

THE UNIVERSITY OF MANITOBA

PRIMARY REINFORCEMENT, A TOKEN SYSTEM, AND ATTENTION
CRITERIA AND FEEDBACK PROCEDURES WITH PROFOUND
RETARDATES IN A VERBAL TRAINING CLASSROOM

by

EUGENE ANTHONY KAPROWY

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ABSTRACT

Primary and social reinforcement, tokens and social reinforcement, attention criteria and feedback procedures, and a differential reinforcement of other behavior (D.R.O.) procedure using attention criteria and feedback were evaluated in a verbal training classroom for seven profoundly retarded females.

A modification of a single organism "reversal" design was used in a seven phase research program.

It was found that primary reinforcement consisting of meals was more effective than tokens cashed in for edibles, such as potato chips, for five of seven subjects on measures including correct responses, trial attention, and inter-trial quiet behavior. Also, primary reinforcement improved behavior in 8 of 11 measures where a previous token reinforcement condition was unable to effect change.

Tokens and social reinforcement as compared to attention criteria and feedback procedures generally had a moderate effect on correct responses and weak effects on trial attention and inter-trial quiet behavior. These effects, however, were inconsistent across the three behavioral measures for each subject. Also, the effects of tokens and social reinforcement were greatest in the first of three introductions of this variable.

The D.R.O. procedure resulted in large decreases in the trial attention of all seven subjects and inter-trial quiet behavior of four subjects. The procedure had minimal effects on correct response outputs of three subjects and, surprisingly, desirable effects for three subjects.

A comparison of performance on pre-session tests and tests conducted in the non-session environment indicated excellent setting generalization. An analysis of pre- and post-research verbal training evaluations indicated subjects improved an average of 36 items each in a 10.5 month period. A portion of this improvement could be attributed to direct classroom training and exposure to other students' training programs.

In conclusion, it was demonstrated that primary and social reinforcement was more effective than tokens and social reinforcement and that tokens and social reinforcement were more effective than attention criteria and feedback procedures only in a verbal training classroom for profound retardates. Also, the classroom proved to be a viable setting for training verbal skills to profound retardates.

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CHAPTER I

INTRODUCTION

In recent years, behavior modification has been expanding rapidly. Popular publications of the 60's included Ullmann and Krasner (1965) and Ulrich, Stachnik and Mabry (1966). Some major contributions have been: teaching machines and programmed instruction (Holland, 1960); programmed university courses (Bostow and O'Connor, 1973; Keller, 1968; Semb, 1974); advancements in preschool and elementary school education (Bushell, Wrobell, and Michaelis, 1968; Johnson and Bailey, 1974; O'Leary and O'Leary, 1972); self-control and clinical practice (Goldfried and Merbaum, 1973; Watson and Tharp, 1972); parent training (Becker, 1971; Deibert and Harmon, 1970; Johnson and Lobitz, 1974; Patterson, 1971); token systems (Ayllon and Azrin, 1968; Walker and Buckley, 1974).

Token systems in particular have received wide spread attention and generally they have served as an effective therapeutic technique. Success has been achieved with many populations such as: hyperative children (Quay, Sprague, Werry and McQueen, 1967); mental patients (Ayllon and Azrin, 1968); delinquent boys (Tyler and Brown, 1968); mildly and moderately retarded children (Birnbrauer, Wolf, Kidder and Tague, 1965); and emotionally disturbed children (O'Leary and Becker, 1967).

One population that requires additional attention is the severely and profoundly retarded. According to the American Association

for Mental Deficiency, the severely retarded range in I.Q. is from 20-35, while the profoundly retarded obtain I.Q.'s below 20. It is estimated that one out of every 1,000 persons in society falls into the severe-profound range of retardation. In Manitoba alone, there are approximately 1,000 severe and profound retardates, while in North America the number is approximately 220,000. Further, institutions for the retarded now cater largely to the severely and profoundly retarded as the mildly and moderately retarded have found their way into the community in increasing numbers. The severely and profoundly retarded compose approximately 70% of the population of these institutions in Manitoba (Martin and Lowther, 1972).

An early form of treatment for the severely and profoundly retarded was the liberal use of constraint for deviant behaviors such as stripping clothes, masturbating, self-destructive behaviors, and feces smearing. The coming of the "Chemical Revolution" of the fifties provided a popular second alternative treatment for these sorts of problems. Coupled with custodial care this population became increasingly manageable.

With the advent of behavior modification in the early and middle 60's emphasis began to focus on the training of the severely and profoundly retarded. Initial experimentation provided support for the appropriateness of principles of operant conditioning to application with the retarded. Then individual training by skilled behavior modifiers commenced in efforts to train basic verbal skills and solve behavior problems in individual training situations (eg., Corte, Wolf and

Locke, 1971; Twardosz and Baer, 1973). Concurrently, an emphasis was placed on self-care training programs in such areas as grooming (eg., Treffrey, Martin, Samels, and Watson, 1970), dressing (eg., Martin, Kehoe, Bird, Jensen and Darbyshire, 1970), toileting (eg. Azrin and Foxx, 1971), eating (eg., O'Brian, Bugle and Azrin, 1972), and bed making (Martin, England and England, 1971).

Some areas that require further development for the severely and profoundly retarded are academic and verbal training programs, group education, and an analysis of token systems. A three year research project undertaken by this author has attempted to study all three. A token system was adapted to the verbal training of fourteen severely retarded females in a classroom situation. Programs were developed for many elementary verbal items, several different training strategies were attempted, and a token system evolved in attempts to meet classroom needs.

Recent research, however, has raised some questions concerning the effectiveness of token systems with the severely and profoundly retarded (Ribes-Enesta, Duran, Evans, Felix and Sanchez, 1973). This research prompted examination of the utility of a token system approach to reinforcement with this population in a classroom setting.

The purpose of the present research was to investigate the effectiveness of token and social reinforcement with seven severely retarded females engaged in verbal training in a classroom situation.

More specifically, tokens and social reinforcement were evaluated against primary and social reinforcement and minimal social conditions using attention criteria and feedback only.

CHAPTER II

REVIEW OF THE LITERATURE

Behavior Modification with Severe and Profound Retardates

Since the early 1960's behavior modification procedures have been applied successfully in a variety of areas. One area receiving considerable attention is the education of the severely and profoundly retarded. Recent books by Thompson and Grabowski (1972) and Gardner (1971) discussed current behavior modification training with this population. Gardner (1971) suggested that training of this population presents "special" problems in terms of training procedures and curricula. These problems are a result of the unique behavioral repertoires of the severely and profoundly retarded. Current training of the severely and profoundly retarded can be categorized into five divisions. They are: elimination of undesirable behaviors, self-care training, imitation and elementary verbal training, group training, and socialization training. Some of the research concerning each of these areas will now be sampled.

Elimination of undesirable behaviors. Considerable emphasis has been directed to the elimination of undesirable behaviors with the severely and profoundly retarded. Typical undesirable behaviors are tantrums, excessive vomiting, regurgitation, clothes ripping, feces smearing, and self-abuse, among others. Successful treatments have included extinction or the removal of all

reinforcing consequences of a problem behavior (Wolf, Birnbrauer, Williams, and Lawler, 1965); various forms of aversive control such as shock, physical restraint, time out, and conditioned aversive stimuli (Giles and Wolf, 1966; Hamilton, Stevens and Allen, 1967; Hendriksen and Doughty, 1967; Tate and Baroff, 1966; Wiesen and Watson, 1967); reinforcement of behaviors which compete with an undesirable target behavior (Vukelich and Hake, 1971). A general strategy for treatment of a persistent behavior problem is to use a "shotgun" approach where a combination of variables is employed to maximize chances of success. When treatment procedures are carried out consistently, success rates are encouraging. Two excellent reviews on the application of punishment procedures to human behavior are Gardner (1969), and Johnson (1972).

Self-care training. Self-care programmes typically have been undertaken at the ward level using trained staff. Some self-care skills studied include grooming, dressing, eating, toileting, and bed-making, among others. Typical training programmes involve breaking down a behavioral sequence into a number of "trainable" steps, specifying the appropriate stimulus control for each step, and using a training procedure consisting of the "fading" or gradual reduction of help required to accomplish each step. Successful completion of steps is reinforced, usually with a combination of social and edible reinforcements. Help can range from complete physical assistance or guidance, physical prompting such as pointing, and verbal prompting such as

repeating an instruction. Finally, as behavior improves on the various steps, frequency of reinforcements is gradually reduced until the entire pattern can be completed successfully, with reinforcement administered only upon completion. Eating programmes (eg., O'Brien *et al*, 1972; Minge and Ball, 1967); toileting (eg., Azrin and Foxx, 1971; Watson, 1968); and work activities such as a drilling machine task (Crosson, 1969) are samples which have been trained in this fashion.

Imitation training and elementary language development. The severely and profoundly retarded are completely lacking in an imitative repertoire, and their language skills are extremely poor (Gardner, 1971). An imitative response may be defined as a motor or vocal response which bears topographical similarity to a preceding stimulus presented by a model. Numerous investigations have demonstrated that imitative behavior in the severely and profoundly retarded can be developed and strengthened through the use of behavior modification procedures (eg., Baer, Peterson and Sherman, 1965; Metz, 1965). Further, it has been shown that extensive imitation training will produce spontaneous imitations to "never before trained" items. This is known as generalized imitative behavior (Peterson, 1968). This fact suggests that generalized imitative behavior of both a motor and vocal nature (echoic behavior) is extremely important in verbal development. Peterson (1968) suggested that a generalized imitative repertoire could reduce significantly the time required to learn new behaviors, and in many situations present a strong alternative

to trial and error learning.

Various language development programmes based on a Skinnerian analysis of verbal behavior (Skinner, 1957) emphasize the importance of generalized imitative behavior in language development of the severely and profoundly retarded (Kent, 1974; Sloane and MacAulay, 1968). A review of the speech programme developed by this author for classroom training can be seen in Appendix 1. Typically, gross motor imitations are taught first using guidance procedures, fading procedures, and successive reinforcements of approximations towards correct imitations. When gross motor imitations have been developed, mouth movement imitations are trained. It is assumed that the development of gross motor imitations makes the acquisition of mouth movement imitations easier. When mouth movement imitations have been acquired, then minimal sound units are brought under imitative or echoic control. When a variety of sound units have been taught, these sounds are combined into words, words into phrases, and phrases into sentences through the use of imitation. Also, concurrently or sequentially, appropriate stimulus management techniques can be used to develop naming and reading repertoires along with appropriate grammar and syntax (Garcia, 1974; Sloane and MacAulay, 1968).

Group training. Behavior modification has made a considerable contribution to effective classroom training with normal children and some special populations such as emotionally disturbed children and delinquents. For extensive reviews see Hanley, 1971; O'Leary and Drabman, 1971.

Classroom strategies have included:

1. Independent programmed work assignments where a teacher or teacher-aide monitors a classroom of students by giving help as necessary and reinforcement for achievement (Birnbrauer et al, 1965; Wolf, Giles and Hall, 1968).
2. Group instruction where all students receive the same material simultaneously from one teacher (Fullmer, 1972; Kaprowy and Opperman, 1971).
3. A situation where a teacher interacts with each child independently while remaining children in a group wait for their turn (Martin, England, Kaprowy, Kilgour, and Pilik, 1968; Zimmerman, Zimmerman and Russell, 1969).
4. A combination of the above three strategies (Fullmer, 1972).

Each of the above strategies has its advantages and disadvantages. For example, independent programmed instruction can be extremely effective and produce high rates of learning, but considerable staff are required to programme work assignments and monitor progress effectively. Also, some training tasks such as the shaping of various vocal skills are not easily amenable to this setting. Alternative two, group instruction, can service a large number of students with a minimum of staff, but it is difficult to apply individual contingencies effectively, and the material to be taught may not be appropriate for all students (the problem of heterogeneity). The third alternative

provides individual instruction, but is inefficient in that each student receives only a small portion of total training time.

The "raisons d'etre" for group training are economy of staff and possible side benefits such as increased generalization and desirable social contingencies imposed by other students. Effective group training with the severely and profoundly retarded in institutional settings is extremely attractive because of poor staff-student ratios. In many ward settings the staff-student ratio may range from 1 to 10 to 1 to 20. Further, even when individual training programmes are in operation, generally there is a "pool" of students who are unable to be worked with. Typically, unstructured play activities are programmed for this "pool" of students. These unstructured activity periods are often unproductive for both students and staff inasmuch as only a small amount of environmental support typically is offered in this type of situation.

Procedures have been developed by this author to control the general classroom behavior of severely and profoundly retarded students and to train elementary verbal skills with a teacher-student ratio of 2-7. Also, attempts have been made to evaluate classroom efficiency, and to increase learning rates. For example, in one study (Kaprowy and Stefiuk, 1973) group participation was encouraged. An eight-student class was divided into pairs of two. One student in each pair received teacher-prompts for items to be learned. The other student of a pair received no teacher-prompts but was required to answer correctly the item that was trained to the first member of the pair.

It was found that students taught using either procedure acquired naming responses at approximately similar rates. In another classroom (Kaprowy and Opperman, 1971) the effect of a test contingency following group classroom instruction was evaluated. It was found that when contingencies were imposed on successful test performance, the efficiency of classroom training was increased.

In the future development of group training for the severely and profoundly retarded it would appear necessary to:

1. Document successful training procedures for the development of elementary verbal skills.
2. Deal effectively with the problem of heterogeneity.
3. Maximize the efficiency of classroom training time.
4. Determine appropriate classroom strategies for various tasks to be trained.
5. Evaluate the effects of various reinforcement procedures on classroom training efficiency.

Socialization training. Behavior modification procedures have been applied to develop social behavior in the severely-profoundly retarded. Work by Martin and Lowther (1972) has demonstrated that with extensive behavior modification training the severely and profoundly retarded can be raised to the level of the moderately retarded. Williams (1974) has suggested that an important distinction between severely-profoundly retarded and moderately retarded persons is the emergence of social behavior in moderate retardates which should help maintain learned behaviors and increase the likelihood of the development of new socially oriented skills.

Witman, Mercurio and Caponigri (1970) demonstrated the development and generalization of social behavior in two severely retarded children as a result of reinforcement for mutual participation in a ball throwing and block passing task. Paloutzian, Hasan, Streifel and Edgar (1971) showed that imitation training procedures could be used to develop social responses in 10 severely retarded children.

Powers and Powers (1971) casually observed the emergence of social interaction when each member of a dyad of two severely retarded subjects were reinforced for the other member's performance. They coined this a "backscratch contingency". These findings were replicated and extended by Williams, Martin, McDonald, Hardy and Lambert (1974) and Williams (1974). It appears that if behaviors are reinforced using a backscratch contingency, social behaviors develop and that generalization is likely to occur if the contingency is applied to normally occurring tasks such as table setting in the daily living environment.

Further research is yet required on the training, maintenance, and importance of social behavior in the overall education of the severely-profoundly retarded.

Primary Reinforcement

The concept of reinforcement, particularly primary reinforcement, has been very important in modern behaviorism and has resulted in a huge body of research and theory. Most of this research has been conducted with lower organisms such as the rat and the pigeon. In a consideration of operant behavior a positive reinforcer may be defined as a stimulus change following a response which increases the probability of that response occur-