1989

Comparing direct vs. indirect response-reinforcer relationships in teaching autistic children

William James Henkel
San Jose State University

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**Comparing direct vs. indirect response-reinforcer relationships
in teaching autistic children**

Henkel, William James, M.A.

San Jose State University, 1989

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Ann Arbor, MI 48106

COMPARING DIRECT VS. INDIRECT RESPONSE-REINFORCER
RELATIONSHIPS IN TEACHING AUTISTIC CHILDREN

A Thesis
Presented to
the Faculty of the Department of Psychology
San Jose State University

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

By
William James Henkel
December, 1989

APPROVED FOR THE DEPARTMENT OF PSYCHOLOGY

Sheila Bienenfeld

SHEILA BIENENFELD Ph.D

Nancy Eldred

NANCY ELDRED Ph.D

Milton Andersen

MILTON ANDERSEN Ph.D

APPROVED FOR THE UNIVERSITY

Serena H. Stanford

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Comparing Direct vs. Indirect Response-Reinforcer

Relationships In Teaching Autistic Children

William James Henkel

San Jose State University

Running head: Response-reinforcer relationships

ABSTRACT

COMPARING DIRECT VS. INDIRECT RESPONSE-REINFORCER RELATIONSHIPS IN TEACHING AUTISTIC CHILDREN

by William J. Henkel

This thesis investigates reinforcer relationships and their effect on skill acquisition in autistic children. Specifically, it examines the implementation of a multiple-baseline design for training four autistic children in a total of three target behaviors each. During the baseline condition of the study, reinforcer acquisition was not directly related to target response. Following a predetermined number of trials reinforcer acquisition was arranged to be directly related to target response. Changes in the data collected in each of the conditions is studied to assist in adapting traditional teaching strategies for use with autistic individuals.

This thesis compares its collected data with similar studies which investigate response-reinforcer relationships. It examines these similarities and differences in terms of cognitive functioning in autistics and the role of trainer/student interactions in the acquisition of target skills.

Comparing Direct vs. Indirect Response-Reinforcer

Relationships in Teaching Autistic Children

Since its identification by Kanner in 1943, infantile autism has been a subject of tremendous interest and research. Autistic individuals display profound behavioral disorders (National Society for Autistic Children, 1976). This, coupled with a particularly slow rate at developing appropriate skills (Rimland, 1964), makes them a unique and challenging population.

The development of an appropriate teaching curriculum and engaging training methodology for autistic children has been an area of increasing attention by educators in recent years. Attempts at developing appropriate lesson plans are challenged by the autistic child's profound behavior problems. Investigators have noted numerous impulsive behaviors, including aggressiveness (Russo, Cataldo & Cushing, 1981), destructiveness, hyperactivity and temper tantrums

(Webster, 1980), and self-injurious behavior (Durand, 1982). An autistic child's behavioral disorders may also include stereotypic and self-stimulatory behaviors (Rincover, 1978), non-compliance and lack of responsivity and motivation (Volkmar & Cohen, 1982; Rincover & Koegel, 1977) and severe delay in social relationships abilities and social communication skills (Wing, 1981).

Behavioral disabilities are often coupled with a particularly slow rate of developing appropriate skills (Rimland, 1964). Autistic children have been shown to have difficulty in developing critical self-care abilities such as tooth brushing, hand washing and hair combing skills (Kissel & Whitman, 1983) and toileting tasks (Azrin & Foxx, 1974). Autistic individuals have exhibited a slow rate at increasing gross and fine motor skills (DeMyer, Hingtson & Jackson, 1981). Autistics show difficulty in learning and cognitive performance tasks (Prior, 1979) including pedestrian safety (Yeaton & Bailey 1978), money-management abilities (Cuvo, Veitch, Trace & Konke, 1978), shopping skills (Barnard, Christophersen & Wolf, 1977), social skills training

(Mesibov, 1984) and work in community settings (Schopler & Mesibov, 1983).

Investigators have noted that autistic individuals also display significant communication deficits, with receptive language deficits (Koegel & Schreibman, 1976; Lovaas, Litrownik & Mann, 1971), and severe language abnormalities and delays (Waterhouse & Fein, 1982) being most commonly cited in the literature. Auditory and verbal stimuli information processing deficits (Lockyer & Rutter, 1970) are also typical of autistic individuals.

Educators have adapted a number of training techniques for use with autistic individuals in attempts to teach appropriate skills while reducing inappropriate behaviors. Among the techniques employed for teaching autistic children include psychodynamic approaches (Bettleheim, 1967), electric shock, slapping and shouting (Lovaas, Freitag, Gold, & Kassorla, 1965). Elements of behavior modification have also been put into use (Wolf, Risley & Mees, 1964).

Among behavior modification techniques, positive practice and overcorrection (Hinerman, Jenson, Walker &

Petersen, 1982), verbal and physical prompting (Barrera, Lobato-Barrera & Sulzer-Azaroff, 1980), and time-out procedures (Leitenberg, 1965) have proved useful. Contingency contracts (Rogers-Warren & Baer, 1976) and stimulus variation (Wilson, 1974) have been applied to higher-functioning autistic individuals with success. Communication deficits have been improved via behavior modification-based sign language strategies (Boavillian & Nelson, 1978) and picture-communication systems (DeVilliers & Naughton, 1974).

Educators have recognized the need for straightforward teaching strategies which best take advantage of each child's repertoire of appropriate skills while combatting a limited attention span and poor receptive and expressive language. Much of the educator's time and effort is concentrated on developing effective teaching techniques which meet each child's educational needs on an individual level.

Statement of the Problem

Schedules of reinforcement play a crucial role in developing a training plan which motivates each child and promotes his/her focused attention. Investigations into

successful reinforcement strategies have studied the effect of various reinforcement conditions. Among these is the association between direct vs. indirect response-reinforcer relationships and skill acquisition in autistic children. It is recognized by educators that an improved understanding of the balance between target response and reinforcer acquisition may aid our ability to motivate learning in the autistic child.

Purpose of the Study

There is a need among the current literature for focused investigation of direct response-reinforcement teaching strategies and their implication in training autistic children. Inquiry into simplified schedules of reinforcement may provide a necessary component in developing an optimal teaching program for use with autistic children. This study proposes to provide a portion of this inquiry by comparing direct vs. indirect response-reinforcer relationships and their effects on skill acquisition in teaching autistic children.

CHAPTER II

REVIEW OF SPECIFIC RELEVANT LITERATURE

The components of behavior modification as identified by Skinner (1953) have successfully been applied to many aspects of human behavior and development (Paolino & Mc Crady, 1978; Davidson & Stein, 1978; Figueroa, 1982). Populations diagnosed with emotional and developmental disabilities have shown particular benefit from behavior modification treatment (Tofte-Topps, Mendonca, & Peach, 1982; Alford, Fleece, & Rothblum, 1982).

Among populations which have shown increased learning through behavior modification-based teaching strategies, autistic individuals have displayed particular benefit. Experimenters have taught a variety of socially appropriate behaviors employing a behavioral approach. Hartley and Salzwedel (1980) used behavior modification techniques to improve writing skills in autistic children. Investigations have demonstrated an increase in appropriate skills including discrimination

tasks (Egel, Richman, & Koegel, 1981) and independent skills (Dunlap & Johnson, 1985). Behavior modification techniques have also been applied to reducing inappropriate behaviors in autistic children, including aggressiveness (Davidson-Gooch, 1980), self-stimulatory behavior (Luiselli, Reisman, Helfen, & Pemberton, 1976), self-abusive behaviors (Favell, Mc Gimsey, & Schell, 1982), and inappropriate speech and self-mutilating behaviors (Hart, 1980). Eason, White, and Newsom (1982) increased appropriate toy play with behavior modification methods and in doing so reduced the subject's inappropriate self-stimulatory behaviors.

Overview of Response-Reinforcement Strategies

An investigation conducted by Koegel and Williams (1980) researched the effectiveness of natural reinforcer relationships in teaching developmentally delayed individuals. Natural reinforcers are defined as having an inherent chain between the desired response and the reinforcing agent (Ferster, 1967), such as teaching a child to put on his or her coat reinforced by being allowed to play outside rather than teaching the same

skill reinforced with a cookie. Investigators emphasize the use of natural reinforcement in designing treatment strategies for the developmentally delayed (Kellerher & Gollub, 1962; Ferster & Skinner, 1957).

Efforts to employ natural reinforcer relationships have noted decreases in skill acquisition when a time lapse is present between the target response and reinforcer acquisition (Renner, 1964; Koegel, Dunlap, & Dyer, 1980; Kazdin, 1977). Investigators have attempted to limit this time lapse and strengthen the response-reinforcer relationship by placing the reinforcer at the end of a chain of natural responses (Millenson, 1967; Whaley & Mallot, 1969). Other investigators have purposely interrupted behavioral chains to reduce the frequency of unwanted behaviors (Zlutnick, Mayville, & Moffat, 1975).

Investigations have compared a variety of reinforcement strategies to ascertain the optimal response-reinforcer chain. Saunders and Sailor (1979) trained severely retarded children on two-choice learning problems under one of three reinforcement conditions. Under the specific reinforcement condition, the child was

allowed to play with the discriminated item, a toy, for correct responding. The non-specific reinforcement condition allowed the child to play with a toy that was not part of the discrimination training. Under the variable reinforcement condition the child was offered either the toys used in the discrimination training or the non-specific toy. The results indicated that correct responding was highest under the specific reinforcement condition, the condition which most directly chained response to reinforcer. Investigations have shown direct response-reinforcer relationships to improve the skill acquisition of retarded children (Mahoney, Van Wagenen & Meyerson, 1971), profoundly retarded adults (Bell & Richmond, 1984), and psychiatric ward patients (Boren & Colman, 1970).

Williams, Koegel and Egel (1981) compared direct vs. indirect relationships between target behaviors and reinforcers in teaching autistic children. During the baseline condition, three subjects were trained in target behaviors employing an indirect response-reinforcer relationship. During the experimental condition, the training procedure remained identical with the exception

of the reinforcer being arranged to be directly related to the target response. Following a predetermined number of trials, the indirect response-reinforcer relationship was reinstated to determine if any increase in target responses would remain. Not only did the target responses increase when employing a direct response-reinforcer relationship but the higher response rate was retained following re-establishment of the indirect condition.

In a study conducted by Litt and Schreibman (1981), five non-verbal autistic children were trained on two-choice label discriminations employing three reinforcement conditions. The first condition consisted of stimulus-specific reinforcement in which correct discrimination was rewarded with a reinforcer unique to the label identified. The second condition matched all correct discriminations with a single desirable reinforcer. The third condition randomly varied the reinforcers between discriminations. The stimulus-specific reinforcement condition which most closely linked discriminative stimulus to reinforcer proved most effective.

Koegel and Williams (1980) researched the relationship between direct vs. indirect response-reinforcer relationships in teaching autistic children. Using a multiple-baseline design, three autistic children were trained in a total of six target responses. During the baseline condition the responses were trained using an indirect response-reinforcer relationship (e.g., in a color discrimination task the child may be asked to point to a particular colored box, whereupon the child is handed a food reward). Following completion of the baseline condition, the reinforcer was arranged to be a direct part of the response-reinforcer chain (e.g., in the identical color discrimination task, the child would be asked to open a particular colored box which would contain the food reward). The investigation concluded that autistic children learn more rapidly when the target response is directly linked to the reinforcer. The results remained consistent regardless of whether identical reinforcers were used across both treatment conditions or were changed between conditions.

Summary of the Literature

Autistic children characteristically lack sufficient motivation to participate in any but the most reinforcing activities. This characteristic becomes particularly apparent when autistic children are called upon to complete learning tasks.

Many of the above investigators suggest an increase in correct responding when the target response is directly related to the reinforcer. The success has been proven across a variety of tasks and activities. The collected literature suggests that previous success rates may remain consistent in training tasks with higher levels of complexity.

Following the guidelines suggested by Koegel and Williams (1980) the present investigation studies the relationship between direct vs. indirect response-reinforcer relationships in teaching autistic children. The present investigation differs from the Koegel and Williams study in regard to the complexity of tasks to be trained (i.e., imitating the verbal sound

"Wh" vs. sequencing a three step task with a single verbal prompt). In addition, the verbal "No" as employed in the Koegel and Williams training procedures was omitted to avoid interfering with the dependent variable.

Hypothesis

The hypothesis of this investigation is that autistic children will display a higher level of response acquisition when the target response is a direct part of the response chain leading to the reinforcer as compared to when the target response is an indirect part of the chain leading to the reinforcer.

CHAPTER III

METHOD

Subjects

Four autistic children between the ages of seven and fourteen years were chosen from among the population of students attending Zonta Children's Center in San Jose, California. Zonta Children's Center is an educational agency which serves autistic and developmentally delayed children. Participators were selected based on their particularly low functional-skills level and slow rate of response acquisition. Subjects were chosen as determined by teacher assessment and recommendation for participation. Parental approval was obtained for all subjects.

Design

The investigation utilized a multiple baseline design (Kazdin, 1977) to examine whether attempts to train the four children in certain target behaviors, which were indirectly related to the reinforcers (baseline

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condition) could be improved by arranging the reinforcer so that the correct responses were directly related to obtaining the reinforcer (experimental condition). The number of trials for each baseline condition and the order in which each subject would participate was determined randomly prior to beginning the experiment (with a minimum requirement of 15 baseline trials) and consisted of 18, 25, 28, 35, 48, 50, 55, and 65 trials.

Procedure

Prior to beginning the baseline condition, the teaching staff responsible for each subject assisted in compiling a list of potential target responses and known functional reinforcers. Reinforcers were assigned randomly either to be held constant across conditions or varied across conditions.

Trainers selected from among the staff employed at Zonta Children's Center participated on a voluntary basis. Volunteers were assigned randomly as either trainers or reliability observers and paired with subjects for the duration of the study.

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Trainers and observers were kept naive to the specifics of the experimental hypothesis and were not involved in the subject recommendation process. Training sessions, during both baseline and experimental conditions, were conducted as follows:

The trainer gave a simple verbal prompt, e.g., "touch cup," "pick up blue." Subjects were given approximately four seconds to respond to the experimenter's cue. Correct responses were reinforced with verbal praise and the selected tangible reinforcer (either received from the experimenter or as part of the direct response chain). Incorrect responses were followed by a moment of quiet and then another verbal prompt. Every third consecutive incorrect response was followed by two manually prompted trials.

Child One/Task One. Child One was taught to discriminate between two persons. Two persons aside from the trainer and reliability observer were seated directly across from the child. The target response was to go to one of the two persons when given the verbal cue "touch Tracey." In the indirect condition, the trainer followed the child and reinforced correct responses by handing the child an

M & M. Following the predetermined number of baseline trials, the direct condition was instituted. In the direct condition, the discriminated person concealed the reinforcer in her hand and reinforced correct responses to "touch Tracey" herself.

Child One/Task Two. The trainer attempted to teach Child One an object recognition task in which the subject was called upon to discriminate between a cup and a bowl. The target response was to touch the cup or the bowl discriminatively when verbally cued "pick up bowl" or "pick up cup." In the indirect condition correct responses were reinforced by the trainer handing the child an Oreo cookie portion. Following the predetermined number of baseline trials, the direct condition was instituted. In the direct condition the cookie portion was discreetly placed within the bowl or cup out of the child's view from his seat. Correct responses to the verbal cue were reinforced by the child picking up the correct object and obtaining the reinforcer himself.

Child Two/Task One. Child Two was taught to complete a two step sequenced task with a single, verbal prompt.

The target response was to stand up, go to one side of the room, pick up a cup from the table, cross the room and place the cup in the sink when given the verbal cue "get the cup and put in the sink." In the indirect condition the trainer followed Child One and reinforced correct responses by handing the child a Cheeto. During the direct condition the trainer placed the reinforcer beside the sink prior to beginning trials. Child One was allowed to pick up the reinforcer following completion of the entire task (any attempts to obtain the reinforcer prematurely were blocked by the trainer).

Child Two/Task Two. The trainer attempted to teach Child Two a word discrimination task. Three words, each taped to the tops of identical shoe boxes, were placed before the subject, including the word "chip." Correct responses to the cue "touch chip" were reinforced by the trainer handing the child a potato chip. Following the baseline trials the direct condition was instituted. During the direct condition, the trainer obscured the subject's vision while discreetly placing the reinforcer beneath the shoe box top. Correct responses were

reinforced by the child picking up the shoe box with the discriminated word and obtaining his own reinforcer.

Child Three/Task One. Child Three was trained in a destination recognition task employing photographs as a discriminative stimulus. The target response was to go to the destination pictured (five destinations were used). During the indirect condition, the trainer followed Child Three and reinforced correct responses by handing the child a potato chip. Following the predetermined number of trials, the direct condition was instituted. In this case, the reinforcers were discreetly placed at the destinations prior to beginning trials. Correct responses to discriminating the photographs and reaching the destination were reinforced by the child discovering the reinforcer waiting.

Child Three/Task Two. Child Three was also trained in an independent running task. The target response was to run or walk 50 yards along a marked track, without stopping, when given the verbal cue, "run." During the indirect condition, the trainer followed at a discreet distance behind the subject and reinforced correct responses by handing the child a can of soda. In the direct

condition, the soda was placed at the end of the track. Correct responses were reinforced by the child reaching the soda and being allowed to reinforce himself.

Child Four/Task One. The trainer attempted to teach Child Four a number discrimination task. Three single-digit numbers, each taped to the tops of identical shoe boxes, were placed before the subject. During the indirect condition, correct responses to the cue "touch seven," "touch nine," or "touch four" were reinforced by the trainer handing the child a pretzel. Following the baseline trials the direct condition was instituted. During the direct condition, the trainer obscured the subject's vision while discreetly placing the reinforcer beneath the appropriate shoe box top. Correct responses were reinforced by the child picking up the shoe box with the discriminated number and finding his own reinforcer.

Child Four/Task Two. Child Four was also trained in a word recognition task in which three words, including two food words, were placed on identical boxes. During the indirect condition, responses to the cue "touch Cheeto" or "touch cookie" were reinforced by the trainer handing the child a Cheeto or a cookie if discriminated

correctly. Following the predetermined number of baseline trials, the direct condition was instituted in which a single reinforcer was placed beneath its appropriately labeled box. When the child responded correctly to the cue "touch Cheeto" or "touch cookie" he was reinforced by lifting the discriminated box and discovering the reinforcer inside.

All aspects of the training procedure remained identical between conditions with the exception of the response-reinforcer relationship. The dependent variable was the number of correct unprompted responses given by the subjects in each of the two treatment conditions (baseline and experimental). Target skills were considered "acquired" following ten consecutive correct response trials by the subject.

In order to insure that any increase in correct responding was not due solely to the strength of the reinforcers used, additional assessments were assigned to a random number of task trainings. Child One/ Task One and Child Two/ Task Two were randomly chosen to vary their reinforcer after a predetermined number of trials (Child One changed from Oreo cookie portions to M&Ms

after 11 trials and Child Two changed from chips to Cheetos after 25 trials).

Reliability

During the course of the trials, correct and incorrect responses, excluding those manually prompted, were scored by the trainer. The reliability observer attended all training and separately scored responses. Percent agreement was calculated by dividing the number of agreements by the number of agreements and disagreements x 100 for each session. Inter-rater reliability was at 99 percent.

CHAPTER IV

RESULTS

Shown in Figure 1 are results of the trainer's attempts to teach each of six tasks employing an indirect response reinforcer relationship (baseline) and the improvement in correct responding when changed to a direct response-reinforcer relationship (experimental). Percent correct responding is plotted in blocks of five trials with percent correct responding shown on the ordinate and blocks of trials on the abscissa.

In all Child/Task combinations the baseline data was characterized by consistently low levels of correct responding, whereas data collected in the experimental condition showed a substantial increase in correct responses. Specifically, the average of percent correct responding during the baseline (indirect) condition was 32% (calculated by adding the percentages of correct responding in the blocks of trials and dividing by the number of blocks): In contrast, the average of percent correct responding during the experimental (direct) condition was 79%. On the average, upon changing the

response-reinforcer relationship to make the target response directly related to obtaining the reinforcer, the acquisition criterion was met in less than 12 trials (Range: 5 to 20).

The additional assessment of random reinforcer variation completed with Child One/Task One and Child Two/Task Two demonstrated no significant change in correct responding for these tasks. The results of this additional assessment suggest a direct relationship between correct responding and a direct response-reinforcer relationship irrespective of the strength of any individual reinforcer used.

Figure 1.1

CHAPTER V

DISCUSSION

The results of the investigation supported the hypothesis that autistic children displayed a substantially higher level of response acquisition when the target response was a direct part of the response chain leading to the reinforcer as compared to when the target response is an indirect part of the chain leading to the reinforcer. Further, a higher level of correct responding was observed irrespective of the type of individual reinforcer used.

A review of the current relevant literature reveals a number of studies which have examined the usefulness of strong response-reinforcer relationships. Though these studies are not identical to the current investigation they show many similarities.

Saunders and Sailor (1979) compared the effect of varying response-reinforcer relationships in teaching developmentally delayed children. The results of both investigations support the hypothesis that the strength of the relationship between target response and

reinforcer acquisition aids in increased learning. Both studies utilized a multiple-baseline design to examine treatment effects.

Saunders and Sailor differed from the current investigation in several respects. The target population consisted of severely retarded children, whereas the current investigation studied children diagnosed as autistic. The maladaptive behaviors of autistic individuals are typically more dysfunctional than those typical of severely retarded individuals. This difference in behavior problems may have played a role in acquisition of target responses.

Saunders and Sailor employed three reinforcement conditions in their training procedure: specific reinforcement, which closely linked response to reinforcer; non-specific reinforcement, which never linked response to reinforcement; and variable reinforcement, which linked response to reinforcement randomly. The current investigation differentiated between direct and indirect reinforcement only.

Food and social praise were deliberately omitted from the list of potential reinforcers in the Saunders

and Sailor study. These reinforcers were omitted to enable the investigators to assess the independent variable in a relatively low motivational situation. In contrast, the current investigation included the highly motivating reinforcers of food and social praise to encourage subjects to respond during difficult tasks.

An additional difference involved the type of learning tasks chosen to be trained. Saunders and Sailor trained subjects exclusively in a nonsense word discrimination task. The current investigation selected a broad variety of discrimination and recognition-type skills in an effort to assess the independent variable with more functional tasks.

In 1981, Williams, Koegel, and Egel published a study similar to the current investigation. Both studies compared direct vs. indirect response-reinforcer relationships in teaching autistic children. Both studies reported that many of the typical autistic behaviors (e.g., handflapping, rocking, and gazing) were present in their group of subjects. Additionally, both studies utilized a multiple-baseline design to examine their results. Both the Williams, et al. study and the

current investigation reported higher levels of correct responding when the functional relationship between target response and reinforcer acquisition were closely linked.

While both investigations employed nearly identical training procedures, a few differences existed which may have affected treatment results. During the training procedure, the Williams, Koegel, and Egel study employed a mild verbal "no" as consequence for a subject's responding incorrectly. Concerns that the subjects may acquire target responses as a method to avoid the punishing "no," rather than as a result of the strength of the response-reinforcer chain, led the current investigator to omit this from the training procedure.

Additionally, the level of complexity of the tasks trained differed between the two studies. In general, the current investigation trained tasks which required a greater level of focused attention (e.g., sequencing a three-step task with a single verbal prompt vs. imitating a hand-to-body gesture). A few of the tasks trained in each investigation were similar (e.g., discriminating between two colored boxes).

The investigation by Litt and Schreibman (1981) appears to have more in common with the Saunders and Sailor article than the current investigation. However, both Litt and Schreibman and the current investigation recruited autistic children as subjects to compare the strength of the relationship between response and reinforcement and its effect on skill acquisition. The results of both studies support the hypothesis that new responses are acquired more easily as the relationship between the target response and the reinforcer increase.

The Litt and Schreibman study differed from the current investigation in several respects. Like Saunders and Sailor, Litt and Schreibman employed three treatment conditions: stimulus specific reinforcement, in which correct label discriminations were rewarded with a reinforcer unique to that label; salient reinforcement, in which correct label discriminations were rewarded with a single desirable reinforcer; and varied reinforcement, in which correct discriminations were rewarded with varying reinforcers. The current investigation differentiated between direct and indirect response-reinforcement only.

In order to keep subjects in the Litt and Schreibman study from long periods without reinforcement, trainers would periodically have the subject perform a task already within the child's repertoire. They would then present the reinforcer for correct responding and continue with the task training. The current investigation did not employ such a strategy.

During the Litt and Schreibman study, trainers punished incorrect responses with a contingent "No." As mentioned above, this aspect of the procedure was not included in the current investigation to avoid interfering with the independent variable.

A study by Koegel and Williams (1981) shows the greatest similarity with the current investigation. Both studies utilized a multiple-baseline design to compare direct vs. indirect response-reinforcer relationships and skill acquisition in autistic children. The training procedure in both investigations was nearly identical. The results of each support the hypothesis that autistic children acquire skills more rapidly when the reinforcer is directly linked to the target response.

The differences in training procedures employed by Koegel and Williams and the current investigation were few. These differences have been noted as dissimilarities between the current investigation and other relevant literature cited above.

While many of the tasks trained in the Koegel and Williams study were similar to those used in the current investigation (e.g., discriminating between two colored boxes) the current investigation strove to train more complex tasks (e.g., sequencing a three-step task with a single verbal prompt vs. imitating the verbal sound "Wh".) Tasks were developed which required a greater level of focused attention from the subjects.

The Koegel and Williams study, as reported in studies cited above, employed a mild verbal "no" for incorrect responding. This aspect of the procedure was not included in the current investigation to avoid interfering with the independent variable.

The results of the current investigation may be due to several factors. First, teaching strategies often require more focused attention than typical autistic students can consistently provide. For example, Lovaas,

Schreibmann, Koegel, and Rehm (1971) have suggested that a learning environment with even limited distractions may be detrimental to an autistic child's level of focused attention. Internal and external stimuli, complicated training instructions and reinforcers that fail to motivate may all play a part in a student's lack of focused attention. Extraneous sensory input and distracting environmental stimuli in the current investigation were kept at a minimum.

Some reinforcement strategies may necessitate a greater cognitive level than most autistic children are capable of investing (Hermellin & O' Connor, 1970). Advanced reinforcement systems such as token economies (Howie & Woods, 1982; Kazdin, 1982; Greenberg, Scott, Pisa, & Friesen, 1975) and contingency contracts (Kelley & Stokes, 1982) are likely to function beyond the comprehension of many autistic individuals. Further, these reinforcement systems may not be immediate enough for students to easily see response and reinforcement as chained. Such weak reinforcement from the subject's perspective may do nothing to promote skill acquisition. The current investigation stresses the value of simple reinforcement strategies which build on each student's

individual strengths and needs. Its simplified approach may simply have been uncomplicated enough for the subjects to grasp and the reinforcers sufficiently immediate to promote task completion.

In the current investigation, the majority of task trainings were designed so the reinforcer was waiting at the subject's destination, beyond the apparent control of the trainer. When the subject responded (in some cases) he was controlling his own reinforcement schedule. Balsam and Bondy (1983) suggested that trainers who position themselves as part of the response-reinforcement chain may inhibit target responses. The child, viewing the trainer as the reinforcing agent, may elicit so much staring, reaching and asking that the relevant aspects of the task are interfered with. When the trainer is removed from the direct reinforcement chain, the child, who may be accustomed to manipulating rather than cooperating, finds that completing the task as devised by the trainer is the sole alternative for acquiring the reinforcer. Establishing firm control when teaching is a typical response by trainers of autistic children (Lovaas, 1976); however, the current investigation suggests controlling the environment may be more

beneficial to student and teacher than attempting to match wills.

The theory of learned helplessness (Seligman, Klein & Miller, 1976) may play an additional role in the characteristic lack of responding in autistics. Students may be slower or less likely to imitate responses when their typical environment frequently gives multiple cues or does not follow through with demands.

Autistic individuals frequently find themselves in situations where their own responses are ineffective and fail to bring desired gratification. Reinforcement continuums which are incessantly manipulated, however well intentioned, by outside individuals may teach that one cannot predict the elements of a situation and thereby assure reinforcement. In an effort to build a friendly, reinforcement-oriented rapport with students, trainers will often "give the benefit of the doubt" and otherwise make spontaneous revisions as to the criteria of correct responding. While this may seem philanthropic at the moment, it often creates confusion for the student or teaches them to hesitate in the target response and wait for "a better deal." If responding and task

completion are often independent of one another, intermittent response-reinforcement contingencies become difficult to trust. The current investigation allows for a single method of reinforcer acquisition: task completion.

A number of difficulties which often complicate training strategies with autistic children have been avoided in the current investigation through the use of a direct response-reinforcement relationship. The present study is meaningful in that it indicates an increase in learning through direct response-reinforcement for each subject.

Further investigations are suggested. Studies varying known strong and weak reinforcers in direct and indirect reinforcement conditions may further the understanding of reinforcement strategies. Studies investigating environmentally-controlled reinforcers vs. investigator-controlled reinforcers would lead to increased understanding of the central elements of direct response-reinforcement. Finally, investigations which move away from tangible reinforcers and employ praise and verbal reinforcement may omit further the variable of

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reinforcement strength as critical to effective response-reinforcer chains.

CHAPTER VI

SUMMARY

Research has noted the relatively slow skill acquisition rate in autistic children. Such information has prompted investigation in modifying traditional teaching methods by strengthening the functional relationships between target behaviors and their reinforcers. The current investigation inquires into direct vs. indirect response-reinforcer relationships and their effect on correct responding in autistic children.

This investigation, using a multiple-baseline design, focused on teaching four autistic children a total of two target responses each. During the baseline condition the target response was indirectly related to the reinforcer. Following a predetermined number of baseline trials, the experimental condition was introduced. During the experimental condition the training procedure remained identical with the exception of the reinforcer being arranged to be directly related to the target response. It was hypothesized that autistic children would acquire target responses more rapidly when employing a direct response-reinforcer

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relationship as compared to learning the same tasks with an indirect response-reinforcer relationship.

The results of the investigation confirmed the hypothesis. Baseline data was characterized by consistently low levels of correct responding (an average of 32% correct response trials). Data collected in the experimental condition showed a substantial increase in correct responding (an average of 79% correct response trials).

Training strategies which utilize direct response-reinforcement relationships appear to aid in correct responding in the skill acquisition training of autistic children. Support of the experimental hypothesis suggests particular attention be paid when arranging reinforcement schedules to take advantage of direct response-reinforcement.

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