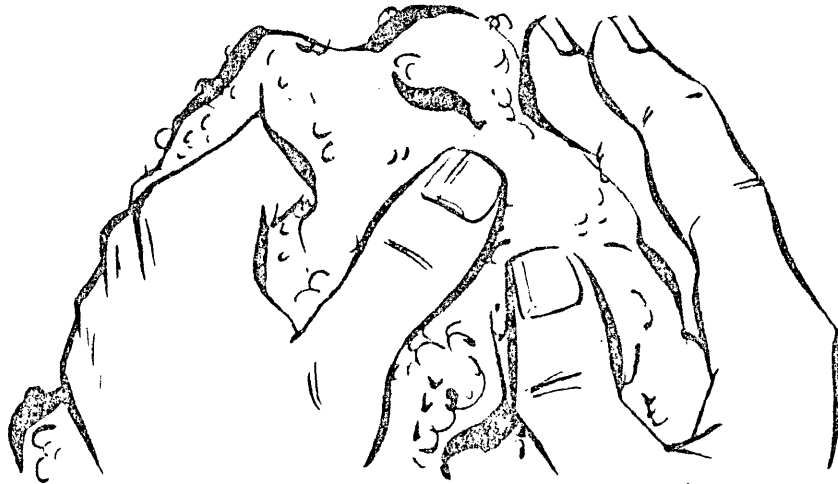
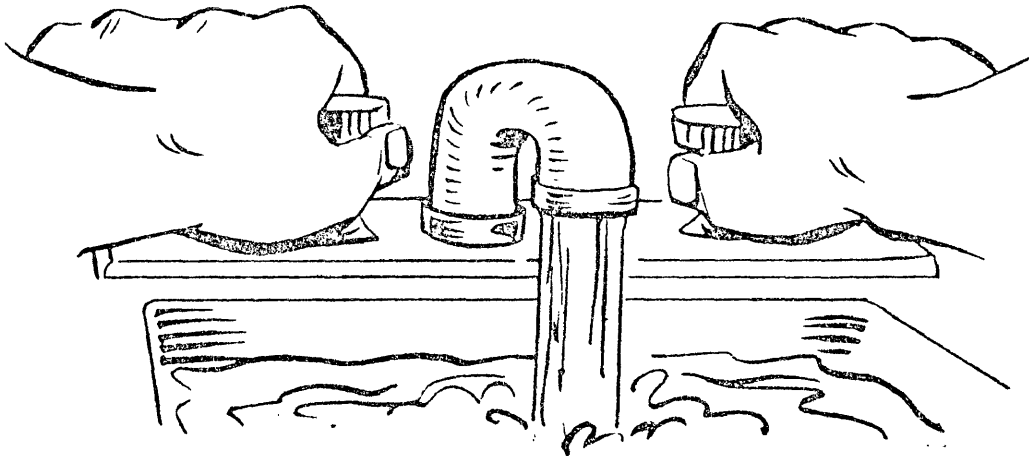
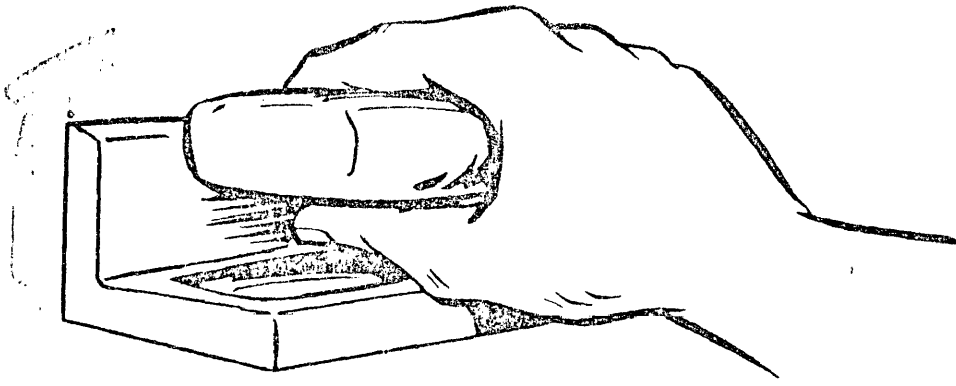


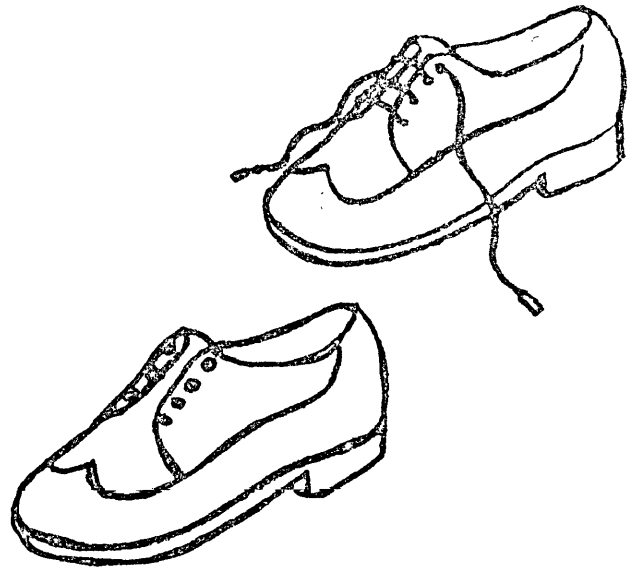
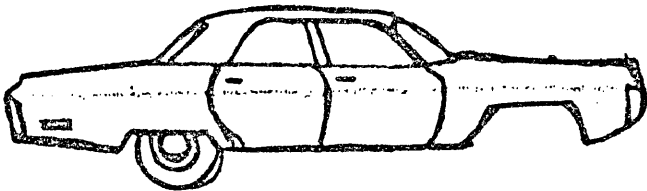
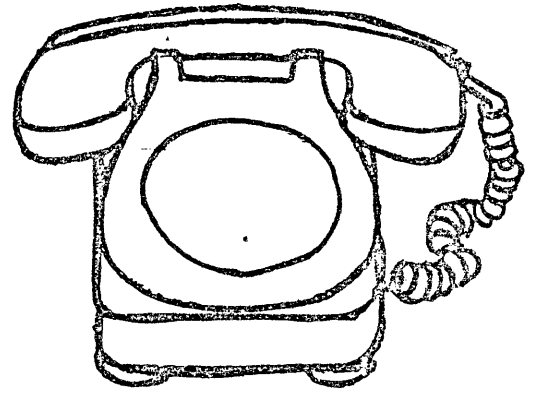
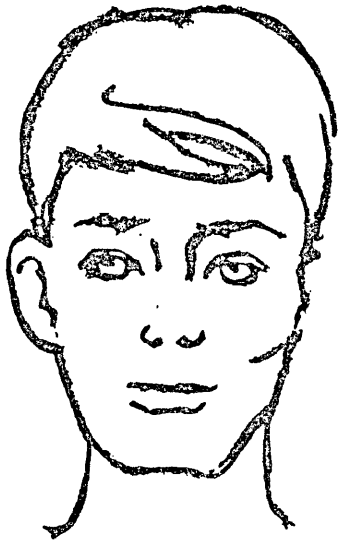
APPENDIX A
SAMPLES OF WORKSHEETS











APPENDIX B
CHECKLISTS
Tables A - C

Problem Solving Study

PASS, 1978-79

Child _____

Date _____

Session # _____

Obs _____

Pri

Rel

Phase(s) 1 2 3 4 5 6

I
Trainer
Aloud

II
Trainer
Aloud

III
Trainer
Whispers Child
Aloud

IV
Trainer
Lips Child
Whispers

V
Child
Lips

. Finish before Timer

. Stop and Look

. Questions about Task

. Answers to Question
about Task

. Self-Instruction to
Guide Through Task

. Now I move Right to
Next One

. Self-Reinforcement and
Go right to Next Page

. Finish before Timer

RELIABILITY OF EXPERIMENTAL PROCEDURE CHECKLIST
Problem Solving Study
PASS, 1978-79

| Child _____ | Date _____ | | | | | | Session # _____ | Obs _____ | Pri Rel | | | | |
|-------------|---|---|---|---|---|---|-----------------|-----------|------------|---------|---------|---------|---------|
| | Phase(s) | 1 | 2 | 3 | 4 | 5 | | | | 6 | | | |
| | | | | | | | | | Trial 1 | Trial 2 | Trial 3 | Trial 4 | Trial 5 |
| 1. | "Watch what I do and listen to what I say." | | | | | | | | _____ | _____ | _____ | _____ | _____ |
| | Praise for listening and watching, or, Prompt to listen and watch. | | | | | | | | _____ | _____ | _____ | _____ | _____ |
| 2. | "This time you do it while I say the words." | | | | | | | | _____ | _____ | _____ | _____ | _____ |
| | Praise for following instructions, or, Prompt to follow instructions. | | | | | | | | _____ | _____ | _____ | _____ | _____ |
| | Praise for correct answer, or, Show correct answer. | | | | | | | | _____ | _____ | _____ | _____ | _____ |
| 3. | "Now you say the words while you do the paper." | | | | | | | | _____ | _____ | _____ | _____ | _____ |
| | Praise for saying all the steps, or, Correction of missed steps. | | | | | | | | _____ | _____ | _____ | _____ | _____ |
| | Praise for correct answer, or, Show correct answer. | | | | | | | | _____ | _____ | _____ | _____ | _____ |
| 4. | "Now you do the paper, but this time whisper." | | | | | | | | _____ | _____ | _____ | _____ | _____ |
| | Demonstrate whisper. | | | | | | | | _____ | _____ | _____ | _____ | _____ |
| | Child practice whisper. | | | | | | | | _____ | _____ | _____ | _____ | _____ |
| | Praise for whispering, or, Prompt to whisper. | | | | | | | | _____ | _____ | _____ | _____ | _____ |
| | Praise for saying all steps, or, Correction of missed steps. | | | | | | | | _____ | _____ | _____ | _____ | _____ |
| | Praise for correct answer, or, Show correct answer. | | | | | | | | _____ | _____ | _____ | _____ | _____ |
| 5. | "This time do the paper without whispering; but pretend you're saying the words by moving your lips." | | | | | | | | _____ | _____ | _____ | _____ | _____ |
| | Demonstrate moving lips. | | | | | | | | _____ | _____ | _____ | _____ | _____ |
| | Child practice moving lips. | | | | | | | | _____ | _____ | _____ | _____ | _____ |
| | Praise for moving lips, or, Prompt to move lips. | | | | | | | | _____ | _____ | _____ | _____ | _____ |
| | Praise for correct answer, or, Show correct answer. | | | | | | | | _____ | _____ | _____ | _____ | _____ |

Reliability of experimental procedure checklist (cont.)

Trial 1 Trial 2 Trial 3 Trial 4 Trial 5

6. "Now I want you to do the paper without talking outloud and without moving your lips. Pretend you're saying the words by thinking them in your head just like we've been saying them outloud."

Praise for correct answer, or, Show correct answer.

Praise for working hard, or, Prompt to work hard.

Ask child if said words in head.

Praise for saying words, or, Prompt to say words.

7. Tell child that saying the things we've been practicing can help him in the classroom when ne/she does worksheets.
