1988

Correspondence training of academic tasks in an 8-year-old Down Syndrome male.

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CORRESPONDENCE TRAINING OF ACADEMIC TASKS IN AN 8-YEAR-OLD DOWN SYNDROME MALE

by

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A Thesis
submitted to the
Faculty of Graduate Studies and Research
through the Faculty of Education
in Partial Fulfillment
of the requirements for the Degree
of Master of Education at
the University of Windsor

Windsor, Ontario, Canada

1988

ISBN 0-315-50531-1

ACB 3236

ABSTRACT

CORRESPONDENCE TRAINING OF ACADEMIC TASKS IN AN 8-YEAR-OLD DOWN SYNDROME MALE

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The efficacy of say-do correspondence training as a technique for teaching task strategies in the remediation of academic problems in an 8-year-old trainable mentally retarded Down Syndrome male was examined. Training was conducted by the researcher who had been functioning as the subject's natural tutor for a year prior to the initiation of this study, and was conducted in the natural tutoring environment, during regular tutoring hours. Addition/subtraction, reading comprehension, and drawing of people were the three target tasks. Training of tasks occurred in multiple baseline fashion. Subject use of task strategies and accuracy, which were markedly below school standards of "average" performance prior to training, improved to final criterion levels (i.e. average or greater) with correspondence training, and maintained through maintenance phases. Generalization to the school setting of the use of task strategies and accuracy, as well as aspects such as self-monitoring and

inner-directedness was indicated. Interpretation of data indicates that correspondence training is a viable tool for effectively teaching Down Syndrome individuals.

DEDICATION

To my late father, Lionel Sabourin, for his love and sense of humor.

To mom and Sam for being the best kind of family while I was growing up.

To Roger for giving me the courage to believe in myself.

ACKNOWLEDGEMENTS

First, I wish to express my appreciation to my thesis committee; Dr. Noel Williams, Dr. Erika Kuendiger, and Dr. Akira Kobasigawa. Special thanks to my chief advisor, Dr. Noel Williams, for his belief in this study and constant support throughout its completion.

Next, I wish to thank Amanda Dibbs for her dedication in functioning as the reliability rater for the subject's art work as well as for her friendship and reassurance.

Third, I wish to thank my mother and family for their love and support of all my educational endeavors as well as my career choice.

Finally, I would like to express my love and appreciation for my husband Roger, who lived with my moods and frustrations and concerns while I completed this study, and never stopped standing by my side, and whose belief in my abilities convinced me to enter the graduate program.

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CHAPTER 1

INTRODUCTION

In examining cognitive behavior modification (CBM) literature, an extensive computer search revealed that while research investigating the efficiency of CBM methods with mentally retarded (MR) individuals does exist, few studies into correspondence training (a form of CBM) utilizing MR subjects have been conducted. Only one CBM study (i.e. self-monitoring) utilizing a Down Syndrome (DS) individual (Rudrud & Ziarnik, 1984), and no correspondence training (CT) studies referencing DS individuals as the subject(s) of study were found. In fact, it has been noted elsewhere (Crouch, Karlan, & Rusch, 1984) that CT studies have typically employed nonretarded young children. The implication of these findings is that CT studies utilizing DS individuals as subjects is either unbroken ground or rare and difficult research to find. At any rate a study investigating the efficacy of CT on DS seems warranted at this time. A review of present literature also revealed that little has been done in the way of implementing CT as a tool for academic

training (Israel, 1978; Karlan & Rusch, 1982).

Therefore, the purpose of the present study was to investigate the efficacy of say-do correspondence training in remediating academic problems experienced by an 8-year-old Down Syndrome male. Tasks chosen for remediation were simple addition/subtraction, concrete reading comprehension, and drawing of people.

Review of literature

The following review examines various issues relevant to the present study. Specifically examined are (a) correspondence as a technique based on Luria's theory that intact verbal processes do/can control nonverbal behaviors, (b) aspects which led to the popularity of CBM, (c) issues perplexing CBM researchers, (d) findings in regard to the methodology of CR studies, and (e) CT studies which have utilized mentally retarded individuals as subjects.

Based on the review of literature, this chapter concludes with a rationale for choosing CT, as well as features of the methodology, and hypotheses for the present study.

Correspondence training and the theory behind its development. One set of procedures popularly publicized in the educational and psychological research literature is cognitive behavior modification. Throughout the last ten years, during which time the study of CBM has grown considerably (Meyers & Craighead, 1984), several terms have been used interchangably to refer to the same procedure. Some of these terms include cognitive strategy training, cognitive restructuring, and cognitive training. For the sake of consistency, CBM is the general term which shall be used in this study in reference to the overall gamut of cognitive procedures presently being reported in the literature.

While it has been suggested that CBM be implemented daily as part of the Educable Mentally Retarded (EMR) curriculum (Winschel & Lawrence, 1985), Whitman, Burgio, and Johnston (1984) caution that the study of CBM is in its initial stages and until fundamental concerns are examined, such programs are not ready for widespread use in school systems.

Initial results obtained with CBM in training

normal and special populations have been promising (Sternberg, 1981; Whitman, et al., 1984; Wong, 1986). One mode of CBM which holds much hope as a useful in-school method, due to its unobtrusive manner, is correspondence training (CT). CT involves improving the relationship between verbal and nonverbal behaviors, such that a subject might come to control his motor behaviors by verbal means. In say-do CT a child is required to verbalize what he intends to do. Subsequent reinforcement is provided if the subject's behavior matches his verbal intentions (Whitman et al., 1984).

A. R. Luria, a Russian psychologist, is noted in the literature as having espoused the theory responsible for the development of verbal self-control procedures (Meyers & Craighead. 1984; Whitman, Scibak, Butler, Richter & Johnson, 1982). Briefly, Luria contends that children use speech to overcome difficulties in their surroundings. It seems that in early childhood (under 4 years) the affective and verbal instructions of an adult trigger a reaction from a child. Gradually by about age 4, children shift to using overt speech prior to activity to plan their behavior. Eventually such

speech is used in a whisper and finally fades to internal speech (age 4 1/2 to 5 years). At this time the child is able to use his verbal analytical abilities to make rules in order to orient himself, to abstract and generalize the connections made; speech, in effect, proceeds to be the "highest self-regulating system". Luria explains that in man a stimulus is incorporated into an existing system of reactions or a category and is "regulated thereafter by a verbally formulated rule" (1961, p. 45). In other words, once a behavior rule is formulated, the behavior is self-regulated and therefore maintained. When faced with an extremely difficult task or situation a child may revert to using externalized speech again.

In discussing the relevance of the regulatory role of speech, Luria (1961) has reported that neurodynamically intact functional systems can compensate for the defects of other systems caused by lesions. For example, if a child displays deranged motor behavior, but intact verbal reactions, the verbal behavior is reported by Luria as able to compensate for the motor defects. Luria (1961, 1963) has described a group of children manifesting

"cerebro-asthenic syndrome". While symptoms of cerebro-asthenic syndrome outlined seem to this researcher to bear closely to attention deficit disorder, (eg. distractibility, dyslexia), Baumeister (1974) maintains that many such individuals would be characterized as mentally retarded (MR) by Western standards. Luria has found these subjects to be capable of using their verbal abilities to compensate for or control nonverbal motor behaviors. On the other hand, "oligophrenics", a term which has also been equated to MR by Baumeister, are viewed by Luria as suffering from a dissociation between speech and motor reactions. Luria believes that the cortical structure of the frontal lobes of the brain of an oligophrenic are irreversibly deranged and that this results in derangement of the verbal processes themselves, such that the verbal processes cannot serve a regulatory function.

Recent CT research on the MR, which is discussed later in this chapter, indicates that MR individuals are capable of utilizing their verbal processes to regulate nonverbal behaviors (Keogh, Burgio, Whitman, & Johnson, 1983; Whitman, Scibak, Butler, & Richter, 1982). Whether the subjects of these positive studies

would be considered cerebro-asthenic or oligophrenic is not clear, as a precise differentiation between these two syndromes, in regard to the population of mentally retarded individuals, does not appear to be offered in the literature. However, if such individuals were to be classified as oligophrenic then the results of the above listed studies (eg. Keogh et al., 1983) would tend to offer evidence contrary to Luria's contention in regard to the dissociation of verbal and nonverbal processes in oligophrenics.

Factors leading to the popularity of CBM.

Since the 1950's researchers have been examining cognitive processes in mildly and moderately retarded children (Whitman et al., 1984). However, it wasn't until the 1970's (Meyers & Craighead, 1984; Whitman et al., 1984) that CBM became the popular paradigm it presently remains. Prior to the 1970's operant measures received greatest research acclaim (Meyers & Craighead, 1984; Whitman et al., 1984). Several factors contributing to the shift in concentration by researchers from operant to more cognitive forms of therapy have been offered as follows: (a) the failure of operant measures to produce durable and

generalized effects (Whitman et al., 1984; Whitman, et al., 1982); (b) developing research in cognitive psychology such as Bandura's introduction of cognitive concepts in modeling, Meichenbaum's development of self-instruction training drawn from Luria and Vygotsky's theories of the role of speech in the regulation of behaviour, problem-solving (Meyers & Craighead, 1984), and the prominent place of cognitive psychology research in the field of MR (Whitman et al., 1984); (c) self-control research--the argument for internal control has given self-control procedures a more cognitive framework in recent years (Meyers & Craighead, 1984); (d) cognitive therapy--Ellis and Beck being the two major exponents, propose that people behave maladaptively because of illogical thought processes (Meyers & Craighead, 1984; Whitman et al., 1984); and (e) increasing concern with training intelligence (Whitman et al., 1984).

Aspects of concern to CBM researchers. While results of CBM studies are tentatively promising, they are also contradictory. Whitman et al. (1984) discuss an abundance of studies which have produced positive, negative, and inconclusive results. The

implication of such findings is that several concerns continue to perplex professionals and are in need of definitive answers via replication research (Borkowski & Konarski, 1981; Loper, 1981; Meichenbaum & Asarnow, 1979; Ryan, Short & Weed, 1986), if cognitive training procedures are to develop into "an educationally effective technology that will facilitate intellectual and personal-social development in mentally retarded children" (Whitman et al., 1984, p. 227). The following have all been noted as aspects within the field of CBM requiring further investigation:

1. The role of individual differences as a variable effecting research outcomes (Borkowski & Cavanaugh, 1979; Sternberg, 1981; Wong, 1986).

2. The need for additional evidence of maintenance and generalization of skills learned (Borkowski & Cavanaugh, 1979; Ellis, Lenz & Sabornie, 1987; Risley & Hart, 1968; Sternberg, 1981; Wong, 1986).

3. Investigation of components of training packages most effective in producing behavioral changes (Karlan & Rusch, 1982; Whitman, et al., 1984; Whitman et al., 1982).

4. Demonstration of ecological utility of training packages (Crouch et al., 1984; Keogh et al., 1983; Whitman et al., 1984).

5. Monitoring acquisition and use of cognitive skills (Israel 1978; Keogh et al., 1983; Wong, 1986).

6. Replication research (Crouch et al., 1984; Whitman, et al., 1984).

This is not to say that CBM is a field so riveted with unanswered questions that it does not deserve consideration as an educational tool, but rather that, as with any new technology, it is a field needy of continued research producing support of prior positive results as testimony to the excellence of these procedures if CBM is to become a universally accepted and utilized therapeutic and/or educational tool.

Methodological issues of correspondence training. In addition to the general concerns of CBM above discussed, several other methodological issues specific to CT have been examined by researchers.

First, the regular procedure followed in most CT studies has been to implement a baseline condition, followed by a reinforcement of verbalization phase, which is then followed by a correspondence training

condition. In the phase referred to as reinforcement of verbalization (RV), subjects are reinforced for verbalizing that they will perform in the desired manner. This reinforcement is given whether or not a subject's verbal report concurs with his/her actual performance.

The logic in including such a phase prior to CT seems to have been as a control procedure, testing subject ability to regulate nonverbal behaviors via speech prior to CT (Israel & Brown, 1977). Israel and Brown have also suggested that an RV phase prior to CT might serve as a procedure strengthening a verbal mediator or as a phase interfering with subsequent acquisition of correspondence "by rewarding the child for saying and not doing" (p. 333). Thus, Israel and Brown investigated the role of an RV phase prior to CT.

The authors (Israel & Brown, 1977) utilized 16 Head Start children, with a mean age of 4 years 8 months, who were divided into two groups. Group 1, following baseline, experienced RV, then CT and finally a second RV phase. Group 2 experienced CT immediately following baseline and then a final RV phase. Two play behaviors (i.e. playing with

dinosaurs and cars) which subjects were found to engage in at low frequencies were targeted for intervention.

Results for Group 1 subjects revealed that while verbalizations to play with target toys increased, no corresponding increases in actual play behavior occurred during initial RV. CT was however found to result in increased correspondence for both groups of children. Further, both groups of subjects performed equally well in the final RV phase. The play behavior (i.e. cars) tested in this final RV phase was different from that examined during baseline and CT.

This study therefore demonstrated that generalized verbal control can be learned via CT. The authors concluded that RV prior to CT is not a necessary precursor to CT which strengthens the verbal component, or a hinderence to subsequent training of verbal control, but rather that RV is merely a control procedure. Israel and Brown (1977) recommended that RV need not be implemented prior to CT unless, "it is particularly difficult to get access to the nonverbal behavior, or where the introduction of a reinforcement procedure is novel enough so that it is desirable to keep the target

behavior simple" (p. 337). Finally, the authors suggested that a researcher/change agent will be equally successful in producing verbal control of nonverbal behaviors in subjects following implementation of either training procedure (i.e. RV before CT or not).

Second, while RV prior to CT has been found to be unnecesssary for producing correspondence and control of nonverbal behaviors via verbal behavior, it has been suggested that an RV phase following CT be implemented in order to test for the effects of CT (Israel, 1978; Karlan & Rusch, 1982). That is, RV following CT would allow for examination of verbal control of nonverbal behaviors under a condition for which reinforcement of correspondence is absent. Thus, RV following CT would test the effectiveness of maintaining target behaviors via verbal control.

Third, testing of maintenance during a return to baseline following CT has been noted by Karlan and Rusch (1982) to be missing in most CT studies. It is suggested that demonstration of maintenance during such a phase would indicate that control of target behaviors had passed either to environmental cues, or covert speech.

Fourth, it has been suggested that percentage of correspondence needs to be employed as a dependent measure in CT research (Israel, 1978; Karlan & Rusch, 1982). Israel (1978) has noted that in prior research percent saying and percent doing have been reported separately, which "permits possible distortion of results" (p. 274). He has gone on to give an extreme example; "children A, B, C, and D say but do not do 'X', while children E, F, G, and H do 'X' but do not report it. This is graphed as 50% saying and 50% doing--the reader abstracts that half of the children exhibited correspondence, when in reality none did" (p. 274). Israel has recommended that reporting of the separate components of percent saying and percent doing only be conducted in studies examining new areas in correspondence research such as the development of psychopathy. Otherwise the author has recommended percent correspondence be utilized as the major dependent variable in correspondence training research.

Furthermore, Israel (1978) has defined two types of correspondence. The first, referred to as positive correspondence is defined as the occurrence of both the verbal (i.e. saying) and nonverbal (i.e. doing)

components of behavior. Negative correspondence , on the other hand is defined as the absence of both saying and doing behavior components.

Karlan and Rusch (1982) have concurred with Israel's suggestion that percent correspondence be employed as the major dependent variable in CT research and have expanded upon his definitions of correspondence types by defining two types of noncorrespondence. Positive saying, negative doing noncorrespondence (+ saying, - doing) is said to occur when a subject verbalizes the appropriate behavior but does not perform accordingly. Negative saying, positive doing noncorrespondence (- saying, + doing) is defined as occurring when a subject does not produce the appropriate verbal components but performs accurately. Karlan and Rusch have described trends in positive, negative, and noncorrespondence which indicate success and/or nonsuccess of study conditions of CT research, either generally conducted or recommended for examination. These trends are explored in relation to the findings of the present study, in Chapter 4 of this paper.

Fifth, Israel and O'Leary (1973) examined the effectiveness of both say-do and do-say CT paradigms

and speculated superiority of the former procedure over the latter, in producing verbal control of nonverbal behaviors. The logic behind this hypothesis was that since Luria has discussed speech as serving a regulatory function over nonverbal behaviors, "encouraging the child to verbalize prior to acting [might] facilitate the use of this still novel regulatory function of language" (p. 576). The authors further suggested "that verbal behavior is a more readily available and versatile discriminative stimulus than nonverbal behavior; the verbal behavior is more likely to prompt rehearsal and thus serve a regulatory or directive function" (p. 576).

In the first of two experiments, the investigators (Israel & O'Leary, 1973) utilized 16 Head Start children, with a mean age of 4 years 4 months in examining which paradigm (i.e. say-do or do-say) was superior in increasing subject rate of play with three play activities (i.e. puzzles, letters, beads). The subjects were broken up into two groups, whereby Group 1 was exposed to say-do sequences for all days for the puzzle and letter activities and a do-say sequence for all days for the bead activity. Group 2 experienced do-say sequences

for the first two activities noted above and a say-do sequence for the third activity. Results demonstrated the say-do procedure superior over the do-say paradigm with significant improvements for Group 1 over Group 2, in the two activities for which Group 1 was exposed to say-do sequences. Comparison of the two groups first exposures to the do-say sequence (activity three for Group 1, activity one for Group 2) further found prior experience with a say-do procedure to facilitate learning of the do-say sequence. The reverse situation was not found to occur.

In the second of the two experiments reported by Israel and O'Leary (1973) another 16 Head Start children with a mean age of 4 years 7 months served as subjects. This time crayons were selected as the target play behavior, with one group of subjects being exposed to a say-do sequence, and the other group to a do-say sequence. Two changes to the original design took place; first, the children in both groups received snacks (reinforcement) after both play and verbalization periods were completed, whereas in Experiment 1, the say-do group (Group 1) received snacks during the verbalization period

although they were not allowed to consume them until after the completion of the play period. Also, in Experiment 1 children in either group who verbalized correctly but did not actually play with the target toy were told by the observer "You didn't really play with puzzles, did you?". The authors speculated that this statement may have served as a mild punishment and therefore excluded this statement "in order to eliminate any procedure other than the reinforcement of a sequence of two behaviors" (p. 579). Again, as in Experiment 1, the say-do group was found to perform significantly greater than the do-say group.

The authors made an additional point in regard to the do-say sequence worth noting. That is, during RV phases subjects are intermittently reinforced for inaccurate reporting in do-say sequences. This reinforcement results in the subsequent need to extinguish the inaccurate reporting before accurate reporting can be established. The obvious draw-back to do-say sequences in this case appears to be two-fold: (a) it encourages lieing behavior during initial RV phases, by reinforcing positive reports of target behavior whether or not the behavior reported actually occurred; and (b) it may require extended

training, beyond that required in say-do sequences where lieing is not reinforced, in order to extinguish this undesirable behavior. As previously discussed, Israel and Brown (1977) did not find initial RV in a say-do paradigm to hinder acquisition of correspondence even though subject's are rewarded "for saying and not doing" in such a condition.

Correspondence training of the mentally retarded. A review of the literature on correspondence training revealed five studies which utilized mentally retarded individuals as subjects (see Table 1).

The first study conducted in 1967 by Brodsky sought out to investigate whether or not verbal behaviour could control non-verbal behaviour. Brodsky utilized 2 institutionalized retarded females. Both subjects were assessed as being highly verbal, but rarely initiated social contacts or responded to contacts by other retardates. Thus, the author set out to advance sociable behavior in the subjects. One subject underwent a behaviour modification procedure whereby in a laboratory setting she was exposed to a 34-year-old highly sociable DS female and was reinforced for sociable behavior. The second subject underwent verbal conditioning whereby she was

Table 1

Summarized Data on Correspondence Training Studies with Mentally Retarded Subjects

Variable	Study	
	Crouch et al. (1984)	Keogh et al. (1983)
Setting	work setting	small room down hall from Ss classroom
Subject	(1) female--23 yrs --IQ 54 (2) male --28 yrs --IQ 47 (3) male --33yrs --IQ 44	(1) male--IQ 53 (2) male--IQ 57 (3) male--IQ 59 (4) male--IQ 75 --age range of 10 yrs 11 mos to 12 yrs 4 mo
Study Purpose	to improve speed of work performance	to improve listening behaviours
Design	multiple baseline across subjects	multiple baseline across subjects
Paradigm	say-do CT	say/show-do-say CT
Procedure	B, coworker prompt, RV, CT, RV	Pre-B, B, CT-1, CT-2, Feedback-3
Results	somewhat positive with all 3 Ss displaying different patterns	positive, gener. displayed

(table continues)

Variable	Study		
	Whitman et al. (1982)		
	Experiment		
	1	2	3
Setting	S's classroom	Ss classroom and adjoining corridor	Ss classroom
Subject	9-yr-old female --IQ 70	4 white males --age range 11 to 12 yrs --IQ range 72-87	(1) male --IQ 56 (2) female --IQ untestable (3) male --IQ 68 --age range 10 yrs 2 mo to 11 yrs 6 mo.
Study Purpose	to reduce out-of-seat behavior	to improve sitting posture	to improve on-task behavior
Design	ABAB with 8 mo. follow-up.	multiple baseline across Ss	multiple baseline across Ss
Paradigm	say-do CT	say-do CT	show-do CT
Procedure	B-1, CT-1, B-2, CT-2, follow-up (B-3)	B, CT, maintenance (RV) and transfer	B, CT, maintenance (R Show) and transfer
Results	positive, maintenance	positive, gener., and maintenance	positive, gener., and maintenance

(table continues)

Variable	Study	
	[a] Scibak, (1980)	Brodsky, (1967)
Setting	----------	laboratory setting
Subject	6 EMR children	2 MR female adults --17, and 25 years
Study Purpose	to improve appropriate classroom behavior	to improve social behavior
Design	multiple baseline	----------
Paradigm	say-do CT	incomplete--RV phase only
Procedure	B, RV, CT, maintenance (RV), and transfer	B, (1) behavior modification (BM) (2) RV
Results	positive with CT	BM S displayed significant improvement, RV S displayed no improvement in sociable behavior

Note. Gener. is abbreviation for generalization

[a]Information is sketchy as taken from a dissertation abstract.

reinforced for positively reporting sociably in response to a list of fifteen questions. Results indicated that the behaviour modification subject made sharp gains in social behavior in the training setting and that these gains generalized to the playground setting and transferred to the interview setting where prosocial responding increased. On the other hand results for the verbal conditioning subject were not as positive. Brodsky reported that the percentage of social statements made by this subject increased, although statements given were false. Also, neither the second subject's social verbal or non-verbal behaviour generalized to the playground.

Brodsky (1967) concluded that his study failed to support the hypothesis that conditioning verbal behavior leads to changes in nonverbal behavior. Rather the results were said to support the converse; that conditioning nonverbal behaviour results in change in verbal behaviors.

However, Brodsky (1967) applied an incomplete CT paradigm (Crouch et al., 1984) as he did not follow-up the initial RV phase with a CT phase. It was earlier noted that Israel and Brown (1977) have

reported that while initially a subject may not possess verbal control and therefore may not display such control in an initial RV phase, verbal control can be learned with CT and later displayed in a subsequent RV phase. Therefore, in that he did not employ and test a CT phase, Brodsky's conclusion that verbal conditioning does not lead to positive corresponding change in social behavior appears to have been premature.

The literature reveals that it apparently was not until 1980 that a second CT study utilizing MR subjects was conducted. In this study (Scibak, 1980) 6 EMR individuals were employed as subjects. The study was directed at improving appropriate classroom behaviour which was measured as rate of in-seat, quiet, and attentional behavior. Results showed an initial RV phase to have little effect on behavior, thus indicating that there was no "pre-existing state of correspondence between verbal and non-verbal behavior prior to training" (p. 1146-B). CT did however produce large improvements in behavior. Scibak concluded that CT is a "viable strategy for effecting changes in classroom behavior" (p. 1146-B).

In 1982 Whitman, Scibak, Butler, Richter, and

Johnson published a paper reporting a series of three CT studies. In the first experiment the authors set out to reduce out-of-seat behavior in a 9-year-old EMR female. The subject was assessed to be functioning at the first grade level and her out of seat behavior was found to be interfering with her task completions as well as disturbing other children in her special education classroom. The subject was only told on the third day of training what was meant by staying in your seat. Specifically, the child was to keep her buttocks in contact with her chair seat and was to keep her body oriented toward her work. During CT the subject was asked, "Are you going to stay in your seat today?". After a 20 minute session the subject was told by the observer, "You said you were going to stay in your seat and you really did" or "You said you were going to stay in your seat and you really didn't did you? Well you'll have to try harder tomorrow." In order to receive positive feedback, plus a reward of candy, and a walk with the observer, the subject had to be out-of-seat three or less times with a total duration of less than 1 minute.

The ABAB design followed by the authors showed

the subject to display the least amount of out-of-seat behavior during CT phases with some increase in out-of-seat behaviour during baseline phases. However, each return to baseline indicated a lower incidence of out-of-seat behaviour than the previous baseline phase. Also, a final baseline or follow-up condition showed a low incidence of the target behavior. These results led the experimenters to conclude that CT is effective with EMR children and that the results obtained with CT are maintained.

In their second study Whitman et al. (1982) set out to improve sitting posture in 4 EMR males. Similar to the first experiment, the authors utilized a say-do CT paradigm. However subjects were told on a daily basis, by their teacher, the four components required of them in order to sit properly; namely, feet kept flat on the floor, back kept against the back of the chair, hands folded on the desk, and buttocks kept in contact with the chair seat. The subjects were then taken into a hallway and asked if they remembered what the teacher said about proper sitting. Subjects were then required to give all four key statements. If the subjects did not give all four statements they were prompted verbally until they did

so. Prompting was gradually faded until the subjects were able to verbalize the statements independently. Subjects were praised for correct verbalizations and told to return to class. Feedback in regard to actual behavior was given similar to the first experiment (i.e. "You said you were going to...) and followed each session. A maintenance phase was included in this study whereby each subject was given reinforcement for the say component only. After 2 weeks maintenance was faded to the natural teacher.

Results obtained indicated the experimental children to have exceeded all other children in the classroom in proper sitting behavior after training. Also, the improvement in sitting behavior was found to generalize to an untreated writing situation. Finally, the authors concluded a relationship among sitting posture, quantity of work completed and accuracy, with subjects demonstrating modest or greater improvements in math and writing performance. The authors concluded CT to be effective in improving sitting posture in EMR individuals.

In the final study reported by Whitman et al. (1982), the authors set out to increase and maintain attending behavior in nonverbal children. The authors

were interested in discovering whether or not a child had to be highly verbal or verbal at all in order to benefit from CT. Thus, they utilized 3 children with extremely poor expressive language abilities from a classroom for the MR.

As in the second experiment the subjects' natural teacher told the class as a whole that they were expected to pay attention, and then the teacher proceeded to tell the students how they were to pay attention. Also similar to the second experiment, subjects were individually taken from their room and asked if they remembered what the teacher said. Subjects were prompted until they answered affirmatively. Unlike the previous two experiments however, the subjects were then required to demonstrate the statements verbalized by the teacher. Once each subject had done so he or she was given positive feedback and sent back to the classroom. Following observations in math and spelling, subjects were given specific feedback, either positive or corrective, in regard to their attending behavior. A maintenance phase was included during which students were taken out of the classroom and required to demonstrate appropriate attending behavior, for which

they received positive feedback, but were not contacted following sessions. Control of maintenance was gradually faded to the natural teacher.

The results of the study showed all 3 subjects to display correspondence for every day except once. Two of the subjects reached the 80% final criterion within the first few days of training and the third subject reached the 80% criterion by the end of the second week. For the two of the three subjects who remained in the study, maintenance and transfer were deemed successful with the subjects continuing to perform at or above the 80% criterion. The results also demonstrated a relationship between on-task behavior and task performance with one subject displaying an increase in the number of math problems completed and spelling accuracy, a second showing increases in both math and spelling accuracy, and the third displaying an increase in spelling work completed. Whitman, et al. concluded that "CT is an effective procedure for increasing the on-task behavior of nonverbal retarded children in an academic setting" (p. 561).

In 1983 Keogh, Burgio, Whitman, and Johnson attempted to increase the listening behaviors of 4

EMR males via CT. An all or non rating system was utilized whereby subjects were expected to sit correctly, maintain eye contact, and keep quiet in order to be assessed as displaying appropriate listening behavior. Subjects were also scored on the accuracy of performance of listening tasks. During CT subjects were given a rationale for being a good listener, and were told how to be a good listener. The experimenter first modeled self-instructions and then taught them using a chaining procedure. Instructions gradually increased from 2 to 4. Following experimenter instruction subjects had to say and show what was required to listen appropriately. Subjects weren't required to reiterate experimenter statements word for word but did have to say the major components. The authors credit this study with providing subjects with, and requiring subjects to give, more elaborate and approximate verbalizations than previous studies of this kind.

Following the "say/show" procedure, subjects were provided the opportunity to act accordingly during a sentence instruction task. After the sentence instruction session was completed subjects were asked a series of questions in regard to their

own performance and were provided with feedback on the accuracy of their responses. Food reinforcers were given to subjects only if 2 correspondences occurred. The first referred to as "say-do" required correspondence between what the subject said he would do prior to the opportunity to act appropriately and what he actually did. The second referred to as "do-say" required correspondence between what the subject did and what he said he did in response to the questions asked following session completion.

Shaping was utilized and focused on reinforcing subjects for improvement in each of the three listening behaviors over the previous day's performance. Shaping was continued until subjects showed perfect listening behavior in the training setting.

Three generalization situations were established: (a) sentence-instruction task in the training setting; (b) sentence-instruction task in the classroom; and (c) story listening in the classroom, whereby the subject was required to listen to a short story and then respond to 10 questions about the story content.

A second CT phase was implemented with 2

subjects in order to facilitate their performance on the generalization tasks. During this phase CT-1 procedures continued and subjects were also asked the same questions which followed CT-1 sentence-instruction but in regard to the generalization tasks. Feedback was provided to each child in regard to listening behaviors displayed during the out-of-class generalization task.

Finally, a feedback phase was implemented with the same 2 subjects included in CT-2. The purpose of this condition was to increase subjects accuracy on the training sentence-instruction task. CT-1 and CT-2 procedures continued. Each subject was shown a graph displaying his task accuracy upon completing the training sentence-instruction task. The experimenter recorded the subject's accuracy in percent on the graph in front of the child. Corrective and evaluative feedback was provided along with comparisons between previous and present day accuracy. A "good listener" badge along with verbal praise served as subject reinforcement.

Results of CT-1 showed 70% to 100% correspondence between what subjects said they would do and what they actually did for the three listening

behaviors during training. Forty five percent to 90% correspondence on the out-of-class sentence task was displayed by the 2 CT-2 subjects. All 4 subjects displayed a rapid increase to or near ceiling levels during CT-1 for sitting correctly and paying attention. Staying quiet was near ceiling level at baseline for three of four children and stabilized near 100% for the fourth subject after intervention. Three of the four subjects displayed generalized changes in listening behavior in the out-of-class generalization setting. Two of four subjects displayed an overall increase in sitting appropriately and paying attention for the in-class generalization sentence task. No generalization of listening behavior was displayed by any of the subjects for the story listening task. Finally, only one subject displayed modest improvement in task accuracy.

Both subjects included in CT-2 displayed increased listening behaviors on the out-of-class and in-class sentence task, but no change in listening behavior during the story task, nor any change in task accuracy.

An improvement in accuracy on the training task

and out-of-class sentence task from 35% prior to the feedback phase to 60% during the last eight sessions of this condition for one of the two subjects included was found. The other subject was only in this condition for 6 days and showed no improvement in accuracy.

The results obtained by these authors (Keogh et al., 1983) led them to conclude that correspondence between the children's verbal and non-verbal behavior was produced. The authors note that they were able to make this conclusion as acquisition of the instructions by the children and the relationship of these instructions to non-verbal behavior was directly monitored. Keogh et al. reported these results to be significant in light of Luria's (1961, 1963) earlier noted contention of verbal regulatory deficiencies in MR individuals. Further, CT was assessed to be effective in improving listening behavior and promoting generalization of these behaviors. Results in regard to task accuracy, were noted by the authors to be complex; with two of four children having shown some improvement in accuracy, and one of these two children having required direct feedback before displaying such accuracy, Keogh et

al. speculated that the lack of improved accuracy may have been due to the fact that "while the CT instructions provided cues to the subjects concerning how to generally attend to tasks, they did not tell the child how to strategically solve these tasks" (p. 69). It was further suggested that the tasks implemented may have required memorial skills not then possessed by the children.

The most recent CT study found, utilizing MR subjects, was conducted by Crouch, Rusch and Karlan in 1984. The experimenters sought out to improve task duration and speed of performance in 3 moderately retarded adults. Tasks targeted for intervention were socially valued and trained in applied settings. This study consisted of 5 phases:

1. Baseline.

2. Coworker prompt. Subject's were told 2 to 5 minutes before task initiation the appropriate start and completion times. During this phase subject number 2 (see Table 1) reached criterion.

3. Reinforce say. Two to 5 minutes before start time each subject was to say when he or she would start and complete the target task. The worker was also to describe how the times looked on his or her

watch/wall clock. In order to control for possible memory deficits subjects were required at task midpoint to say when they would finish the task. Subjects received verbal praise for each statement made in regard to start and completion times. During this condition the subject who reached criterion in the coworker prompt phase maintained his criterion. A second subject reached criterion and maintained this level except for 3 days. The third subject demonstrated lasting improvement in task performance, but only reached criterion once. However, this third subject's nonhandicapped coworkers also reached criterion only once. The authors speculated that the criterion set for the third subject was unreasonably stringent.

4. Reinforce correspondence. The one subject who had not previously reached criterion was instructed and prompted to say when he would start and finish the task, describe how this looked on his watch and at task midpoint again say when he would complete the task. However, verbal reinforcement was given to the subject only if his statements matched his performance. The subject's performance was not found to improve.

5. Reinforce say. The time criterion for the unsuccessful subject was increased to 30 minutes. The procedure followed in the initial reinforce say condition was reinstated. The subject was found to reach criterion on 2 of 3 days.

Unlike the other CT studies described previously, Crouch et al. (1984) found the verbal component of CT sufficient to establish and /or maintain verbal control of the study tasks. The individual effect of age in these adult subjects, in regard to its possible effect on the results of the Crouch et al. study, is explored by the present researcher in Chapter 4 of this thesis.

Therefore, as previously suggested, the findings of the CT studies discussed in this review indicate that Luria (1961) was correct in his hypothesis that functional systems which are neurodynamically intact can compensate for other defected systems, but incorrect in his contention that mentally retarded individuals are incapable of using their verbal skills to control nonverbal behaviors.

The present study

Correspondence training--rationale. The

advantages in choosing CT to remediate the subject are the following:

1. The desire to utilize a paradigm as unobtrusive as possible. The reason for this desire was that should the subject generalize the procedure and/or skills trained to the classroom, the procedure would need to be such that the subject's behavior would not disturb his teachers or fellow classmates. Research literature indicates correspondence training to be the least obtrusive technique for any setting (Whitman et al., 1982).

2. The subject of this study was observed to be lacking intrinsic motivation and to be outer-directed (i.e. dependent on external reinforcement and guidance to complete tasks or feel any level of accomplishment) prior to the initiation of the study. Research has found such outer-directedness to be typical of MR individuals (Sternberg 1981; Whitman et al., 1984). Since it is not desirable or feasible for a student to be constantly externally reinforced throughout the execution of a task, in order for that task to be completed or successfully completed (Israel, 1978), goal setting procedures were implemented in order to aid in developing

self-initiative in the subject (Rosenbaum & Drabman, 1979). However, while self-regulation was a desired goal of this study, it was not the primary concern. Therefore, while a self-regulation procedure (i.e. goal setting--see Chapter 2) was implemented, this paradigm was not chosen as the central technique for this study. It should be noted that correspondence training has been referred to as a self-control procedure due to its focus on developing the subject as the locus of control (Keogh et al., 1983). Also, as discussed earlier in this chapter, Luria (1961) has proposed that rules verbally formulated by individuals regulate behaviors previously requiring external reinforcement for maintenance. This would indicate that a procedure such as CT, which aims to produce verbal regulation of behavior would tend to counteract the outer-directedness of MR individuals. As such, the potential of CT to alter the problem of outer-directedness, found evident in the subject of the present study, further rendered CT the preferable paradigm for this study.

Features of methodology. The exact methodology engaged in this study was based on the general CBM concerns, and specific CT issues outlined previously

in this chapter (eg. role of individual differences, superiority of the say-do paradigm over do-say). While this study did not set out to solve all the problems perplexing cognitive researchers, it did include, where feasible, aspects which would lend evidence to pertinent CBM/CT issues.

In regard to general CBM issues the following procedures took place; (a) an extensive subject section was written in order that subsequent examination of individual differences across subjects and studies might be made possible, (b) procedures directed at facilitating maintenance and generalization were engaged. Specifically, feedback on the value of the task strategies (Borkowski & Cavanaugh, 1979), praise as a natural contingency (Borkowski & Cavanaugh, 1979), training of metacomponents or self-regulation (i.e. goal setting) (Sternberg, 1981; Wong, 1986), and informed plus self-control training (Wong, 1986) which have been suggested as a few of the methods for enhancing maintenance and generalization, were employed in the present study; (c) personally significant deficiencies were remediated by the natural tutor, in the natural tutoring environment in order to

demonstrate ecological utility; (d) a day by day examination of both the subject's saying and doing of the task instructions were assessed, so that a relationship between changes in cognitive skill and task performance might be observed. Such examination allowed for monitoring acquisition and use of cognitive skills; (e) in the sense that this study is another CT study with an MR individual, it proposes to function as a replication study. In that this study is original in its use of a DS subject, remediation of academic as opposed to social skills, and demonstration of complete ecological utility, replication of this study is necessary to validate its findings.

In regard to methodological concerns specific to CT, the following procedures were implemented in the present study; (a) in concordance with Israel's and Brown's (1977) findings and suggestions earlier noted of RV prior to CT being unnecessary, an initial RV phase was not conducted; (b) as suggested by Israel (1978) and Karlan and Rusch (1982) an RV phase following CT was included in order to examine maintenance; (c) baseline following RV-1 was conducted in order to further examine maintenance,

and possible shifting of control from experimenter cues to subject internal control and/or environmental cues as suggested by Karlan and Rusch (1982); (d) percent saying and percent doing were calculated in addition to percent correspondence and correspondence types (i.e. positive, negative, noncorrespondence), since CT with DS individuals is a new area of CT research; and (e) a say-do paradigm was utilized as opposed to a do-say paradigm due to the apparent superiority of this procedure, as suggested by Israel and O'Leary (1973).

Finally, as has previously been noted, this study involves a single subject. It should be noted that it was due to the apparent strength of single subject research, that the researcher was satisfied with conducting such a study. Specifically, Kendall & Finch (1986), have written,

> The single-subject method allows for intensive investigation of one person and thus a careful examination of the effects of treatment. Also, as stated elsewhere, "with intensive study of the single case it is a valuable source of hypotheses for later investigation". (p. 856)

Hypotheses

Having considered the pertinent issues faced by cognitive researchers, particularly within the field of CT, and by expanding upon the CT studies having utilized MR individuals above described, the following results are hypothesized for the present study:

1. CT will be effective in increasing the DS subject's use of task strategies.

2. The subject's academic performance on the three study tasks shall improve to criterion levels as a direct result of (1) above.

3. The subject's self-confidence, initiative, and independence will improve.

4. Academic behaviour will be maintained throughout initial RV (RV-1), return to baseline (B-2), and follow-up (RV-2) phases.

5. Generalization of task strategies to the school setting shall occur.

CHAPTER 2

METHOD

Subject

Developmental history. The subject (S) of the study lives at home with his parents, sister and two brothers. The S is the youngest sibling in his family.

An interview with the S's mother revealed that the S was carried to full term with no birth complications. The S was born March 29, 1979. The S's mother was 40 years of age when the S was born and his father was 43. Although the S's mother does not recall the exact weight of the S at birth, she did say that he was not small, and appeared in good health. The S was born with no physical defects, such as heart or lung problems. Throughout his life the S has been bothered by constipation which presently persists. The S's parents were told the day following his birth that he was a Down Syndrome baby. Doctors believed from infancy that the S was only mildly handicapped, as he displayed quite good muscle strength for a DS infant. The S's mother was not aware which form of DS (i.e. trisomy, translocation,

or mosaicism), the S was afflicted with.

The S's mother could not recall at what age the S began to crawl, but said that he began to walk at 18 months of age. At approximately the age of 3 years the S began to utter words, and by age 4 1/2 to 5 years was verbalizing short sentences. The S is right-handed. Bladder and bowel control were evidenced at approximately age 3 years.

Physically the S is quite attractive, but short in stature. He appears at present to be of normal weight for his height.

Academic background. The S's parents have always been concerned with their son's development--both academically and socially--seeking to gain the best care and training possible for the S. During infancy physiotherapy was conducted in the home by a physiotherapist. At age 2 years the S was enrolled in the St. Clair College Early Childhood Education Centre in mornings and attended Shirley E. Taylor Preschool for the Developmentally Handicapped in the afternoons. Speech-language therapy was begun through Shirley E. Taylor, June 1983, and continues presently, in the S's school.

The S's parents signed a form permitting the

researcher to attain full access to the S's student records. The following information was obtained:

The S was enrolled in a "regular" kindergarten class in the Windsor Separate School system for the academic year 1984/1985. In the early part of the academic year, the S was found to require adult assistance to follow routines. While the S's independence in following routines improved, assistance was still required. The S tended to fall asleep during class time at the beginning of the school year, but this lessened as the year progressed, and class-participation by the S improved.

In-home tutoring for the S was solicited by the S's parents. An in-home program was suggested for the S and was developed through the school and Regional Children's Centre in September 1984. The following objectives were set: (a) to increase receptive and expressive language skills; (b) develop math skills, including counting and number concepts; (c) improve phonics and sight reading, reading skills; (d) improve eye-hand coordination; and (e) review colours, letters, and numbers.

The teacher report for March revealed that the

S's ability to follow class routines had improved from the October 1984 report. However, strict 1:1 supervision for following directions was reported as still necessary for all non-play activities. Abstract concepts (eg. rhyming, copying) were not believed to be comprehended by the S. Small motor skills such as those required for printing and colouring were reported as extremely poor. Also, the S had not formed any close relationships, and seemed insecure with his school caregivers. A school conference report indicated that speech skills had shown some improvement by March 1985. Social progress was noted on the June 1985 teacher report. By the end of the academic year 1984/1985, the S was displaying satisfactory performance in various task areas. Counting skills, recognition of likenesses and differences in words, pictures, and letters, letter knowledge, and names of colours, all seemed at normal grade level according to the final teacher report. The S was reported as able to quickly memorize reading stories, but written work was far below grade level.

In the academic year 1985/1986, the S was enrolled half a day in kindergarten, and half a day

in grade 1. The special education teacher continued to work with the S, as did the teacher's aide, and an in-home tutor. Speech therapy also continued.

In October 1985, the S was reported as able to quickly memorize reading stories, but his written work was far below grade level. Both social interaction and ability to follow routines had also improved from September. Strict 1:1 supervision for following directions was still necessary.

A battery of psychological tests was conducted for the Special Education Identification Placement and Review Committee in October 1985. The subject was 5 years 10 months of age at the time of testing. Individual scores of tests conducted were: (a) WPPSI, verbal score 62, performance under 45, full scale 48; (b) Slosson, MA 4 years 3 months, IQ 72; (c) PPVT, MA 3 years 6 months, IQ 61; (d) WRAT, first grade reading level, spelling pre-first grade, arithmetic pre-first grade. Results of these tests produced an assessment of Trainable Retarded. Good reading vocabulary, recognition of letters and numbers, and improvement in motor skills were listed in this report.

As of January 1986 the S began full time

placement in grade 1.

A Psychology Report presented to the school in February 1986, reported the S as showing continual progress "in such areas as cognitive development, language, self-help skills, gross-motor skills, and specific speech-language skills including receptive and expressive vocabulary, length and complexity of speech and phonemic articulation". A short attention span, and difficulty in sustaining attention were also reported. Excellent sight recognition of letters, and limited word attack ability under situations of overlearning were listed. The S was reported as displaying extremely limited comprehensional skills. Some rote counting and numerical recognition skills were noted. Motor-skill development was indicated as particularly deficient.

WPPSI, Bender Gestalt, and Human Figure Drawing tests were administered for the Psychology Report. Test results produced an overall assessment of Trainable Retarded (upper limits of), although the S's verbal/language processing abilities were found to be remarkably stronger than his non-verbal/visual spatial functioning. The S's verbal abilities scored in the "mental defective to low average" range of

functioning. The S displayed "rather severe limitations in his auditory attentional abilities and retention of information in short-term auditory memory". However, he was reported as "quite capable of retaining overlearned, highly familiar verbal information in long-term memory". The S displayed very concrete thinking with difficulty understanding abstract concepts. Restricted expressive language abilities were found.

The S was found severely deficient in all the areas tested in regard to visual-spatial processing (eg. visual-motor organization, visual planning). The S's performance on the Bender Gestalt Test was unscorable and figures drawn for the Human Figure drawing task showed extreme visual-motor coordination and integration difficulties, with all body parts omitted, except for the head and stick torso. Perseveration scribbling was also reported.

While the S's verbal/language abilities were noted as proposing potential in the Educable Retardation range, his deficiencies in abstraction were cautioned as possibly resulting in difficulties in progressing in this area of functioning.

In March of 1986 a speech and language

assessment revealed difficulties in articulation (i.e. "decreased intelligibility", "frontal lisp", "difficulty with consonant blends") and fluency (i.e. hesitation, prolongation, word repetition, rapid rate of speech). The Illinois Test of Psycholinguistic Abilities and Boehm Test of Basic Concepts revealed delayed Receptive language skills and poor concept development (i.e. spatial and quantity concepts). Always and every were two of the concepts the S was found deficient in comprehending. Delayed abilities in expressive language with syntax errors were reported.

For the academic year 1986/1987 the S was placed in grade 2. Baseline measurement began April 24, 1987. At this time the subject was reported by the regular teacher to be failing dramatically in all areas of school performance such that she could not foresee him passing the school year.

Personal observations made by the researcher prior to the initiation of the study indicated that the S experienced difficulties in abstract thinking, memorization of addition/subtraction facts, short-term memory required for completion of reading assignments, eye-hand motor coordination, expressive

language and independent completion of school or school related tasks.

One week prior to the initiation of the baseline phase of the present study the R conducted a Peabody Picture Vocabulary Test (PPVT) with the S. The S's chronological age (CA) at the time of testing was 8 years 0 months. The PPVT revealed an IQ of 71, MA 5 years 1 month. This score was exactly 10 points higher than the last PPVT conducted when the S was 5 years 10 months. However, the score indicated agreement with the last assessment of the S, of verbal abilities in the Educably Retarded Range of functioning.

Setting

All sessions were held in the natural tutoring environment (i.e. the dining room of the subject's home). The S worked at a school desk on loan from his school. The researcher (R) worked at the dining room table adjacent to the subject.

Tasks, materials

The academic tasks chosen for intervention were math, reading comprehension, and drawing. Study tasks

were comparable to school activities occurring in the S's grade 2 classroom in the areas of math, reading comprehension, and art.

Math assignments consisted of simple single, double, and/or triple digit addition and subtraction questions. Fifteen addition and 15 subtraction questions comprised assignments. During all math lessons an arithmos board (i.e. number board) was at the subject's disposal.

For reading comprehension, the S and R read together a story, after which the S was given an assignment consisting of 5 concrete fill-in-the-blank questions which were based on the content of the story. Each story on which the reading comprehension assignments were based was left with the S for all assignments.

Art assignments were based on the content of the story read for reading comprehension or were based on an interest expressed by the S. Motivation in the form of discussion of what the S was to draw, and/or reading of a poem by the R, and/or displaying pictures relevant to the topic was provided throughout all phases of the study. Crayons were the medium with which all art assignments were completed.

(See Appendix A for samples of study tasks).

Rating system, reliability

Observation sheets (see Appendix B) were developed by the R in order that any pertinent or possibly pertinent information might be collected for each session and each task. Summaries of the information recorded on the observation sheets were listed on a session by session basis on Data Summary sheets (see Appendix C). Phase, day, accuracy in percent and number, strategy use in percent and number were recorded on the summary sheets.

Each math problem completed by the S was recorded as having been calculated with or without the use of the arithmos board. Once the math sheet was marked each problem was also noted on the observation sheet as having been completed correctly (C) or incorrectly (I).

Each reading comprehension problem was recorded as having been completed with or without the use of the reader and the accuracy of each answer was recorded on the observation sheet after the assignment was marked.

Each person the S was observed drawing was

recorded as having been completed with or without the aid of the "people card". The S's art work was marked for the number of people components drawn by the subject and the proper placement of these components (see Appendix D, Table D-1). In order for a component to be given a mark for proper placement it had to be (a) attached to the logical body part (eg. neck to head), or (b) logically placed within the outline of the head (i.e. eyes, nose, and mouth). If an animal or fictional character played a relevant part in a picture to be drawn, then any significant parts in addition to or different from those on the people card were discussed and scored.

Based on the assignment and motivational discussion which took place prior to the S's beginning each art assignment, a list of "necessary people" and corresponding components was recorded on the observation sheet. The S was also given an opportunity following completion of his assignment to discuss what he had drawn with the R in order to promote motivation and to confirm that the S followed through on drawing the picture he originally intended to. Each person considered necessary for picture completion was scored out of a possible value of 36

for components drawn and placement. Therefore, each drawing was scored out of a total possible 36 multiplied by the number of necessary people.

A second rater was utilized in order to assess the reliability of the scoring procedure for art assignments.

The researcher and second rater separately recorded the total number of points for each person she distinguished in each of the S's drawings. The researcher calculated the percent accuracy obtained by the S as judged by both herself and the second rater for each of the S's drawings. Percent agreement between the experimenter and second rater was calculated.

The people card and corresponding rating system were composed based on the S's verbal listing of body parts. This listing corresponded with components noted by art researchers as common in the drawings of students of the S's CA (see Appendix D, Table D-2).

Each day the S's performance on each task was recorded under the headings Saying , Doing , and Correspondence Type (i.e. positive, negative, or noncorrespondence). To be recorded as saying, the S had to volunteer to verbalize the key statements for

"good performance", when asked if he was going to do good work and how. The S was scored as saying even if he failed to remember all the key statements and required prompting.

To be scored as doing the S had to meet the strategy use criterion for that particular day.

Under the heading, Correspondence Type, positive correspondence was recorded as having occurred if the S was scored as saying, and doing. Negative correspondence was recorded as having occurred if the S was scored as neither saying or doing for that particular day. Finally, noncorrespondence was recorded as having occurred if : (a) the S was recorded as saying and not doing (+ saying, - doing); or (b) if the S was recorded as not saying, but doing (- saying, + doing).

Mean percent saying, doing, and correspondence type were calculated and recorded for each study condition and task.

Response definitions

Good performance for math consisted of reading add and subtract signs, writing neatly, and using the arithmos board for every problem. The latter

requirement was the strategy observed for and reinforced.

Good performance for reading consisted of reading each sentence carefully for meaning, referring to the book for each answer, and copying the answer exactly and neatly from the book. The subject was observed for and reinforced for looking in the story book for the answers to the comprehension sentences after reading each sentence.

Good performance for art assignments consisted of thinking of everyone and everything needed to make the picture complete, using the people card for every person drawn, so that every person drawn had all his/her body parts, and drawing neatly. The subject was observed and reinforced for use of the people card.

Thus, the term "task strategy use" refers to the subject's use of the arithmos board for math, reader for reading comprehension, and people card for art assignments.

Discussion between the R an S took place in regard to the S's performance of each of the other components composing good performance for each task completed.

Design

A multiple baseline design across tasks was employed. As the researcher's primary goal in conducting this study was to remediate the subject's areas of weakness without interruption, a reversal design (eg. A/B/A/B) was not desirable. Multiple baseline allows for several between and within series comparisons and no withdrawal of treatment is called for (Barlow, Hayes, & Nelson, 1986). The multiple baseline design attempts to rule out the "possibility that some impactful extraneous event has coincided with the timing of the change in conditions....[by] replicat[ing] the phase change in more than one series, and by using each subsequent series as a control condition for the earlier series" (Barlow et al., 1986, p. 247). Therefore, internal validity is strengthened by this design.

Following correspondence training a maintenance or reinforcement of verbalization (RV-1) phase was simultaneously introduced across all three tasks. Following maintenance a second baseline phase was simultaneously introduced across all three tasks and then a follow-up (RV-2) was introduced (see Table 2).

Table 2

Sequence of Experimental Conditions

Math	Reading Comp.	Art
B-1		
CT	B-1	
	CT	B-1
		CT
RV-1	RV-1	RV-1
B-2	B-2	B-2
RV-2	RV-2	RV-2

Note. B = baseline; CT = correspondence training; RV = reinforcement of verbalization.

Procedure

Baseline. Sessions were held Monday through Friday from approximately 4:00 p.m. to 5:00 p.m. In this condition the subject was observed working on study tasks. No discussion about task requirements took place.

Correspondence training (CT). On the first day that a task was incorporated into the treatment phase the S was given a rationale and told what was required for good performance. The rationale explained that strategy use would improve the S's marks; this would make the R/tutor proud, S's parents proud and most importantly should make the S proud of himself. After this, the S was asked to repeat what was required and prompted on any statements he did not remember. On all subsequent treatment days the S was asked what was required for good performance and prompted if he did not remember.

Upon completing verbalization of key statements the S was permitted to begin the corresponding task. The S was given as much time as he needed to complete a task. The S was not interrupted while doing a task unless he was observed scribbling, or gazing, or

otherwise not engaging in the task at hand. Once the S completed a task it was handed in by him and marked in front of him by the researcher.

In order that the number of days in treatment until the point of final criterion be held as consistent as possible across tasks, it was determined that the S should undergo CT of reading comprehension and art assignments for at least as many days as he had experienced CT solely for the math task.

CT Reinforcement Procedure. The subject received minimal verbal feedback (i.e. O.K.) upon responding affirmatively when asked if he was going to do good work and upon verbalizing the key statements. Corrective feedback followed completion of each task under treatment, whereby the R and S discussed if the S deserved reinforcement and why he did or did not. Reinforcement in the form of verbal praise and a sticker of the S's choice were awarded to the S each day of treatment that the S's task strategy use increased beyond baseline levels by (a) 6 problems for math, (b) 1 response for reading, and (c) 1 necessary person for art. Once an improvement of these levels was maintained for 2 days the S's

performance had to improve by these levels again in order for the S to receive reinforcement. This procedure was continued until the S reached final criterion. When final criterion had been reached, reinforcement was maintained for any performance reaching or surpassing this level.

The same reinforcement procedure was administered for accuracy with the S being required to improve his accuracy by at least 20% for each task in order to receive reinforcement. Reinforcement procedures were discussed with the S so that he could observe the rationale for using the strategy in practice. Accuracy was also reinforced in order to more closely approximate the reinforcement procedure engaged in at school. That is, students are usually reinforced for the end product of a task and not the process involved in completing a task.

Final criterion for strategy use for all tasks was 100%, whereas for accuracy it was (a) 20/30 for math, (b) 3/5 for reading comprehension, and (c) 65% for art assignments. The S was made aware of final criterion levels for strategy use and accuracy at the point at which a task entered treatment. When final criterion for both strategy use and accuracy had been

maintained for at least 2 days for math, reading comprehension entered the treatment phase. The same procedure was followed through for art assignments.

Modeling/training of strategy use. It was determined that modeling of the task requirements would be carried out by the R if after approximately 5 days in treatment (i.e. CT), the S showed no improvement in strategy use and/or accuracy or if a decline in performance was observed.

The first question of the reading comprehension assignments was completed by the S with the R by his side giving guidance and feedback for the first 32 days of the study. This procedure was simply a carry-over from previous tutoring sessions. It was discontinued as the R wished for task completion to more closely approximate the classroom environment where the S would not be regularly given such assistance. Also, the S was found to ask for feedback from the R while completing these assignments. It was speculated that the R's guidance facilitated these requests for feedback and thus hindered the independence which the study sought to facilitate via goal setting. Therefore, the goal of extinguishing the S's requests for feedback while completing the 5

questions he was required to do on his own further advanced the idea of discontinuing the practice of the R completing one question with the S.

It was necessary to train the S in the use of the people card as this was a new activity for him. Training involved modeling by the R for the S in the use of the card and allowing the S to then model the R's demonstration. That is, once an art topic had been decided on by the R and S, and motivation provided, the R proceeded to complete the assignment utilizing the people card. At all times during modeling the S remained at the R's side. Once the R completed the assignment the S was then permitted to complete the exact same assignment with the use of the people card while the R observed. Training ceased the fifth day of this treatment phase.

Goal Setting. Upon entering the CT treatment phase a goal setting procedure was initiated for all tasks. Before being asked what was required for "good" performance the S was asked to set accuracy and strategy use goals. Both the S's predicted goals and actual performance were recorded on a day by day basis so that the S would be able to examine both standards and evaluate the success or

reality of his predictions as well as his day to day progress.

For strategy use the S always set a goal of 100% use, stating that he intended to use the board, or book, or people card "everytime". The S's standards for accuracy for math and reading comprehension were quite high, usually exceeding the final criterion set by the R. For art the S's intended accuracy goal was always 100% as he always set out to draw all people with all the necessary components in all the correct placements.

If the S reached or exceeded his own goal he received a sticker and praise, in addition to that given for reaching the R's criterions. The S was required to determine if he had or had not reached the various criterion levels (i.e. his own goal, criterion for that day, final criterion) and therefore what reinforcements he deserved. The S was required to discuss with the R why he thought he did or did not deserve stickers. It was speculated that such a procedure would promote self-appreciation in the S of his own abilities and accomplishments such that he would eventually no longer require outside reinforcement in order to take pride in his

accomplishments. The S was in essence reinforcing himself for his accomplishments. Reinforcement given by the R was secondary.

On day 38 the S verbalized an interest in marking his own reading paper. A similar interest was expressed on day 39 for math. The interest to self-mark was taken by the R as a sign of independence by the S and therefore it was permitted. The S's self-marking was checked by the R to ensure accuracy.

Reinforcement of verbalization (RV-1). This phase was initiated when the S had maintained criterion levels for the third task (art assignments) for 3 days. The S received verbal praise for verbalizing the task requirements for good work. No feedback was given to the S by the R upon completing each task. Goal setting of strategy use ceased so as to eliminate the provision of feedback to the subject in regard to the doing aspect (i.e. strategy use) of this study. The S continued to record his own accuracy goals and actual performance and reinforced himself with praise and stickers if he thought he was deserving.

Baseline-2 (B-2). This phase was initiated 7 study days after RV-1 had been completed. The purpose of this phase was (a) to initiate a condition which approximated the school situation as closely as possible and to examine maintenance in such a situation, and (b) to examine maintenance under a condition in which verbal cues, in the way of questioning the S regarding good performance, were absent. The R began marking all assignments again due to purpose (a) above. All use of goal forms ceased. Reinforcement in the form of praise and/or stickers and/or written comments were provided by the R based on S accuracy. No reference to any goals was made during this phase.

Follow-up (RV-2). This condition was initiated 6 weeks after B-2. The procedure followed was as that described for RV-1. However, no goal setting procedures were engaged and the R marked all papers.

Teacher checklist. A likert type interview-checklist was designed by the R and completed with the S's teacher's aide during

baseline, CT, and follow-up conditions. The purpose of the checklist was to gain some measure of generalization.

CHAPTER 3

RESULTS

Reliability

Rater agreement for art assignments was calculated by dividing the number of point agreements by the number of point agreements plus disagreements and then multiplying by 100. This procedure has been employed in previous research (eg. Keogh et al., 1983; Whitman et al., 1982). The mean reliability for the S's accuracy of art assignments was 92.53% with a range of 73.33% to 100%.

Correspondence

The S displayed a large proportion of negative correspondence during the B-1 condition with low proportions of noncorrespondence (- saying, + doing) for the math and reading tasks, and 100% negative correspondence for the art task (see Table 3). During B-1 doing was recorded as having occurred if the S's task strategy use during a particular day of this phase surpassed his mean strategy use for this condition.

High positive correspondence was displayed

Table 3

Subject's Percent Correspondences Across Study Conditions

Variable	Task	Condition B-1	CT	RV-1	B-2	RV-2
% Saying	Math	0.00	100.00	100.00	0.00	100.00
	Read.	0.00	100.00	100.00	0.00	100.00
	Art	0.00	100.00	100.00	0.00	100.00
% Doing	Math	20.00	89.47	100.00	100.00	40.00
	Read.	13.33	92.86	100.00	100.00	100.00
	Art	0.00	80.00	80.00	80.00	100.00
Correspondence Type						
Positive	Math	0.00	89.47	100.00	0.00	40.00
	Read.	0.00	92.86	100.00	0.00	100.00
	Art	0.00	70.00	80.00	0.00	100.00
Negative	Math	80.00	0.00	0.00	0.00	0.00
	Read.	86.67	0.00	0.00	0.00	0.00
	Art	100.00	0.00	0.00	20.00	0.00
Non	Math	20.00	10.53	0.00	100.00	60.00
	Read.	13.33	7.14	0.00	100.00	0.00
	Art	0.00	20.00	20.00	80.00	0.00

during CT for the math, reading comprehension, and art assignments. That is, the S verbalized the key statements that described "good" performance (although prompting was required the first 5 days of CT for math and reading assignments, and the first 4 days of CT for art assignments) during each session, and proceeded to meet the strategy use criterion predetermined for each session, 89.47, 92.86, and 80.00 percent of sessions respectively for the three tasks.

During the maintenance, RV-1 phase, the S displayed perfect positive correspondence (100%) in the math and reading sessions, with 80% positive correspondence and 20% noncorrespondence (+ saying, - doing) displayed in the art sessions. The S verbalized the key statements 100% of the time during art sessions, but failed to meet the strategy use criterion for one fifth of the sessions. During this session the S used the card to complete four of five people drawn. However, the strategy use criterion was set for 100% and since the S failed to use the card for every person he drew, he was recorded as failing to do as he said he would. Therefore, for this day the S's saying/doing behavior was recorded as

noncorrespondence (+ saying, - doing), which accounts for the 20% noncorrespondence recorded.

During B-2, no verbalization of key statements was required, and yet the S met the strategy use criterion for 100% of math and reading sessions. Therefore, the S was recorded as having displayed 100% noncorrespondence (- saying, + doing) during B-2 for math and reading comprehension tasks. The S met the strategy use criterion for four of five or 80% of B-2 art sessions. During the one session in which the 100% strategy use criterion was not met the S was observed using the people card for two of three people drawn. Thus, while strategy use did occur it did not meet the 100% criterion level set. Since the S neither "said" or "did" (to criterion level), the S's performance was recorded on this one day as negative, and therfore accounts for the 20% negative correspondence for art sessions recorded under condition B-2.

Finally, during the Follow-up, RV-2 condition, the S both verbalized the key statements and met the strategy use criterions during every reading comprehension and art session. Therefore, the S was recorded as displaying 100% positive correspondence

for reading comprehension and art tasks during RV-2. In regard to the math task the S missed the 100% strategy use criterion on 3 of 5 RV-2 days. On the 3rd and 4th days of RV-2, the S used the arithmos board for 27/30 questions and on the 5th day of RV-2 the S used the arithmos board for 28/30 problems. However, since the criterion set for use of the board was 30/30 or 100%, the S was scored as having missed the criterion for "doing" on 3 of 5 days of RV-2. Therefore, 40% positive correspondence and 60% noncorrespondence (+saying, -doing) was recorded for the math task under condition RV-2.

Strategy Use and Accuracy

Math

Correspondence training. An improvement in both strategy use and accuracy, greater than 5 marks above the S's mean baseline level was evidenced on the 2nd day of CT (Day 7) (see Appendix C, Table C-1). However, the S's performance then began to deteriorate, with the S meeting the day criterion for strategy use only again on the 3rd day, such that by the 7th day of CT, modeling was implemented. On this day the S met the overall criterions for both

strategy use and accuracy, displaying 100% use of the arithmos board and 66.67% accuracy. With the overall criterions then having been met, the S was expected from that day on to hold this level of performance in order to receive reinforcement for his math efforts.

On the 8th day of CT (Day 13) modeling by the researcher again took place with the S missing his accuracy criterion (although vast improvement above baseline levels had been achieved), but again using the arithmos board for 30/30 problems. At this point modeling ceased. The S proceeded to meet the overall criterions for accuracy and strategy use on the following 2 days. At this point CT of the second task, reading comprehension commenced. Throughout CT of reading comprehension and art assignments, CT of the math task continued. The S utilized the arithmos board for 100% of these sessions and missed the overall criterion for accuracy 9 of 28 of the CT sessions in which training of reading comprehension and then art assignments took place. While the S's accuracy score fell below the overall accuracy criterion set by the researcher on these 9 days, his scores still remained above baseline levels. The lowest score of these 9 days achieved by the S was

9/30. This mark was the last failing score (below 50%) produced by the S, and yet was still 13.33% greater than the highest mark and 22.00% greater than the mean score achieved by the S during baseline.

Tables 4 and 5, and Figures 1 and 2 illustrate the mean accuracy and strategy use scores produced by the S across study phases. An overall improvement in accuracy of 51.30% and in strategy use of 80.61% above baseline was achieved during CT for the math task.

The graphs depicted in Figures 3 and 4, illustrate the obvious upward gain beyond baseline levels in strategy use and math accuracy during CT as discussed above (See Appendix C for raw data represented by Figures 3 and 4). As a numerical support of the visual analysis (Scruggs, Mastropieri, & Casto, 1987) of the above noted graphs, Proportion of Nonoverlapping Data (PND) scores were calculated. Basically, a PND score is the proportion of data points in the treatment phase which fall above the highest baseline measure (Scruggs et al., 1987). The higher the PND score, the stronger the argument for treatment effect (Scruggs et al., 1987). The PND scores depicted in Table 6 support the visual

Table 4

Subject's Mean Number and Percent Accuracy

		Phase				
Task		B-1	CT	RV-1	B-2	RV-2
Math	#	2.40	17.79	20.80	22.80	19.40
	%	8.00	59.30	69.33	76.00	64.67
Read. C.	#	0.20	2.80	4.40	4.60	5.00
	%	4.00	56.07	88.00	92.00	100.00
Art	#	------	------	------	------	------
	%	25.56	62.36	83.33	89.26	87.78

Table 5

Subject's Mean Number and Percent Strategy Use

		Phase				
Task		B-1	CT	RV-1	B-2	RV-2
Math	#	2.00	26.18	30.00	30.00	28.40
	%	6.67	87.28	100.00	100.00	94.67
Read. C.	#	0.73	4.86	5.00	5.00	5.00
	%	14.67	97.14	100.00	100.00	100.00
Art	#	------	------	------	------	------
	%	0.00	88.33	96.00	93.33	100.00

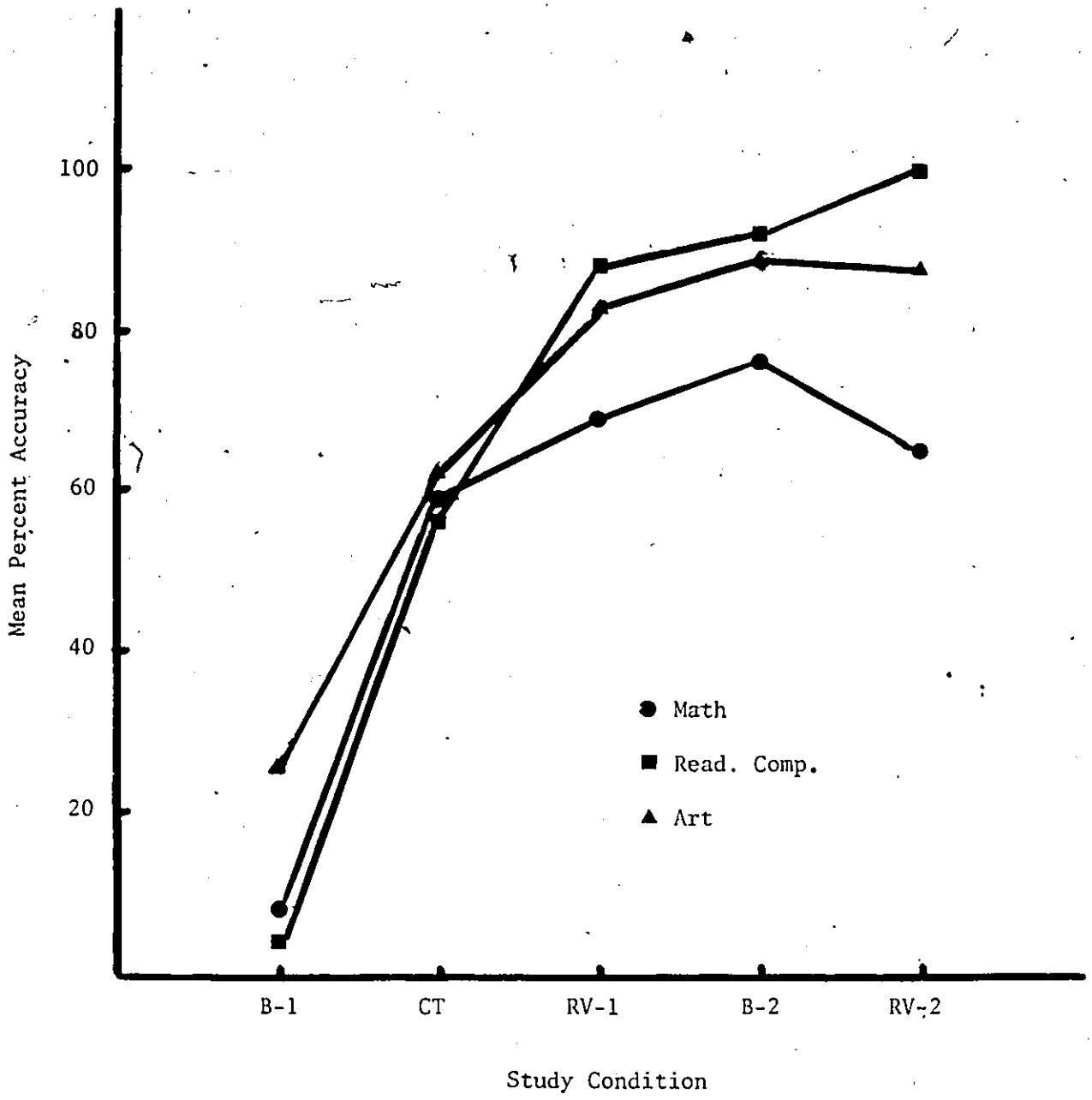

Figure 1. Subject's mean accuracy in percent across tasks and study conditions.

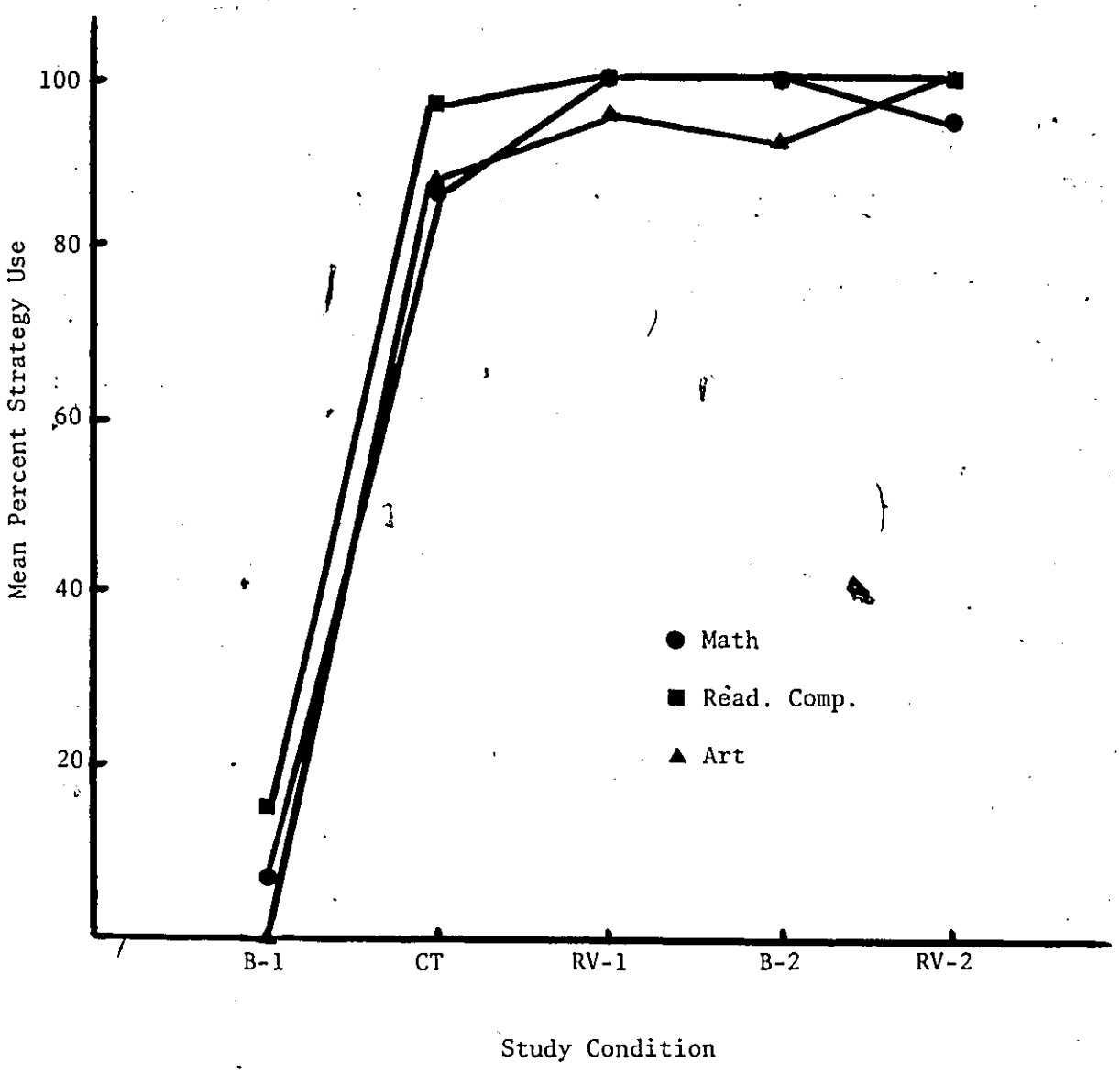

Figure 2. Subject's mean strategy use in percent across tasks and study conditions.

Figure 3. Subject's daily percent accuracy across tasks and study conditions.

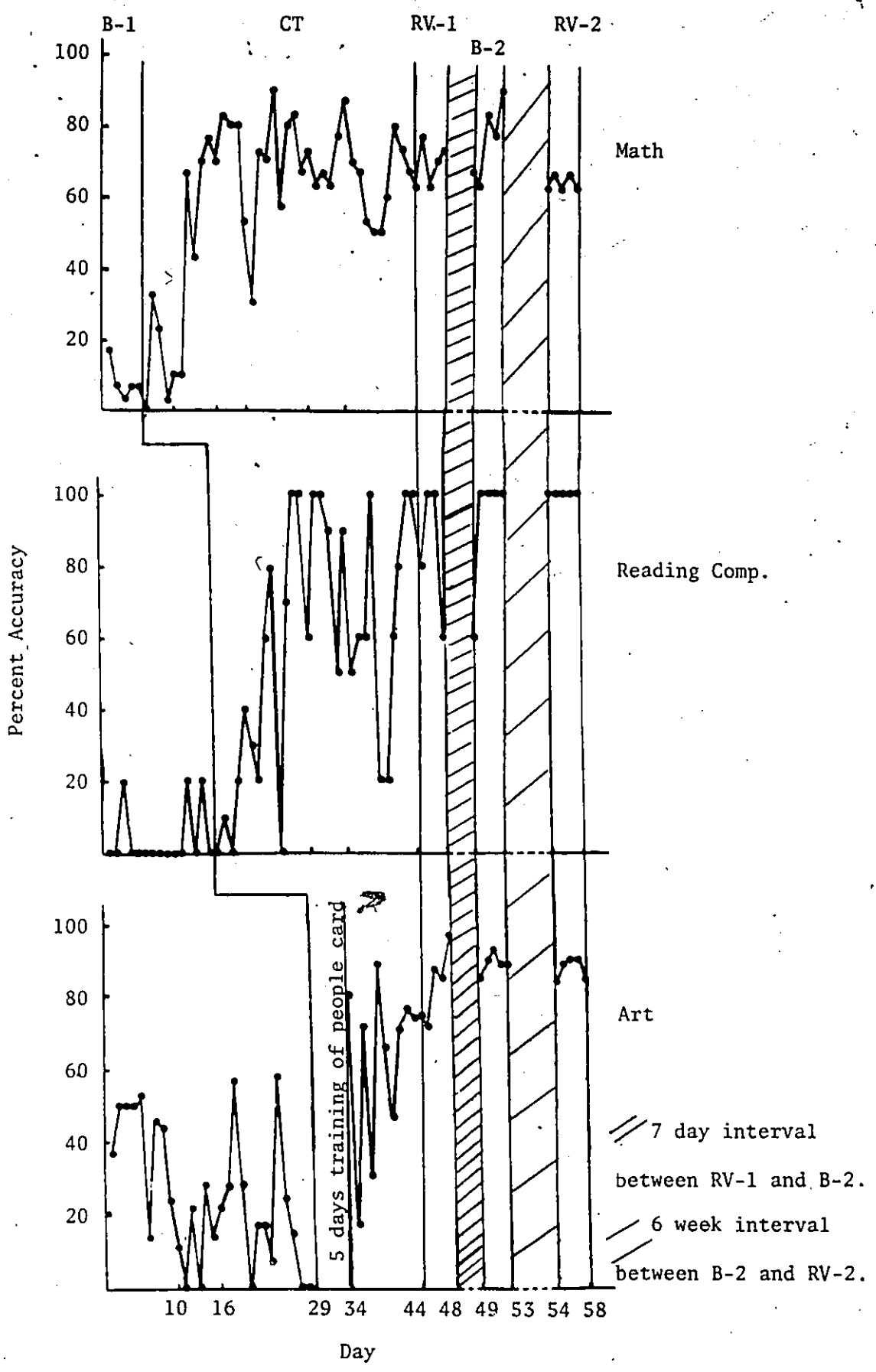
B-1
CT
RV-1
B-2
RV-2
100
80
60
40
20
Math
Reading Comp.
Art
Percent Accuracy
5 days training of people card
7 day interval
between RV-1 and B-2.
6 week interval
between B-2 and RV-2.
10 16 29 34 44 48 49 53 54 58
Day

Figure 4. Subject's daily percent strategy use across tasks and study conditions.

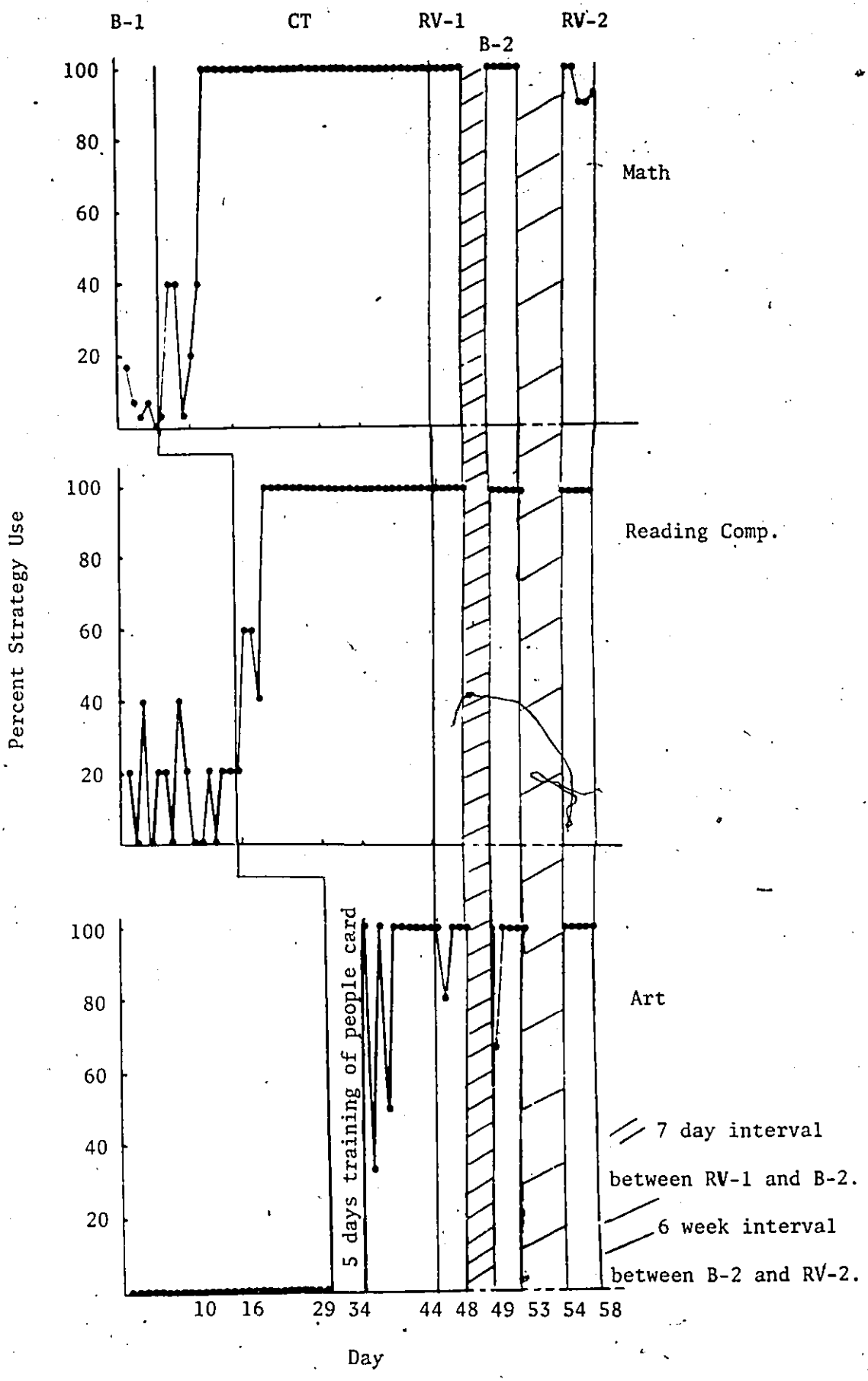
B-1
CT
RV-1
B-2
RV-2
100
80
60
40
20
Math
Reading Comp.
Art
Percent Strategy Use
5 days training of people card
7 day interval
between RV-1 and B-2.
6 week interval
between B-2 and RV-2.
10 16 29 34 44 48 49 53 54 58
Day

Table 6

Proportion of Nonoverlapping Data (PND)

Variable	Task	Study Condition				Overall PND
		CT	RV-1	B-2	RV-2	
Accuracy	Math	89.47	100.00	100.00	100.00	92.45
	Read	71.43	100.00	100.00	100.00	81.39
	Art	70.00	100.00	100.00	100.00	88.00
Strategy Use	Math	92.11	100.00	100.00	100.00	94.34
	Read	92.86	100.00	100.00	100.00	95.35
	Art	100.00	100.00	100.00	100.00	100.00

Note. PND = $\frac{\text{number of treatment data points that exceed highest baseline data point}}{\text{total number of data points in treatment phase}} \times 100$

analyses of Figures 3 and 4 with the proportion of nonoverlapping data points during CT being 89.47%.

Reinforcement of verbalization-1 (RV-1). As is depicted in Table 5, and Figure 4, the S continued to use the arithmos board for all math problems during each day of this phase. Figure 3 displays that the S failed to meet the overall accuracy criterion on 2 of 5 days of this condition, but did so only by one mark. Furthermore, by school standards the S's marks on these days still fell within the average (i.e. C) range of performance. The strategy use and accuracy PND scores for RV-1 (Table 6) support the visual analysis of Figures 3 and 4; that is, the S's performance of strategy use and accuracy fell far beyond the S's baseline scores, for all RV-1 sessions.

Baseline-2 (B-2). Again, Table 5, and Figures 3 and 4 illustrate that the S met the strategy use criterion for 100% of B-2 sessions, and only missed the accuracy criterion on one day by one mark. Tables 4 and 5 and Figures 1 and 2 illustrate that during RV-1 and then again in phase B-2 the S's mean accuracy and strategy use were improved from CT levels. Mastery of strategy use without further need

of CT was indicated by these results.

Reinforcement of verbalization-2 (RV-2).

The S missed the overall criterion for strategy use 3 of 5 days of this phase. As noted in the discussion of correspondence results, the S opted not to use the board for 3/30 questions on the 3rd and 4th days of this phase and for 2/30 questions on the final day of RV-2. However, the questions answered without aid of the arithmos board were answered correctly, indicating that the S had successfully memorized these facts, and therefore altered use of the board to meet his own needs; that is, the S was beginning to opt not to use the board for math facts he was certain he independently knew.

The S missed the accuracy criterion on 3 days by 1 mark. However, Figures 3 and 4 and the PND scores for accuracy and strategy use illustrate that the S's performance was still far above baseline levels on every day of RV-2.

Reading Comprehension

Correspondence training. The S reached the strategy use criterion on the 2nd and 3rd days of CT (Days 17 and 18), but missed all criterions on the 4th day of CT (Day 19) (see Appendix C, Table C-2).

On Day 20 the S reached the overall strategy use criterion of 100% use of the reader. Therefore the S was expected to continue to meet this criterion for all subsequent study days in order to receive reinforcement, and did so. However, while the day criterion for accuracy was met on Day 20, the overall criterion was not achieved until Day 23 and again on Day 24. Since CT for the math task continued for 10 days and Day 24 marked the 9th day of CT for reading comprehension, it was decided that CT of this task should continue for a 10th day before moving on to CT of the art task. However, the S scored 0/5 on the reading assignment for this day, and subsequently CT continued for an additional 3 days, during each of which the S achieved or surpassed the overall criterion for reading comprehension accuracy. At this point training of the use of the people card for art assignments began.

During training of the use of the people card and CT of art assignments the S missed the criterion for accuracy of reading assignments 4 of 15 sessions. Of these four sessions, the S never scored below his highest baseline mark. Furthermore, the lowest of these four scores surpassed the S's baseline mean

reading comprehension accuracy by 16.00%.

Tables 4 and 5 and Figures 1 and 2 demonstrate that the S's mean accuracy score during CT exceeded his mean baseline score by 52.07% and his mean CT strategy use score exceeded his mean baseline strategy use score by 82.47%.

As per the math task, visual inspection of Figures 3 and 4 indicate an upward trend of both accuracy and strategy use reading comprehension scores during CT. Table 6 supports this impression with 71.43% and 92.86% PND scores for reading comprehension accuracy and strategy use, respectively.

Reinforcement of verbalization-1, baseline-2, reinforcement of verbalization-2. During these phases of the study the S maintained both his overall accuracy and strategy use criterions. PND scores across these phases for both study variables (i.e. accuracy and strategy use) remained at the 100% level. Figures 3 and 4 illustrate near ceiling and ceiling effects of accuracy and strategy use respectively. Examination of Table 4 and Figure 1 reveals a continued upward rise in the S's mean accuracy of reading

comprehension assignments, and 100% use of the reader across RV-1, B-2, and RV-2 conditions.

This evidence presents a strong argument for maintenance and mastery of use of the task strategy, indicating an ability by the S to efficiently utilize the strategy beyond CT and with (RV-1 and RV-2) or without (B-2) verbal cuing.

It should be noted that while the S referred to the reader for all questions during RV-2, he had altered the use of this strategy as he had been seen to alter use of the arithmos board for the math task; that is, the S had come to alter use of the reader to meet his own needs, by first verbally answering questions he thought he knew the answer to, and then checking the reader to assure his accuracy. The S was observed doing this for 1/5 problems on each of the last 4 days of RV-2.

Art

Correspondence training. On the 1st day of CT following training in the use of the people card, the S achieved both the overall accuracy and strategy use criterions, and therefore had to maintain or surpass this overall level throughout CT and the other study phases in order to receive

reinforcement. Although the number of necessary people on this day was only one, the subject was henceforth required to meet the strategy use criterion of 100% regardless of the number of necessary people in subsequent assignments. As Appendix C, Table C-3 illustrates the S missed both criterions on the 2nd day of CT (Day 35), met both on the 3rd day (Day 36), and missed again on the 4th day of CT (Day 37). Both criterions were met again on the 5th and 6th days (Days 38 and 39) of CT. Again, in order to attempt to keep the number of days in CT consistent with the number of days the math task initially was, CT of art continued. Subsequently the S missed the accuracy criterion on the 7th day of CT (Day 40) and then achieved both on the 8th (Day 41), 9th (Day 42), and 10th (Day 43) days of CT of the art task.

Table 4 and Figure 1 illustrate an accuracy improvement of 36.80% over the S's mean baseline score, while Table 5 and Figure 2 indicate improvement in strategy use of 88.33% over the baseline mean score. Figures 3 and 4 pictorally illustrate this improvement trend and the PND scores in Table 6 further support an interpretation of vast

performance improvement by the S.

Reinforcement of verbalization-1, baseline-2, reinforcement of verbalization-2. The S proceeded to meet or exceed the overall criterion for accuracy during these three final phases of the study. The overall criterion for strategy use was also met for all RV-2 sessions. However, the S missed the 100% strategy use criterion one day of RV-1 and one day of B-2. The people card was used by the S, but not for every person he drew (see Appendix C, Table C-3). Still, the S's use of the card was remarkably greater than the S's baseline mean of 0% use.

Figures 3 and 4 illustrate a generally high trend beyond baseline levels in accuracy and strategy use, an impression supported by Tables 4 and 5, Figures 1 and 2, and the PND scores of Table 6. These results again support a hypothesis of maintenance beyond CT.

In the final 3 days of B-2 the S's use of the people card was altered to suit his own needs as he had altered use of both the arithmos board and reader. During the final three B-2 sessions the S drew all people to be included in his pictures

without the card, but verbally listed the body parts as he drew them. Once the S had completed the assignment on each of these final 3 days of B-2, he then referred to the people card to check his work and discovered in each case that he had neglected to draw arms and ears on his people. Each time the S noted that he had forgotten arms or ears, he would overtly express the realization that he had left out these components with such exclamations as "Oh yeh, I forgot arms and ears!". The S then proceeded to draw these components on his people.

During RV-2 the S continued to draw all his people before referring to the people card, but in this phase the card was merely a checking tool as the S did not forget arms and ears before checking with the card.

Finally, the overall PND scores in Table 6 should be noted. These scores indicate that the S's accuracy and strategy use scores were above baseline scores for a proportionately large number of CT and maintenance phase days.

Relationship Between Strategy Use and Accuracy

As noted earlier in this paper, the intention of training the S to use the aids or a strategy for completing the task assignments was to improve his accuracy to at least what is considered average by school standards. Had accuracy not improved, than the overall goal of the study would have failed to have been met. However, the S achieved accuracy criterions on all three tasks and upon doing so maintained average or better scores throughout the study across tasks. Comparison of Figures 3 and 4 for the three tasks indicates a rise in accuracy with a rise in strategy use.

Furthermore, examination of raw data revealed very few instances in which tasks were completed accurately without use of task strategies. In the 58 days of the study the S correctly completed a total of 11 math questions scattered across 5 days without the arithmos board (see Appendix C, Table C-1). Eight of 11 of these problems were completed on the last 3 days of RV-2, and as discussed previously were interpreted as representing efficient alteration of the use of the task strategy (i.e. arithmos board) by the S to suit his needs.

No reading comprehension sentences were

completed correctly without the reader.

The relationship between use of the people card and art accuracy are demonstrated by comparison of Figures 3 and 4, which demonstrates a dramatic increase in S accuracy once he began to use the people card in CT. Across 4 days (Day 35, 37, 45, 49) the S completed 7/16 necessary people without the people card. The S's scores on these people were lower than the scores achieved for people drawn with the card on each of the 4 days.

These results indicate that strategy use was successful in producing improved accuracy scores.

Teacher's Aide Checklist

Table 7 depicts the reports offered by the Teacher's Aide during B-1, CT, and RV-2 conditions (see Appendix F, Table F-1, for checklist items and possible responses). Table 7 illustrates an upward trend in the S's performance of study tasks in the school setting as the study progressed, with complete generalization of study effects being indicated under report period RV-2. The reports indicate mastery of the use of the task strategies and subsequent gains in task accuracy in the school setting by the

Table 7

Teacher's Aide Checklist Reports

Item	Report		
	B-1	CT	RV-2
1	1	1	4
2	2	3	4
3	1	2	3/4
M	1.3	2.0	3.8
4	2	2	3
5	2	2	3
6	1	2	4
M	1.7	2.0	3.3
7	1	1	31
8	2	3	4
9	1	2	[a]3/4
M	1.3	2.0	3.5
Overall M	1.4	2.0	3.5

[a] Aide noted S's art work to have improved to a level of C or average as compared to other students, but to an A, B range as compared to his own work prior to intervention. B-1 and CT reports were based on S's work as compared to the "norm" for all students.

follow-up period.

Teacher's Aide's Subjective Comments

During the academic year of 1986/1987, at which time this study began, the S's teacher reported him to be failing in all three of the task areas chosen for intervention. Subsequently the S failed the school year, and was required to repeat grade 2 for the academic year 1987/1988. A different teacher than that from the 1986/1987 year, was assigned the S. At the time of follow-up (mid October 1987) the S's teacher reported the S as pleasant, "no trouble at all", and one of her best students. The S was able to function and complete tasks independently, as were his peers. The S continued to perform satisfactorily in grade 2 for the academic year 1987/1988, such that he has been promoted to grade 3 for 1988/1989.

Several subjective comments were made by the teacher's aide throughout the various phases of the study.

The S's "happiness" with individual caregivers was noted by the aide as a factor she believed effected his work efforts.

During baseline the S was found to be making

efforts in reading comprehension assignments, but the concept of using the stories in answering questions was only rarely utilized and not properly employed.

Throughout CT more time and personal effort was put into all tasks.

During the RV-2 or follow-up condition the S was found to have improved in several areas:

1. Spontaneous, accurate use of his arithmos board in class. The S's memorization of addition and subtraction facts was found to have greatly improved. Also, manual manipulations, which the arithmos board allowed daily practice of, was found to have noticeably improved; cutting, pasting, colouring, printing, shoe tying skills, and play with Attribute Blocks (i.e. putting different shaped blocks into appropriate spaces in a small container) were all reported to have improved increasingly beyond baseline levels as the study progressed.

2. In regard to the reading comprehension assignments, the S was found to have improved greatly with little assistance required. However, completion of these questions was conducted in a 1:1 withdrawal situation, such that the S was afforded feedback from the aide. On rare occasions the S would require help

finding the page that an answer was on if the answers were several pages apart. Overall, the S's use of the reader and tracking abilities were reported as having incredibly improved, and was even better then many of the children in his regular class.

3. The teacher's aide and 1987/1988 classroom teacher both reported that the S's improved tracking/copying skills had generalized to other areas such as copying from the board, copying from work sheets, and completing handout assignments such as fill-in-the-blanks. Prior to the study the S was deficient in performing such tasks and had required 1:1 assistance in order to successfully complete them. By RV-2 the S was able to complete these tasks without 1:1 assistance. That is, the S successfully completed work assignments on his own, as did the other children in his classroom.

4. By RV-2 the S was observed making a verbal plan for completing art assignments, listing people parts out loud as he drew them, and was also found spontaneously using the people card at school to check his work. The aide also reported generalization of the positive results of people drawing to other mediums (eg. paints). Creativity, such as use of

colours, was seen to improve. Also, colouring activities were viewed by the teacher's aide as becoming much more enjoyable for the subject as the study had progressed.

5. The S was reported as spontaneously and efficiently self-checking and self-reinforcing (i.e. praising) his work. The teacher's aide reported that the S was heard overtly self-monitoring his work, and "putting himself on the right track". For example, the S was heard making comments such as "Na, that doesn't make sense" and then erasing his answer and correcting his work.

6. Finally, the S's independent activity across school tasks was also found to have greatly progressed as the study continued. For example, prior to the study, abstract thinking was very difficult for the S such that he rarely attempted to provide his own ideas for reading assignments requiring such activity. By RV-2, the S's performance of such activities had greatly increased and he preferred to produce his own ideas as opposed to allowing the aide to provide them for him. However, the S was still finding these assignments difficult and requiring some help on them. The S in general was found to

prefer to independently choose activities and complete them on his own. Personal concern by the S with wanting to do well had flurrished, as had his ability to work on a task till its completion without the need for perpetual external reinforcement.

In summary, subjective comments by the teacher's aide, supported by the S's teacher, indicated that by the follow-up period (i.e. RV-2) generalization of independence, and self-checking (metacognitive skills), in addition to generalization of various skills related to the task strategies was occurring.

CHAPTER 4

DISCUSSION

A generally high degree of task strategy use, increased accuracy and positive correspondence beyond original baseline (B-1) levels, throughout correspondence training (CT), reinforcement of verbalizations-1 (RV-1), return to baseline (B-2), and reinforcement of verbalizations-2 (RV-2) conditions was found. The positive findings of this study indicate that CT is an effective tool for remediating academic deficiencies in Down Syndrome individuals, and that the results of such training are both durable and transferable.

Significance of correspondence

Karlan & Rusch (1982), have suggested that a large proportion of negative correspondence during initial baseline, followed by an increase in positive correspondence during CT, which continues to predominate in subsequent RV phases, indicates success and maintenance of CT. Indeed, results of the present study tend to follow this classic suggestion, with positive correspondence predominating over baseline levels during CT, RV-1 and RV-2. However,

during RV-2 for the math task, the subject's percent positive correspondence decreased to 40% while his percent + saying - doing noncorrespondence increased to 60%. The subject's high percent + saying - doing noncorrespondence was due to the fact that on 3 of 5 days of RV-2 the subject chose not to utilize his arithmos board for a few questions he had accurately memorized although he continued to utilize the board for the vast majority of math problems and his use greatly surpassed baseline levels. As discussed elsewhere (p. 87) the subject's opting not to use his board for a few questions during RV-2 did not result in inaccuracy, and thus was interpreted as indicating accurate alteration of use of the strategy by the subject to meet his own personal needs. Rooney and Hallahan (1985) (see Appendix G) have noted that cognitive change, desirable in a cognitive training study, is indicated by such accurate alterations of strategy use by a subject to meet subject need. Thus, in this study the decrease in positive correspondence and increase in + saying - doing noncorrespondence during RV-2 is not interpreted by the researcher as indicating failure to maintain although Karlan and Rusch (1982) have suggested otherwise. Rather,

considering the above noted contention of Rooney and Hallahan, the subject's altered use of all three task strategies is interpreted as suggesting positive cognitive change in the subject.

In regard to baseline phases subsequent to CT, Karlan and Rusch (1982) have argued that a decline in positive correspondence followed by an increase in - saying, + doing noncorrespondence further demonstrates maintenance. Such a trend did develop in the present study. This finding supports the hypothesis of maintenance.

Karlan and Rusch (1982) have further proposed that such a trend during B-2 indicates control of nonverbal behaviors as passing from verbal behavior to context or setting cues, and that covert self-instruction is likely occurring. Thus, it would seem that some context cue served to promote maintenance during B-2 of the present study and that the subject had come to internalize the statements previously overtly expressed.

Also suggested by Karlan and Rusch (1982), is that by training a subject in the presence of a task, the task itself can attain cue properties which come to elicit appropriate behavior in the subject,

previously encouraged by a trainer. Subsequent presentation of the task itself can come to promote maintenance. In the present study, other than during baseline conditions the subject was given a task, then required to give the appropriate verbal statements and then was provided the opportunity to perform. Such training it would seem resulted in cue properties being attributed to the tasks themselves. According to the hypothesis of Karlan and Rusch (1982) presented above, training the subject of the present study in the presence of the actual tasks facilitated eventual maintenance, with presentation of a task itself resulting in recall of the task requirements, previously overtly expressed, which in turn resulted in appropriate behavior. In effect, covert speech, triggered by cue properties possessed by the tasks, was controlling overt behavior. The hypothesis of control of behavior during B-2 via covert or internalized speech tends toward Luria's theory (1961), that eventually a behavior comes under the control of internalized verbally formulated rules.

Error changes

During baseline the subject did not display any

attempt to produce planned or correct responses to tasks. Rather, the subject rushed haphazardly through tasks in order to have them "over and done". Thus, responses to math questions were for the most part random numbers, while responses to reading comprehension questions were random selections of words the subject had in his spelling vocabulary (i.e. the, and), and art attempts were quickly drawn scribbles. However, following training, errors made by the subject displayed "sense"and a viable attempt, although incorrect, on his part to accurately complete tasks. A general concern by the subject for doing well or for producing accurate answers in all tasks he engaged in was observed. The subject's self-marking of math and reading assignments was quite accurate and his self-reinforcements were always fair.

Generalization and motivational factors

Both far and near generalization (Borkowski & Cavanaugh, 1979) are indicated by the results of the teacher's aide checklist, subjective teacher/teacher's aide reports, and researcher observations. Near generalization is said to occur when there is a "minimal change in task demands"

(Borkowski & Cavanaugh, 1979, p. 572) such as a change in settings, or in semantic categories. Far generalization occurs when "task demands in training and generalization are substantially different [as for example when] .... children trained to use a questioning or interrogative strategy to learn a paired-associate task employ the same strategy in studying a categorized free-recall list, asking questions of themselves about how items are related semantically" (Borkowski & Cavanaugh, 1979, p. 572). Thus, near generalization is indicated by the subject's use of the task strategies (i.e. arithmos board, reader, people card) within the school setting as well as by his use of task strategies for similar tasks (eg. using people card across different mediums such as paints, and for completion of pictures apart from art classes).

Skills facilitated by use of the task strategies (eg. small motor skills facilitated by daily use of arithmos board, scanning and copying abilities facilitated by reading comprehension task) were also found to improve in both the home and school settings. Since these skills were utilized across tasks varying from those trained, far generalization

of scanning, copying, small motor co-ordination, is indicated.

In addition, the subject's independence, initiative, and self-confidence were found to have significantly increased as the study progressed, such that by the follow-up period the subject rarely requested or required outside assistance in order to complete tasks of any type, whether they be similar to those trained, other school related tasks (eg. abstract reading comprehension assignments) or non-academic tasks (eg. shoe-tying). That is, the subject's outer-directedness had diminished, while his inner-directedness had advanced. Far and near generalization of independence were therefore indicated.

It should be noted that during the time the researcher was completing one reading comprehension problem a day with the subject, the subject would periodically seek feedback in regard to the accuracy of his responses, before he would complete his assignment. The subject was encouraged to complete his assignment before he would receive feedback, but his outer-directed search for assurance did not completely cease until after the researcher stopped

completing questions with the subject.

During the RV-2 condition, the subject reverted a couple of times to seeking feedback from the researcher while he was completing the reading comprehension assignments. This led the researcher to speculate that the subject was possibly receiving 1:1 assistance and feedback on similar assignments in the school setting. Conversation with the teacher's aide revealed that indeed the subject did complete his reading assignments in a 1:1 setting, and was periodically reinforced for his efforts, while in the process of completing his work. The reinforcement given was not necessarily sought out by the subject, but often spontaneously given by the aide. Thus, in order to discourage the subject's tendency toward outer-directedness, the aide was encouraged not to deliver reinforcement until after the completion of assignments. This finding indicates that while cognitive interventions (eg. CT, goal-setting) may contribute to subject development of inner-directedness (Whitman et al., 1984), encouragement of independent functioning is equally as important a factor (Sternberg, 1981).

The literature proposes that motivational

factors in addition to cognitive training are of considerable importance in promoting task performance (Sternberg, 1981). It has further been found that promotion of independent functioning is one such motivational variable (Sternberg, 1981). Self-determined or independently set goals by subjects has been found beneficial in increasing task completions (Rosenbaum & Drabman, 1979).

In an individualistic environment such as that in which the subject of the present study was trained, self-self comparison is the primary motivating factor (Ames & Ames, 1984). The self-self comparison the subject engaged in was between his actual performance and his set goals. Therefore, as the subject of the present study was encouraged to independently set goals, and was also found to require encouragement to complete tasks independently, it is the researcher's judgment that such encouragement combined with goal setting, served as a dominating motivating factor in the present study. It is further speculated that this motivation to achieve generalized to the subject's completion of all subsequent tasks that he was required to complete both in the tutoring and school settings.

However, since the effect of goal-setting separate from CT was not examined, the precise role goal-setting played in facilitating inner-directedness and the subject's concern with accurate completion cannot conclusively be discerned and deserves further attention in research with DS individuals as a possible facilitator of inner-directedness.

A prime example of the subject's generalized inner-directedness and concern with achievements was evidenced in his learning to tie his own shoes. Up to the point of follow-up, regular attempts by the tutor, parents, teacher, and teacher's aide to teach the subject how to tie his own shoes had been unsuccessful. Further, the subject had not displayed any sense of concern for mastering this skill, but rather was content with allowing any caregiver to tie his shoes for him. During the follow-up period the researcher re-initiated teaching the subject how to tie his shoes. Prior to this point the subject had learned to tie a knot but not how to tie a bow. The tutor found at the time of follow-up that the subject displayed frustration and anxiety over his inability to master tieing a bow. Over a period of a week the

subject had not accomplished the task, but had continued to try, and display disappointment with his inability to master the task. Thus, at the week's conclusion the researcher suggested to the subject that he practice this task over the weekend. The researcher's return at the beginning of the following week revealed that the subject had practiced over the weekend and had indeed mastered the task of shoe tieing. Furthermore, it was discovered that over the weekend the subject had been found alone in his bedroom trying to tie his shoes where he asked to be left alone so that he could continue to practice tying his shoes by himself. Some 3 hours later the subject excitedly emerged from his room to show his parents that he had independently mastered the task of shoe tying. This incident was significant as it was the first time the subject had practiced anything independently, and it was the first time the subject had shown such persistence in learning to succeed at a task independently.

As noted in Chapter 3 of this thesis, evidence of the metacognitive skill of self-checking work was displayed by the subject across various tasks and was evidenced in the training and school setting. Far

generalization of metacognitive awareness was therefore displayed. However, while the subject and researcher discussed the subject's incorrect reading comprehension responses during training in terms of whether or not they "made sense", no actual training of self-checking took place. Therefore the researcher proposes that since the subject was not trained to self-check his work, that it was his new-found inner-directedness and concern with responding accurately which facilitated his independent self-checking of completed tasks. Also, as earlier discussed, even the subject's incorrect responses to tasks displayed planfullness and sense. Being that self-checking is a metacognitive skill (Rosenbaum & Drabman, 1979) and "metacognition is the introspective awareness of one's own cognitive processes, and one's self-regulation" (Wong, 1986, p. 12), it would seem that the subject's continued use of this skill can only serve to further facilitate his success experiences.

Finally, perhaps the "farthest" generalization would be that of generalized verbal control by the subject across tasks other than those targeted in the present study. However, such generalization was not

investigated and therefore deserves examination in subsequent CT research. Overall, as Borkowski & Cavanaugh (1979) have written that "increased scope and utility are enhanced each time generalization is demonstrated" (p. 572), and several instances of both near and far generalization in the present study have been outlined above, the results of this thesis indicate CT to be an extremely valuable and versatile technique in facilitating the potentials of DS individuals.

Theoretical significance of subject interjections

Theoretical significance is indicated by the interjections and exclamations of self-checking and self-reinforcement the subject was heard to utter. By means of what is referred to as the "functional system of mental orientation" or "direct comprehension of relationship", Luria (1961) has suggested that children incorporate interjections such as "that's it" as a means of guiding their performance of tasks. Gradually, such interjections shift to extended verbal analysis of a situation such that problems are solved via verbal reasoning. Therefore, the subject's self-reinforcing and self-monitoring exclamations indicate that this study

was successful in facilitating the subject's use of verbal reasoning for controlling his nonverbal behavior.

Cognitive change

As a final measure of the efficacy of the training package implemented in the present study the results were compared to the "Guidelines and Assessment Questions for Cognitive Change" outlined by Rooney and Hallahan (1985) (see Appendix G) which were referred to earlier in this chapter. This assessment produced 100% positive results in the direction indicating cognitive change. Flexible, spontaneous, independent use of task strategies across time and settings, increased locus of control and improved academic performance by the subject, was evidenced, all of which are facets indicating cognitive change. Therefore, a consequence of utilizing CT in the present study was the implication of cognitive change in the Down Syndrome subject. Furthermore, due to the cognitive change demonstrated by the subject, continued academic and social skill progress is probable for him.

General Discussion

Throughout the completion of this study, a number of issues pertinent to CT and educational research deserving further examination surfaced.

Optimum training time. It has been reported in the literature that optimum training promotes maintenance and generalization (Sternberg, 1981). However, what length of time constitutes optimal is not designated in the literature, and perhaps quite necessarily so, as individual differences of subjects effect treatment lengths. The present study suggests that too long or too short a treatment period could be deleterious to final maintenance and/or cognitive change. That is, in the present study the subject was quickly seen to alter use of the people card to suit his own needs (i.e. during B-2 and RV-2), whereas such alteration of the use of the arithmos board and reader was not witnessed until follow-up (RV-2). The author speculates that possibly the longer period of time the subject experienced CT of the math and reading comprehension tasks over the art task strengthened the subject's conviction for sticking to his stated intention in regard to the use of the arithmos board and reader. Perhaps the lesser period of time in CT of the art task permitted the quicker

shift to using the people card as a self-checking tool as opposed to using it as a task aid.

While alterations of task strategy use are desirable as evidence of positive cognitive change (Rooney & Hallahan, 1985) it would be undesirable for a subject to alter use of a strategy and in effect, break from his stated intentions prior to mastery of a task. Obviously, premature alteration of a strategy, such as use of the arithmos board, could potentially lead to errors in task completions. On the other hand, it is not desirable for a subject to stringently use a strategy, and thus fail to alter it as required by a specific situation. For example, it would not have been desirable for the subject to have used the arithmos board for every math problem he ever completed, regardless of whether or not he had accurately memorized a specific math fact. Thus, it is suggested that prolonged use of control procedures such as CT be carefully monitored with each individual they are employed in order to assure maximum opportunity for mastery of skills and positive cognitive change.

Use of skill strengths in remediation. As noted in Chapter 2, IQ tests have indicated the

subject to be much stronger in his verbal as opposed to performance level skills. Providing the subject with a verbal means (i.e. people card) of completing a performance level skill (i.e. people drawing) which he had previously been found to be severely deficient in performing, permitted the subject to develop a feasible means of completing the task. The success of this aid suggests that skill strengths such as verbal abilities in the present study, be utilized in remediating deficiencies in individuals. In the present study remediation of weak aspects of functioning was facilitated by 1:1 observation, which afforded the researcher the opportunity to discern subject strengths, which were eventually utilized in the treatment of the subject's deficiencies.

Effect of socializing agent. One of the subjective comments offered by the teacher's aide was her belief that the subject performed better for a socializing agent whom he liked. Kendall & Finch (1976) have speculated that a positive researcher-subject relationship may aid treatment by functioning as a reinforcer. Therefore, since the subject and researcher did have a very strong, caring relationship prior to, throughout, and after the

conducting of this study, the potential that the researcher-subject relationship may have fostered treatment does exist. Furthermore, the effect of a well-known, well-liked teacher or researcher as opposed to an unknown and/or disliked socializing agent, on facilitating treatment deserves further research attention.

Correspondence training in the schools. The feasibility of utilizing CT as an in-school teaching technique also deserves consideration. That the procedure was designed, implemented, and evaluated with no more effort than any other effective means of teaching which the researcher has implemented with students, demonstrates the ease of application of CT. Also, while previous research (eg. Whitman et al., 1982) has transferred control of maintenance procedures from researchers to teachers, it may be advantageous for future research to utilize subject's actual teachers as the sole implementers of CT, so that any positive effects of the socializing relationship (as discussed above) might be taken advantage of, and also so that teachers might gain beneficial experience in the design, implementation, and evaluation of such procedures; experience which

might encourage further use of CT procedures by teachers, beyond that engaged in for research purposes.

Role of modeling in the present study. While the effect of modeling separate from CT was not examined in this study, modeling alone was attempted by the researcher and teacher's aide on various occasions prior to the initiation of this study. However, modeling alone was never effective in producing desired behavior change in the subject.

Rogers-Warren, Warren, and Baer (1977) similarly found modeling alone to be ineffective in producing behavior change, but found modeling plus CT to be most effective. Modeling was implemented in the Rogers-Warren et al. study as a means of explaining a key concept (i.e. sharing). These authors suggested that modeling in CT studies be reserved for those situations in which verbal explanation of a key concept does not sufficiently define a term for a subject.

In regard to the present study, the Psychology Report and Speech and Language Assessment both revealed subject deficiency in comprehending abstract terms such as every and always. Thus, it seemed

probable to the researcher that the subject's lack of progression in CT was not due to a deficiency on the part of the subject to control his nonverbal behaviors via verbal means, but rather an inability on his part to comprehend the key abstract component of using his arithmos board for every problem he completed. Therefore, as suggested by Rogers-Warren et al. (1977), modeling was incorporated in the present study as a means of concretely demonstrating the abstract term of every to the subject. In fact on the first day of modeling, which took place while the subject was simultaneously completing the math task, the subject proceeded to use his arithmos board for every problem, as did the researcher. Stickers were placed on both the researcher and subject's pages for 100% use of board. On the second and last day of modeling, the subject inquired as to why the researcher put a sticker on her page after she had completed her math sheet. When asked why he thought the researcher put a sticker on her page, the subject responded, "because you used your board everytime". At this point modeling ceased as the subject's accurate explanation of the reason for stickers was interpreted as a display of his comprehension of the

meaning of the term everytime. Subsequent CT of the reading comprehension and art tasks did not require modeling, as the subject very quickly reached criterion levels of task strategy use for these two tasks, displaying comprehension of the abstract term every.

Thus, since modeling had not been effective in producing appropriate behavior in the subject prior to the initiation of this study, and since modeling functioned merely for 2 days of the study as a "defining" tool, it seems unlikely that modeling was responsible for the subject's attaining and maintaining appropriate behavior throughout and beyond the study. Rather it seems that modeling gave the subject a means of understanding what was being requested of him (i.e. to use board everytime), and CT gave the subject the power to control this behavior once it was comprehended.

The implication of this finding is that while CT may be effective in facilitating the regulatory role of speech in children, it cannot function sufficiently unless a subject comprehends the request made of him. Rogers-Warren et al. (1977) and the author of the present study have both found modeling

a sufficient means of defining abstract terminology. Therefore, before assuming that CT or any remediation technique is an ineffective technology, if it does not work to produce behavior change on a particular subject or group of subjects, it may be advantageous for researchers finding disappointing results to reassess their methodology for the possibility that the lack of positive results was due to a lack of comprehension on the part of the subject as opposed to technological deficiency.

Indiscriminable contingencies. The role of indiscriminable contingencies (ICs) in facilitating maintenance and generalization has not previously been discussed in this thesis, and deserves consideration at this time.

Basically, researchers investigating the role of ICs have suggested that during RV and CT conditions subjects learn what behavior (verbal and/or nonverbal) produced by them will result in reinforcement. While Israel and Brown (1977) have not found RV prior to CT to interfere with subsequent acquisition of correspondence, IC research indicates that during RV phases prior and subsequent to CT children may not display desired verbal control of

nonverbal behavior, but may simply produce the verbal component required for reinforcement (Baer, Williams, Osnes, & Stokes, 1984). If this is the case then perhaps any possibly deleterious effects of RV prior to CT deserves further attention, in spite of contrary findings by Israel and Brown.

Similarly, during CT children may produce the appropriate behavior merely as a means of gaining reinforcers (Baer et al., 1984). Based on the premise that ICs do not provide subjects with cues as to what is required for reinforcement, it is suggested that less discriminable contingencies than those provided during RV and CT phases may promote maintenance and generalization (Baer et al., 1984). Delaying reinforcement of verbalizations (D-RV) until after behavior sessions (Baer, et al., 1984) and providing a series of varied reinforcement procedures from session to session (Guevremont, Osnes, & Stokes, 1986) have been used as IC procedures. Studies utilizing such procedures (Baer, et al., 1984; Guevremont et al., 1986) have resulted in positive indications of maintenance and generalization with the subjects of average intelligence utilized.

The review of correspondence training-mental

retardation literature (eg. Whitman et al., 1982) has not demonstrated the need for ICs, with maintenance and generalization during RV subsequent to CT being displayed. Thus, the results of correspondence training-mental retardation research indicate intellectual level as an individual difference possibly playing a role in the effectiveness of CT, possibly related to the need for ICs. Therefore, the relationship between individual differences such as intellectual level and the need for ICs is indicated as warranting further investigation.

Significance of targeting ecologically valuable tasks on subsequent maintenance and generalization. In their examination of the efficacy of ICs in promoting maintenance and generalization, Baer et al. (1984) reported that little maintenance was indicated and declining trends in target responses were found. Thus, Baer et al. (1984) speculated that the play behaviors intervened "had little or no natural reinforcement value, that the children engaged in them only because they had promised to, and that they learned gradually that they could fulfill their promises and earn reinforcers by engaging in them for short periods of time" (p. 439). The implication of

this speculation is that behaviors or tasks targeted for intervention, which hold little or no ecological value for a subject, will not be maintained beyond the training and reinforcement period. The relevance of tasks possessing personal value for subjects is further indicated by both the Guevremont et al. (1986) study and the present study.

In the Guevremont et al. (1986) study two subjects received intervention on two behaviors each. For one subject, maintenance during baseline subsequent to CT was indicated in both behaviors (i.e. hand raising, and staying on-task), while the second subject demonstrated such maintenance for one task (i.e. peer talk) but not for another (i.e. mat straightening). While hand raising, staying on-task, and peer talk would likely result in continued personal reinforcement beyond the study period in the school setting, it may be that mat straightening sustained less personal reinforcement for the subject beyond training. Therefore, it seems probable that the subject failed to maintain performance of this behavior due to its lack of personal significance.

On the other hand, the tasks/behaviors targeted in the present study were ecologically valuable, and

thus apparently gained personal and sustained relevance for the subject, which in turn contributed to eventual maintenance and generalization of all tasks trained. Thus, this discussion leads to the speculation that maintenance and generalization may be facilitated if target behaviors are personally significant to subjects. This speculation adds to the already existing concern that additional research depicting ecological utility of CBM methods is needed (Whitman et al., 1984). Also indicated by this speculation is examination of the possibility that conflicting results with CBM research may be at least in part due to the extent of or lack of personal significance of target behaviors for subjects. In light of Baer's et al. (1984) discouraging findings in regard to lack of maintenance in IC research it may be that the personal significance of tasks targeted in CT research plays as great a role in the eventual durability and transference of skills trained as does the discriminability of reinforcement procedures engaged.

As noted previously (Chapter 3) the subject of the present study displayed general concern for the accuracy of his performances following training. This

concern for accuracy indicated that while strategy use was the key component of the CT statements of the present study, accuracy had become the subject's primary concern. The author has considered the possibility that although strategy use provided the subject the means of accomplishing his personal concern with accuracy, had accuracy not been targeted as a goal in the present study, the subject may have learned to appear to use the task strategies (i.e. arithmos board, reader, people card) in order to receive reinforcement without ever truly applying himself in terms of learning to use the aids effectively. That is, by establishing accuracy as a study goal, strategy use became personally relevant to the subject as it provided him the means to succeed as he never had before in the target tasks (i.e. math, reading comprehension, art).

Speculation in regard to motivational environment. The present study was conducted in what would be considered an individualistic environment (Ames & Ames, 1984). In this situation the subject's performance was not compared to anyone else's as is the case in competitive and cooperative systems (Ames & Ames, 1984). Rather the subject's

performance was only compared with his own goals and stated intentions. Thus, as discussed earlier in this chapter, achieving his own goals became a motivating force for the subject. In a competetive or even cooperative environment, the subject would have been placed in a situation of comparing his performance with that of others. This leads to the following speculations and considerations in regard to the motivational situation a subject is trained in:

1. Being that the subject is MR, his initial attempts which were subaverage, may have been interpreted as failures by the subject, in comparison to his intellectually normal classmates had he been trained in a non-individualized environment or encouraged to utilize strategies in the classroom prior to mastery. Thus, had he been trained in such a setting, would a competetive environment, such as the natural classroom, have fostered subject-classmate comparisons by the subject, leading to frustration and eventual "claim to defeat" in terms of further attempts at using the task strategies or might competetive or cooperative situations have motivated such a subject to work harder?;

2. Could success and mastery experienced in an

individualistic environment facilitate extinction of "learned helplessness" in individuals displaying such maladaptive behavior, and/or foster attempts at new tasks trained in competetive environments?;

3. What is the success rate of prior studies in which subjects were trained under individualistic conditions as compared to studies in which subjects have been trained under competetive or cooperative situations?

In effect, research investigating the potential effect of differing motivational environments on study outcome and subject perception is warranted.

Relationship between age and a pre-existing state of verbal control. In examining CT literature, specifically the study by Crouch et al. (1984) the following potential for further research investigation was developed. In this study (Crouch et al., 1984), unlike the other CT studies discussed which utilized MR individuals, subjects displayed verbal control during RV prior to CT. Furthermore, the subjects of the Crouch et al. (1984) study were adults whereas the other studies examined utilized children as subjects (eg. Whitman et al., 1982). It is speculated by the present researcher that verbal

control in these adult subjects was pre-existing and that RV merely stimulated use of this skill already possessed by the subjects. While Brodsky (1967) also utilized adult subjects and found no such verbal regulatory abilities, examination of the possibility of a pre-existing state of verbal control in adult MR individuals as compared to non-existence of such ability in MR children, is suggested by the results of Crouch et al. (1984). Thus, it may be that depending on the degree of mental retardation, by adulthood, verbal control in MR individuals naturally develops, as it has been suggested to develop in intellectually average people (Luria, 1961, 1963).

Concerns of present study

Throughout the development of this study the following concerns emerged:

1. No up-to-date IQ score. The subject's parents refused to allow the school to conduct further testing. A PPVT was conducted by the researcher just prior to the commencement of this study with permission of the subject's parents.

2. No interobserver reliability measure. The subject was noted to become distracted when

strangers, family, or friends were present in the work setting. Such distraction was found to result in poor work attempts. Using a previous tutor of the subject's as a second observer was considered, since the subject would have been more comfortable with an individual he had worked with in this environment; however, no such person was available for observing. Therefore, since a stranger functioning as a second observer would have likely resulted in unreliable task scores due to distraction, a second observer was not utilized. In light of this limitation the study observations were designed to be as objective as possible in order to decrease unreliability due to subjectivity. A second scorer for art work was obtained since art scoring was subjective.

3. Sequential analysis of the effects of the components of training procedures was earlier noted as an area requiring further attention. A step-by-step analysis of the effects of the separate components of the training package was not conducted. Unfortunately, a deficiency to expose the specific function served by the individual components results. However, for the subject's benefit, the researcher wished to remediate the subject in as quick a time

frame as possible in order to prevent him from further failing. Component analysis would have expanded the time it took for the subject to reach criterion levels within the classroom, and therefore would have provided the subject with the undesirable opportunity of a longer period of failure. Contentions by Rogers-Warren et al. (1977) as they relate to the issue of component analysis, presently deserve consideration. In 1977 Rogers-Warren et al. conducted a correspondence training study which sequentially introduced 6 conditions; model present, model shares, model reports sharing and is reinforced for report, subject reports, subject reinforced for true or untrue reports of sharing, subject reinforced only for true reports of sharing. The results of this study found modeling alone and modeling combined with reinforcement of the model's report of sharing to be insufficient for improving subject sharing. This study further found the introduction of reinforcement for true reporting by subjects to be the contingency which produced the highest degree of corespondence between saying and doing in subjects. As pointed out by the authors, while individual assessment of each component was not conducted, the effect of the

introduction of the final condition, noted above, which was the cumulation of all preceding conditions, save for the reinforcement of false reports, produced the greatest effect. Therefore, it was proposed that the individual evaluation of conditions held "small pragmatic importance" (p. 320). The authors further wrote that "no assembly of the components works as well as the total package" (p. 320). Additional research has indicated that metacognitive components combined with cognitive training may bring the best results (Sternberg, 1981; Wong, 1986), particularly in regard to generalization (Borkowski & Cavanaugh, 1979). Therefore, with these considerations in mind, a total package of modeling (where/when necessary), self-regulation, and correspondence training was implemented in the present study.

4. No direct in-class observation to test for generalization of training effects. It was the intent of the experimenter to obtain daily observations of the subject in his school classroom in order to measure generalization and maintenance. However, a series of teacher and teacher's aide strikes in the winter and spring of 1987, which had already resulted in delays in the commencement of the study, deemed

in-class observation unattainable. The teacher's aide checklist was developed and measures were gathered several times throughout the study so that some measure of generalization and maintenance to the school setting could be attained. Since the study took place over parts of two school years the teacher's aide was questioned with the rating scale as opposed to the student's teacher, as the same aide worked with the subject from year to year, while teachers changed. Some subjective observations from the subject's teachers were obtained and noted in Chapter 3 of this thesis.

5. No testing of generalization of verbal control. CT literature indicates that it is desirable to observe subjects following CT in order to determine if such individuals display verbal control of nonverbal behaviors, other than the behaviors included in the original study. Time limits prevented further observation.

Summary of research suggestions

Based on the literature review, methodology, results, and concerns of the present study, several suggestions warranting further exploration have been

indicated in this chapter. The following list summarizes the research and/or educational suggestions advanced and/or supported in the present study:

1. The potential of developed stimulus-cue properties in contributing to maintenance.

2. Systematic replication of the present study in order to discern the exact function of the various components of the training package such as goal-setting.

3. The effect on study outcomes and on subject's of promoting independence and inner-directedness in subject's.

4. Possible ramification of prolonged or brief implementation of control procedures.

5. Use of subject skill strengths in facilitating development of weak areas of functioning.

6. Further single subject or 1:1 intervention as a means of intensive investigation of special needs.

7. The effect of the social relationship existing between researcher-subject on study outcome.

8. Implementation of CT research by natural

change-agents.

9. The use of modeling as a "defining" tool.

10. The relationship between RV prior to CT and the need for introduction of ICs.

11. The effect of individual differences such as intellectual level in regard to indiscriminable contingencies.

12. The effect of ecologically valid and personally relevant tasks on maintenance and generalization.

13. The effect of individualistic, competetive, and cooperative environments on subjects and study success.

14. Possible pre-existing verbal control in adult MR individuals.

15. Evidence of generalized verbal control following CT.

Conclusion

The results of the present study overwhelmingly supported the hypotheses earlier listed. Thus, CT is a viable tool for remediating academic tasks and contributing to independent functioning in DS

individuals. Furthermore, direction for new and/or continued CBM/CT research has been generated by the present study. Finally, single subject or 1:1 intervention was a profitable design for the present study, as it allowed for intensive investigation of the efficacy of CT with a DS individual and contemplation of various issues related to education and research of special needs people.

Appendix A

Examples of Task Assignments

Math

ADD!

44 +33	55 +44	33 +55	22 +66	66 +33
8 + 8	8 + 7	8 + 6	8 + 5	8 + 4
321 +334	476 +323	538 +421	927 +132	654 +333

SUBTRACT!

44 -33	55 -44	55 -33	66 -22	66 -33
8 - 8	8 - 7	8 - 6	8 - 5	8 - 4
334 -321	476 -323	538 -421	927 -112	654 -333

Reading Comprehension--based on a story from the reader "Heads and Tails", supplied by the subject's school.

Tony and the Dragon

Complete the following using information from the reader.

[a]1. Tony saw something he had never seen before on his way home from the store with his mother. It was a _____.

2. The dragon's name was _____ and he lived in The _____.

3. Tony said he would help Peabody find his way home. Peabody was too tired to walk so Tony suggested Peabody take a _____.

4. The taxi driver said that there were no dragons around and then he drove away. This made the dragon _____.

5. Tony and Peabody crossed their fingers and wished for _____ _____.

[a]This example assignment is from the period of time during which the researcher completed one question from each assignment with the subject. Therefore, there are 6 blanks; the first one was completed by the subject with the researcher by his side and the following five were completed by the subject independently.

Art

Special Friends:

Discussion: do you think Peabqdy was real or make believe.

do you have a special friend? Who? Why are they special? What does your special friend look like? (continue discussion based on subject responses)

Display: examine various pictures of special friends. eg. animals, pretend, people.

Assignment: Subject to draw a picture of himself and his special friend.

Appendix B

Observation Sheets

To be completed by observer.

1. Date:

2. Task: Add/Sub___ Reader workbook___ Picture creating___

3a. Time allotment for task: Start-
b. End-

4. Does student express &/or demonstrate comprehension of task so that he should be able to complete on own? E____ D____ N____

5a. Did subject complete task on his own in time alloted? Y/N

b. If Yes to 5a, at what time did subject complete task? _____

c. Did assistance become necessary for the student to complete the task assigned? Y/N

d. If yes to 8d, at what time was assistance initiated? ____

*e. Reason for assistance: specify inappropriate behaviour subject was engaging in which rendered assistance necessary. eg. scribbling, not attempting exercise, etc.

*assistance refers to aid needed by student in order for student to complete task as student's independent activity is undirected or inappropriate. Aid may be either verbal instructions &/or physical/motor assistance. This does not include a brief verbal cuing given by tutor as a reminder for subject to continue with assignment.

**Operational definition of undirected or inappropriate behaviour;
- -subject requests assistance
  OR
- -subject is not engaging in task assigned and continues not to do so after verbal cuing
  OR
- -subject is observed scribbling

Observation form for arithmetic

Date:_____

Does subject use arithmos board for addition/subtraction?
(In either case record whether or not subject printed correct answer - C or I)

Y	N

Observation form for reading assignments

Date: _____

Sentence/Question # (note only those #'s which S completed on his own)	Is Subject observed looking in reader for response?

Observation form for art assignments

Date:_____

1. Assignment description

2. Brief outline of assignment discussion between E S:

3.**OBSERVATION

People	Is S observed referring to people card as he composes his picture?

4. People identified by subject in his art work.

5. List of necessary people and corresponding components.

Scoring sheet for art assignments

Date: _____

People and people components identified by scorer.

Appendix C

Table C-1

Summary of Subject's Daily Math Performance

Day	Condition	Accuracy		Strategy use	
		#	%	#	%
1	B-1	5	16.67	5	16.67
2	"	2	6.67	2	6.67
3	"	1	3.33	1	3.33
4	"	2	6.67	2	6.67
5	"	[a]2	6.67	0	0.00
6	CT	0	0.00	1	3.33
7	"	10	33.33	12	40.00
8	"	7	23.33	12	40.00
9	"	1	3.33	1	3.33
10	"	[b]3	10.00	3	10.00
11	"	3	10.00	6	20.00
12	"	20	66.67	30	100.00
13	"	13	43.33	30	100.00
14	"	21	70.00	30	100.00
15	"	23	76.67	30	100.00
16	"	21	70.00	30	100.00
17	"	25	83.33	30	100.00

(table continues)

Day	Condition	Accuracy		Strategy use	
		#	%	#	%
18	"	24	80.00	30	100.00
19	"	24	80.00	30	100.00
20	"	16	53.33	30	100.00
21	"	9	30.00	30	100.00
22	"	22	73.33	30	100.00
23	"	21	70.00	30	100.00
24	"	27	90.00	30	100.00
25	"	17	56.67	30	100.00
26	"	24	80.00	30	100.00
27	"	25	83.33	30	100.00
28	"	20	66.67	30	100.00
29	"	22	73.33	30	100.00
30	"	19	63.33	30	100.00
31	"	20	66.67	30	100.00
32	"	19	63.33	30	100.00
33	"	23	76.67	30	100.00
34	"	26	86.67	30	100.00
35	"	21	70.00	30	100.00
36	"	20	66.67	30	100.00
37	"	16	53.33	30	100.00

(table continues)

Day	Condition	Accuracy		Strategy use	
		#	%	#	%
38	"	15	50.00	30	100.00
39	"	15	50.00	30	100.00
40	"	18	60.00	30	100.00
41	"	24	80.00	30	100.00
42	"	22	73.33	30	100.00
43	"	20	66.67	30	100.00
44	RV-1	19	63.33	30	100.00
45	"	23	76.67	30	100.00
46	"	19	63.33	30	100.00
47	"	21	70.00	30	100.00
48	"	22	73.33	30	100.00
49	B-2	20	66.67	30	100.00
50	"	19	63.33	30	100.00
51	"	25	83.33	30	100.00
52	"	23	76.67	30	100.00
53	"	27	90.00	30	100.00
54	RV-2	19	63.33	30	100.00
55	"	20	66.67	30	100.00
56	"	[c] 19	63.33	27	90.00
57	"	[d] 20	66.67	27	90.00
58	"	[e] 19	63.33	28	93.33

[a]2/2 problems answered correctly were completed without use of arithmos board.

[b]1/3 problems answered correctly were completed without use of arithmos board.

[c]3/19 problems answered correctly were completed without use of arithmos board.

[d]3/20 problems answered correctly were completed without use of arithmos board.

[e]2/19 problems answered correctly were completed without use of arithmos board.

Table C-2

Summary of Subject's Daily Reading Performance

Day	Condition	Accuracy		Strategy use	
		#	%	#	%
1	B-1	0	0.00	1	20.00
2	"	0	0.00	0	0.00
3	"	1	20.00	2	40.00
4	"	0	0.00	0	0.00
5	"	0	0.00	1	20.00
6	"	0	0.00	1	20.00
7	"	0	0.00	0	0.00
8	"	0	0.00	2	40.00
9	"	0	0.00	1	20.00
10	"	0	0.00	0	0.00
11	"	0	0.00	0	0.00
12	"	1	20.00	1	20.00
13	"	0	0.00	0	0.00
14	"	1	20.00	1	20.00
15	"	0	0.00	1	20.00
16	CT	0	0.00	1	20.00
17	"	0.5	10.00	3	60.00

(table continues)

Day	Condition	Accuracy		Strategy use	
		#	%	#	%
18	CT	0	0.00	3	60.00
19	"	1	20.00	2	40.00
20	"	2	40.00	5	100.00
21	"	1.5	30.00	5	100.00
22	"	1	20.00	5	100.00
23	"	3	60.00	5	100.00
24	"	4	80.00	5	100.00
25	"	0	0.00	5	100.00
26	"	3.5	70.00	5	100.00
27	"	5	100.00	5	100.00
28	"	5	100.00	5	100.00
29	"	3	60.00	5	100.00
30	"	5	100.00	5	100.00
31	"	5	100.00	5	100.00
32	"	4.5	90.00	5	100.00
33	"	2.5	50.00	5	100.00
34	"	4.5	90.00	5	100.00
35	"	2.5	50.00	5	100.00
36	"	3	60.00	5	100.00
37	"	3	60.00	5	100.00

(table continues)

Day	Condition	Accuracy		Strategy use	
		#	%	#	%
38	CT	5	100.00	5	100.00
39	"	1	20.00	5	100.00
40	"	1	20.00	5	100.00
41	"	3	60.00	5	100.00
42	"	4	80.00	5	100.00
43	"	5	100.00	5	100.00
44	RV-1	5	100.00	5	100.00
45	"	4	80.00	5	100.00
46	"	5	100.00	5	100.00
47	"	5	100.00	5	100.00
48	"	3	60.00	5	100.00
49	B-2	3	60.00	5	100.00
50	"	5	100.00	5	100.00
51	"	5	100.00	5	100.00
52	"	5	100.00	5	100.00
53	"	5	100.00	5	100.00
54	RV-2	5	100.00	5	100.00
55	"	5	100.00	5	100.00
56	"	5	100.00	5	100.00
57	"	5	100.00	5	100.00
58	"	5	100.00	5	100.00

Table C-3

Summary of Subject's Daily Art Performance

Day	Condition	Accuracy #	Accuracy %	Strategy use #	Strategy use %
1	B-1	40 108	37.04	0 3	0.00
2	"	36 72	50.00	0 2	0.00
3	"	18 36	50.00	0 1	0.00
4	"	36 72	50.00	0 2	0.00
5	"	19 36	52.78	0 1	0.00
6	"	10 72	13.89	0 2	0.00
7	"	33 72	45.83	0 2	0.00
8	"	32 72	44.44	0 2	0.00
9	"	17 72	23.61	0 2	0.00
10	"	12 108	11.11	0 3	0.00
11	"	[a] ----	----	----	----
12	"	24 108	22.22	0 3	0.00
13	"	0 72	0.00	0 2	0.00
14	"	20 72	27.78	0 2	0.00
15	"	10 72	13.89	0 2	0.00

(table continues)

Day	Condition	Accuracy #	Accuracy %	Strategy use #	Strategy use %
16	"	16 74	21.62	0 2	0.00
17	"	30 108	27.78	0 3	0.00
18	"	28 49	57.14	0 2	0.00
19	"	20 72	27.78	0 2	0.00
20	"	0 72	0.00	0 2	0.00
21	"	12 72	16.67	0 2	0.00
22	"	12 72	16.67	0 2	0.00
23	"	13 180	7.22	0 5	0.00
24	"	21 36	58.33	0 1	0.00
25	"	9 36	25.00	0 1	0.00
26	"	16 107	14.95	0 3	0.00
27	"	0 144	0.00	0 4	0.00
28	"	0 72	0.00	0 2	0.00
29	CT[b]	----	----	----	----
30	"	----	----	----	----
31	"	----	----	----	----
32	"	----	----	----	----
33	"	----	----	----	----

(table continues)

Day	Condition	Accuracy		Strategy use	
		#	%	#	%
34	"	29 36	80.56	1 1	100.00
35	"	37 216	17.13	2 6	33.33
36	"	52 72	72.22	2 2	100.00
37	"	22 72	30.56	1 2	50.00
38	"	96 108	88.89	3 3	100.00
39	"	71 108	65.74	3 3	100.00
40	"	34 72	47.22	2 2	100.00
41	"	51 72	70.83	2 2	100.00
42	"	83 108	76.85	3 3	100.00
43	"	53 72	73.61	2 2	100.00
44	RV-1	135 180	75.00	5 5	100.00
45	"	130 180	72.22	4 5	80.00
46	"	63 72	87.50	2 2	100.00
47	"	61 72	84.72	2 2	100.00
48	"	70 72	97.22	2 2	100.00

(table continues)

Day	Condition	Accuracy #	Accuracy %	Strategy use #	Strategy use %
49	B-2	92 108	85.19	2 3	66.67
50	"	65 72	90.28	2 2	100.00
51	"	201 216	93.06	6 6	100.00
52	"	128 144	88.89	4 4	100.00
53	"	128 144	88.89	4 4	100.00
54	RV-2	91 108	84.26	3 3	100.00
55	"	64 72	88.89	2 2	100.00
56	"	65 72	90.28	2 2	100.00
57	"	65 72	90.28	2 2	100.00
58	"	92 108	85.19	3 3	100.00

[a]S did not discuss any intended drawing and later admitted to scribbling.

[b]Days 29 to 33 training of use of "People" card took place and therefore no data recorded.

Appendix D

Table D-1

Components Listed on Subject's People Card

Component
head
2 eyes
nose
mouth
2 ears
hair
neck
body
2 arms
2 hands (with fingers)
2 legs
2 feet

Table D-2

Characteristics of Children's Drawings

Lowenfeld & Brittain, 1962	Kellogg, 1970	Art Curriculum Guide, 1979
The schematic stage, 7-9 years: The achievement of a form concept	Early pictorialism, ages 4-8	Drawing objectives. Gr. 1 & 2
DRAWING CHARACTERISTICS -development of a form concept which is repeated again and again. -schema is altered only when special meaning is conveyed. -drawing shows concept, not percept. -drawings reflect a child's active knowledge of the environment.	-esthetics takes precedence over realism in drawing body parts.	
SPACE REPRESENTATION -establishment of a base line on which objects are placed and often a sky line, with the space between representing air. -two dimensional organization of objects. -no or little overlapping. -subjective space representation common a. simultaneous representation of plan and elevation b. X-ray drawings c. fusion of time and space. -multi-base lines. -environment symbolized.		

(table continues)

HUMAN FIGURE REPRESENTATION	HUMANS	GRADE 1
-repeated schema for a person -body usually made up of geometric shapes. -arms & legs show volume and are usually correctly placed. -exaggeration, omission, a change of schema shows effect of experience -proportions depend on emotional value (p.431) -other person particulars: hair, neck, hands, fingers, feet, clothing are commonly drawn.	-facial features become more detailed at around age 8. eg. eyebrows -up curved line = smile -down curved line = frown -straight line = serious look. -neckless humans still made at age 8 -rarely make outlined Humans; build Humans area to area so as to allow child ability to accommodate section according to proportions of previously constructed sections -sex may or may not be indicated by anatomy or clothes -arms may be left off -by age 8 years, the full anatomy is common in drawings.	-draw a human figure that includes the head, facial features, body, arms, hands, legs, & feet. -draw a figure that indicates motion. -draw facial features that convey emotion. -complete a self-portrait that indicates his/her most obvious features eg. hair colour -correctly identify and reproduce basic shapes -use various media to add colour to specific areas of his/her art work -incorporate a horizon line to divide sky & land. GRADE 2 -use drawings to convey thoughts and feelings in an original manner. -create visual texture by repeating shapes. -draw the complete figure of a student model.

(table continues)

GRADE 2
-develop perception by drawing objects from memory.
-interpret experiences in a composition.
(p. 8)

ANIMALS
-hard to distinguish from Humans. eg. a Human schema with ears may be a bear or rabbit.
-not difficult for age 5 or 6.

OTHER
-developing own colour relationships.
-motivation supplied by teacher should encourage drawing of we, action, where.

Appendix E

Goal Form

Day	Variable	Subject's Goal	Subject's Actual
	(str. use) (accuracy)		

Note. (str. use) refers to strategy use

Appendix F.

Table F-1

Teacher's Aide Checklist of Subject's Performance of Study Tasks In The School Setting

Items and Possible Responses

1. S is able to independently complete addition/subtraction assignments:

4	3	2	1
ALWAYS	USUALLY	SOMETIMES	NEVER

2. S uses his arithmos board independently:

4	3	2	1
ALWAYS	USUALLY	SOMETIMES	NEVER

3. The accuracy of the S's independent performance of addition/subtraction facts is:

4	3	2	1
ABOVE AVERAGE (A, B)	AVERAGE (C)	PASS (D)	FAILURE (F)

4. S is able to independently complete simple fill-in-the-blank reading comprehension assignments:

4	3	2	1
ALWAYS	USUALLY	SOMETIMES	NEVER

5. S independently refers to his reader for answers:

4	3	2	1
ALWAYS	USUALLY	SOMETIMES	NEVER

6. The accuracy of the S's independent performance of reading assignments is:

4	3	2	1
ABOVE AVERAGE (A, B)	AVERAGE (C)	PASS (D)	FAILURE (F)

7. S is able to independently complete art assignments:

4	3	2	1
ALWAYS	USUALLY	SOMETIMES	NEVER

(table continues)

8. S utilizes some strategy, such as "people" card, for completing art work independently:

4	3	2	1
ALWAYS	USUALLY	SOMETIMES	NEVER

9. The accuracy of the S's independent performance of picture creating is:

4	3	2	1
ABOVE AVERAGE (A, B)	AVERAGE (C)	PASS (D)	FAILURE (F)

Appendix G

Guidelines For Assessing Cognitive Change

Karen J. Rooney and Daniel P. Hallahan

1. The student should be able to use the strategies independently (O'Leary, 1980): Can the student use the procedure or procedures without cues or assistance? Can the student match the appropriate strategy with the task? Can the student adapt the strategy if necessary?

2. The student should be able to use the strategy spontaneously (O'Leary, 1980): Does the student have to be encouraged to use the appropriate strategy? Does the student accept the strategy as an aid or see it as additional work?

3. The student must be flexible in his or her use of the strategy (Marholin & Steinman, 1977): Does the student assess the situation before using a strategy? Can the student pick out cues in a situation to guide his or her use of strategies? Can the student adapt his or her behavior to different situations? Is the strategy rigidly adhered to even if the situation is inappropriate? Are there spontaneous adaptations to meet the needs of particular situations?

4. The student should use strategies across time (Stokes & Baer, 1977): Does the student use the strategy appropriately during each class period? Does the student use the strategy appropriately throughout the day? Does the student use the strategy only during school time?

5. The student should use the strategy across situations (Stoke & Baer, 1977; Loper & Hallahan, 1982): Does the student's performance vary from situation to situation? Is each strategy tied directly to a teacher, task, or situation? Is there evidence of a spontaneous overlap from one situation to a similar situation? Is there spontaneous transfer to an appropriate but unrelated or dissimilar situation?

6. The student should show an increase in internal locus of control (Meichenbaum, 1980): Does the student attribute success to his or use of the strategy? Does the student relate success to the difficulty of the task rather than the use of the strategy?

7. The child should show improvement in self concept (Meichenbaum, 1980): Does the student see himself or herself as an active participant? Does the student regard himself or herself as a more successful student in general? Does the student seek out new learning situations? In general, does the student conceptualize his or her performance as success oriented or failure oriented? Does the student avoid learning situations or academic tasks?

8. The student should improve in academic performance (Lloyd, 1980): Is there evidence of improvement in academic performance in time on task, productivity, and/or accurancy? Is there evidence of improvement in the student's grades?

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VITA AUCTORIS

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