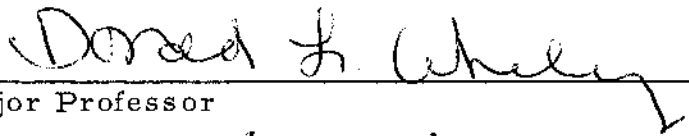


EFFECTIVENESS OF SECONDARY REINFORCEMENT  
ON THE BEHAVIOR OF A HYPERACTIVE CHILD

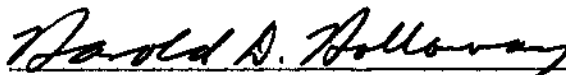
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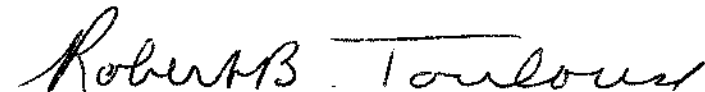
Major Professor



Minor Professor



Director of the Department of Psychology



Dean of the Graduate School

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Payton, Tommy I., Effectiveness of Secondary Reinforcement on Behavior of a Hyperactive Child. Master of Science (Clinical Psychology), May, 1973, 52 pp., 2 tables, 7 figures, bibliography, 47 titles.

The problem with which this investigation is concerned is that of determining the effectiveness of each of four secondary reinforcers on the behavior of a hyperactive child. The method of determining the effectiveness of the secondary reinforcers was the rate of observed appropriate behavior achieved by the hyperactive child.

The purpose of this study was to demonstrate the effectiveness of various secondary reinforcers on the behavior of a hyperactive child. A base rate of appropriate behavior was obtained in a first-grade classroom. The operant techniques employed were secondary reinforcers consisting of monetary reinforcement; monetary paired with peer reinforcement; monetary, peer, and verbal reinforcement combined; and verbal reinforcement only. When the secondary reinforcement procedures were introduced the frequency of appropriate behavior increased. The most effective secondary reinforcer was found to be a combination of monetary, peer, and verbal reinforcement.

The level of effectiveness of the combination of monetary, peer, and verbal reinforcement increased the appropriate behavior of the hyperactive child to a level of 72 per cent. Monetary paired with peer reinforcement was found to be 68 per cent effective in increasing appropriate behavior. Sixty-four per cent effectiveness was found in the verbal reinforcement alone. Peer reinforcement alone was found to be 56 per cent effective in increasing appropriate classroom behavior. Monetary reinforcement was found to be 39 per cent.

The level of effectiveness produced by the operant techniques in this study suggest that there are contained within the classroom effective reinforcers that can be used in a classroom to modify behavior without changing the normal teaching activities.

EFFECTIVENESS OF SECONDARY REINFORCEMENT ON  
BEHAVIOR OF A HYPERACTIVE CHILD

THESIS

Presented to the Graduate Council of the  
North Texas State University in Partial  
Fulfillment of the Requirements

For the Degree of

MASTER OF SCIENCE

By

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Denton, Texas

May, 1973

EFFECTIVENESS OF SECONDARY REINFORCEMENT  
ON BEHAVIOR OF A HYPERACTIVE CHILD

Introduction

Hyperactivity is operationally defined by most doctors, clinicians, and teachers by external observable events, namely motor movements which have no apparent utility to the individual (Werry and Sprague, 1970; Oklahoma Department of Education, 1968). The hyperactive child is characterized as a child whose everyday level of activity is far above the normal child's level of activity in terms of movements of the body, head, limbs, and extremities, including these movements while the child is in a stationary position. The child is hard to manage in ordinary settings, accidentally destructive, difficult to communicate with, and therefore comes into conflict with his immediate environment, which necessitates intervention of some nature.

The main unanswered question about hyperactivity or hyperkinetic behavior syndrome, as it is sometimes called, is its etiology. The long-standing explanation of hyperactivity is one of organicity or impairment of structure of functional physiological mechanisms. Reference to hyperactivity due to cerebral cortex damage goes as far back as 1876; but the first scientific study seems to be that of Lashley

in 1920. It was found that rats with organic frontal and frontoparietal cortex lesions had an extremely high level of activity when compared with rats without the frontal and frontoparietal lesions (Lashley, 1920, p. 22). This finding, that organic change in the cortex produced hyperactivity, is supported by other investigators, such as French and Harlow (1955). Most psychiatrists feel that the hyperactivity of a child is a symptom of an organic problem (Burks, 1960; Strauss and Lehtinen, 1947).

This view, that hyperactivity is due to organic involvement, is consistent with the medical model of behavior. The medical model conceptualized behavior as symptoms or indicators of some underlying disease entity. The removal of the underlying basic problem should, according to the medical model, alleviate the manifest symptomology, in this case the hyperactive behavior (Ullmann and Krasner, 1969).

French and Harlow (1955) removed the bilateral neocortex of the temporal lobe in one group of experimental monkeys and the bilateral ablation of the prefrontal area in another group and found that hyperactivity would result. Damage to these areas, as well as ablation, produced the same result of hyperactivity.

Another study, by Bard and Mountcastle (1964), which was well controlled and executed, showed that decortication of cats and dogs produced hyperactivity in their subjects. Other studies supporting the

organic view state that hyperactivity is due to cerebral cortex damage that occurs during birth (Menkes, Rowe, and Menkes, 1967).

The evidence for an organic etiology of hyperactivity is not entirely cogent, because many hyperactive children have no demonstrable cortex damage. Proponents of the organic view contend that there is damage, but it cannot be measured by present methods (Burks, 1960).

Some researchers feel that hyperactivity may be due to a genetic modification, or to a "maturational lag" on part of the central nervous system (Clements and Peters, 1962). A maturational lag is thought to be a deficiency in habitatory functions of the nervous system that have to do with checking and suspending verbal or motor activity until the incoming stimulus and sensory data are compared with the stored information.

It has also been found that hyperactivity can be induced by the prolonged use of drugs. Hippius found that drug treatments of mental illness produced hyperactivity (Hippius, 1966).

Werry and Sprague, in their review of the literature of hyperactivity, sum up the organic question in an effective manner. The earliest reports of hyperactive children regard hyperactivity as the direct result of some sort of physical damage to the cerebral cortex, particularly from encephalitis, trauma, or anoxia. Strauss, in

his description and explanation of hyperactivity, views it as a "hard" neurological sign sufficient to make the diagnosis firm of brain damage, even with the absence of any other neurological evidence. In the last twenty years terms such as minimal brain dysfunction and hyperkinetic syndrome have started to replace the more positive etiological term of brain-damage syndrome. Confusion occurs because of the misuse of the term brain damage for hyperactivity. This misuse of terms leads to the assumption that there is some form of organic etiology.

In a study by Gardner, Cromwell, and Foshee (1959), four groups of subjects classified as organic hyperactives were exposed to various conditions of increased and reduced distal stimulation. It was found that all groups showed significantly less activity under increased visual stimulation. The study was done in order to examine the hypothesis that hyperactivity results from increased distal stimulation. They found that all groups showed significantly less activity under increased visual stimulation than under reduced visual stimulation. The results were interpreted in terms of proximal versus distal stimulation. When the distal visual stimulation was great, the subject learned to make attention responses, but no gross motor responses. However, when the distal visual stimulation was decreased, the subject's attention shifted to the proximal visual



stimulation of the chair he was sitting on, clothing, or his own body. The subject learned to respond toward the proximal stimuli with gross motor movements. Thus the decreased distal visual stimuli increased the activity of the subjects. When reduced stimulation brought about an increase in the rate of activity, it was interpreted as an activity which involved a basic or a learned need for stimulation. Therefore when the exteroceptors were lacking stimulation, such as vision, the organism created his own stimulation proprioceptively by increasing the rate of his motor activity (Gradner, et al., 1959).

Along the more traditional interpretation, Silvano Arieti interprets hyperactivity in the child as

. . . when the phantasmic level is too difficult for the child to bear, several consequences may follow. He may escape again into the exceptional world and become hyperkinetic. He may also repress the images from consciousness perhaps by transforming them into endocepts. However, the effects of a too disturbing phantasmic level may not be easily kept in a state of unconsciousness. They may re-emerge, even much later, in dreams, schizophrenia, and states of intoxication [Arieti, 1967, pp. 82-83].

Presently the researchers, authors, clinicians, and psychiatrists who hold to various schools of thought and the empirical evidence being somewhat obscure and ambiguous make the etiology an issue which can be resolved only by more and better experimentation and better research design.

The diagnosis of hyperactivity has been approached with various methods ranging from neurological examinations, to electroencephalograms, to evidence from psychometry. Evidence from some electroencephalographic studies indicates a definite relationship between an abnormal electroencephalogram and hyperactivity (Burks, 1960, 1968). Other studies indicate that while there are conflicting evidences, the electroencephalograms are indispensable in aiding a diagnosis of a hyperactive child (Clements and Peters, 1967).

Some researchers have obtained evidence that the relationship between electroencephalogram (EEG) results and the incidence of behavior problems raises serious question as to the reliability of the EEG in diagnosing behavior problems such as hyperactivity. (Wood, 1967; Freeman, 1967). Werry and Sprague feel that

. . . medical-type assessments such as the electroencephalogram, neurological examination, and medical history are among the least helpful of all assessment procedures and should be kept to a minimum, except where there is suspicion of disease of the central nervous system requiring medical treatment excluding psychopharmacological drugs, the indications for which are not medical, but rather behavioral [Costello, 1970, p. 400].

Two of the main psychometric techniques that have been used in testing for hyperactivity are the Wechsler Intelligence Scale for Children and the Bender-Gestalt. Some of the subscales of the Wechsler Intelligence Scale for Children have been used to test for

organicity (Ogden, 1967). Another researcher, Burks, has tried to use the WISC with the EEG to diagnose hyperactivity (Burks, 1960). In Burks's study, one group of hyperactive children, with abnormal EEG's which were interpreted as indicating cortex damage, was compared with another group of hyperactive children with normal EEG's (there might have been possible brain damage in the lower parts of the brain, which the EEG did not test). A pattern was formed by the cortex-damaged group on the WISC, in that the group fell significantly low on five out of six of the verbal tests, while the normal group fell down in only one of the verbal tests (arithmetic). On the non-verbal tests both groups fell down on the coding subtests, which Burks interprets as being more like a verbal test than a performance test. Burks goes on to say that the test pattern or profile scores tend to "scatter" more for hyperactive children than for normal children. Also, according to Burks, if the verbal performance section of the WISC falls below normal, it would tend to indicate hyperactivity; and with an abnormal EEG, Burks feels that it would be a relatively good indicator of hyperactivity in children (Burks, 1960).

In a study by Woody (1967), it was found that the EEG and the behavior of a subject as identified on mental abilities test have a very questionable relationship. In a comparison of data from the WISC and the EEG, the results between the verbal scale and

performance scale I. Q. 's, along with the variance of the special subtests in a behavioral classification, were found questionable (Burks, 1968).

One study in particular has found the use of intelligence tests a valuable tool in diagnosing hyperactivity. In a twenty-five-year follow-up study, the intelligence tests were found to be an extremely valuable aid in a prognosis for hyperactive children who were clearly brain damaged. In this particular study, the subjects who had obtained an I. Q. above ninety were at the end of the twenty-five-year program self-supporting, with only one exception (Menkes, Rowe, and Menkes, 1967).

The Bender-Gestalt test can be used in the diagnosis of hyperactivity (Burks, 1960; Clements and Peters, 1962; Bender, 1938). If the hyperactivity of the child is due to organic damage to the cortex, the Bender-Gestalt is, with other tests, an aid in the confirmation of a diagnosis. However, the diagnosis of hyperactivity is not to be dependent upon the Bender-Gestalt alone (Pascal and Sutsell, 1951).

Clements and Peters developed a method for the detection of the minimal brain dysfunctions in school age children. The plan put forth was to make a careful medical history of the child with a specialized neurological examination, a psychological evaluation, and

an EEG. Clements and Peters felt that the omission of any one of these procedures would create the possibility of a blatant misdiagnosis and also a questionable treatment plan (Clements and Peters, 1962).

Although Clements and Peters may have clouded the etiological issues of hyperactivity by using the term minimal brain dysfunction interchangeably with the term hyperactivity, they did much to support the thought that hyperactivity must not be diagnosed solely on a neurological, psychological, or an EEG test.

Some researchers in their effort to find a better diagnostic tool used the mothers of the children as diagnosticians. This unique method was disclosed in an interesting study by Glidewell, Mensh, and Gilder, who found that there existed "a reliable and positive relationship between the frequency, duration, and severity of symptoms reported by a child's mother and the degree of sickness found in the child. The relationship permits one to use the mother's report as a screening instrument with more success than with most medical screening techniques [Glidewell, Mensh, and Gilder, 1957, p. 53]."

Ullmann and Krasner (1969) support the notion that labeling another person abnormal is a social behavior and social process. This viewpoint is also shared by numerous scientists, such as Scheff. Scheff has edited a book entitled Mental Illness: Social Processes.

which moves further toward understanding and accounts for abnormal behavior by the discernment of the intervention of the social variables in man's environment. Scheff puts forth the view that abnormal behavior (which would include hyperactivity) is whatever each society says is abnormal (Scheff, 1967).

Szasz supports this school of thought in this same book in his article, "The Myth of Mental Illness." He puts forth the view that what is considered mental illness (which includes hyperactivity) is merely a convenient myth which has long outlived its usefulness (Scheff, 1967). This is given greater impetus by Paul (1962) in his study of a mental disorder and the self-regulatory process in a foreign culture. Paul tells of a young girl, Maria, who had delusions of persecution, delusions of being dead, and hallucinations about spirits of the dead. Social intervention was necessary only because she could not function in her society and she created problems for that society. The difference in our society's attitudes and those of Maria's is not so much the actual means of acquiring her mental disorder, but the definition that her culture placed on the process of her mental disorder. It was the degree and abrupt switch in her deviation from normal, as determined by her culture, that resulted in social intervention by her relatives. The fact that Maria's culture had no hospitals in which to hide her or label her enabled Maria to

experience much less resistance to her re-entrance in society (Paul, 1962).

These studies point out that many times a diagnosis or label is applied because of the dictates of society. Society tends not to label a behavior abnormal until that behavior comes into conflict with the goals of society or some of its members.

These viewpoints are consistent with some of the research studies such as those of Patterson, Jones, Whittier, and Wright, whose conclusions were that very high rates of behavior are adverse to adults. Data collected by Patterson (1956) showed four child clinics where "hyperactivity" was one of the most common problems for which children were referred. The general hypothesis was that there is a curvilinear relationship between the activity level of the child and the acquisition of socially acceptable behaviors. Up to moderately high levels of activity, a child's behavior will elicit an increasing number of reactions from peers and adults in the culture. Assuming that these reactions are, by and large, positive, this should imply that the active child will acquire social skills at a faster rate than the less active child. It is further assumed that extremely high rates of behavior are aversive to the social culture; hence the reaction from the culture is more likely to be punitive. In this situation, the child operating at high activity levels may very well be

punished even when displaying socially acceptable behavior, e. g., friendliness. This higher ratio of punishment to reinforced behavior for the hyperactive child should result in his developing social behaviors at a slower rate (Patterson, 1956).

In a study by Davis (1962) it was stated that the prognosis and diagnosis of any functional or clinical entities, such as hyperactivity, are uncertain. One of the functions of a medical school is to teach the doctors how to cope with this uncertainty.

Because the experimental and empirical evidence is so very unclear for the diagnosis of a behavior such as hyperactivity, the more objective measure, such as a frequency or response rate, is rapidly gaining prominence as a dependent measure in the study of behavior. This has been developed into a method of observing the behavior of children in the elementary classroom, by Becker, Madson, Arnold, and Thomas (1967).

Werry and Quay (1969) made use of rate of response as a dependent measure. In their study a group of normal children and a group of children with behavioral problems were placed in a classroom situation. The frequency of each behavior was counted for each child. The evidence suggested that this method of direct behavioral observation is reliable and could be used to discriminate between the normal child and the emotionally disturbed child through



the use of rate count. The use of a frequency or rate count can yield information as to the nature of the maladjustment to school, when the problem is one of conduct. The use of rate count was shown to be a highly reliable index as to the efficiency of a special education program. Rate count can also serve as a sensitive dependent measure of various therapeutic manipulations.

The treatment of the hyperactive child typically yields results which are adequately summed up by Levitt's study of the results of psychotherapy on children. An evaluation was done on the results of psychotherapy with children. Levitt's findings were very similar to those obtained with adults by Eysneck, using what Levitt calls therapeutic eclecticism. Levitt (1957) points out that Eysneck found in his study that ". . . roughly two-thirds of a group of neurotic patients will recover or improve to a marked extent within about two years of the onset of the illness, whether they are treated by means of psychotherapy or not [p. 189]." Eysneck concluded further that "the figures fail to support the hypothesis that psychotherapy facilitates recovery from neurotic disorder [p. 189]." Levitt concluded, "the present evaluation of child psychotherapy, like its adult counterpart, fails to support the hypothesis that treatment is effective, but it does not force the acceptance of a contrary hypothesis [p. 194]." In another study, by Eisenbery, Gilbert, Cytryn, and

Molling (1961), using hyperactive and neurotic pediatric patients, it was found that only a 15 to 40 per cent improvement for the children with hyperkinetic syndrome was made.

It was the experimenter's objective to determine if the effectiveness of behavioral procedures produced rapid and demonstratable results to a greater extent than would have normally occurred in the environment without intervention. Recent studies using behavior modification techniques have been found to be highly effective in the treatment of behavioral problems in children. Many of the well controlled and well designed studies were carried out in the classroom.

One of behavior modification's main principles is the rewarding of the desired behavior with pleasant consequences and ignoring or not rewarding the undesired behavior, which is an unpleasant consequence.

The first step in setting up a behavior modification program is to identify the specific behavior to be changed. The teacher must think in such terms as "Johnny gets out of his seat too frequently" rather than "Johnny is hyperactive" (Greiger, Mordock, and Breyer, 1970).

The second step is the measurement of the specified behavior, the rate of occurrence in a given amount of time. This measurement is usually referred to as baseline. Baseline is the rate of a behavior--

how often it occurs in a given amount of time under a given set of conditions. For example, how often in a one-hour time period does a child get up from his seat?

Setting up consequences for the specified behavior is the third step. The consequences are of two types: pleasant and unpleasant. An unpleasant consequence should immediately be made to follow the undesired behavior that was emitted, as well as a pleasant consequence following immediately an appropriate response. This is done so that the child can associate his appropriate behavior with reward, positive reinforcement, and his inappropriate behavior with nonreward, negative reinforcement (Whaley and Malott, 1971).

"Any state of affairs that, following a response, serves to increase the rate of responding may be a positive reinforcer [Wolpe, 1970, p. 220]." This means that the positive reinforcement used must be determined for each child.

The fourth step in this behavior modification program is evaluation. Evaluation is made by looking at the rate of behavior that was measured initially and the rate of behavior after treatment and noting any changes made. This is imperative to see if the method being used or the reinforcers being used are effective.

In the study of Merchenbaum, Bowers, and Ross (1968), it was shown that behavior modification techniques produce results. A

group of institutionalized girls demonstrating a high frequency of inappropriate classroom behavior was compared with a group of non-institutionalized peers in terms of rate of inappropriate classroom behaviors. It was found that the institutionalized girls performed significantly less appropriately than the non-institutionalized girls. After three weeks of treatment using behavior modification techniques, namely a secondary reinforcer of money, the institutionalized girls were performing on a level comparable to that of the non-institutionalized girls in terms of the frequency of appropriate classroom behaviors.

Behavior modification techniques have been found to be effective, not only with institutional groups but also with individuals. In a study by Walker and Buckley (1968) a single individual was used with positive reinforcement to condition attending behavior in the classroom. At the start of the study, the subject was exhibiting only thirty seconds of appropriate behavior. Once these behaviors were under control, procedures were used to maintain and to have this behavior generalize outside of the experimental setting.

Behavior modification techniques have also been found to be effective with deprived school children, as well as with institutionalized children's groups and individual children in the classroom. Wasik, Senn, Welch, and Cooper (1969) used two children from culturally deprived environments. A behavior modification technique of

positive reinforcement (attention and approval), contingent upon desirable classroom behavior, with a time-out procedure (no reinforcement), contingent upon aggressive and resistive behaviors, was used. The results were that the desirable behaviors increased and remained high for both girls, even after a three-month follow-up. The Wasik, Senn, Welch, and Cooper study is important in that it shows that culturally deprived children respond to the same contingencies that have been shown to operate with other children.

Time-out reinforcement procedures were used by Bostow and Bailey (1969) in much the same way as in the Wasik, et al. study to modify the behavior of retarded patients in a state hospital. The procedures used were time-out for disruptive and aggressive behaviors and reinforcement for their appropriate behaviors. These procedures lowered the rate of loud verbal behavior to a near-zero level. Upon removal of the time-out and reinforcement procedures, the aggressive, disruptive, and loud verbal behaviors returned to their original high rates. When these procedures were again reinstated, the subjects reduced their behavior to a near-zero level again. Bostow and Bailey's (1969) study demonstrates that behavioral procedures succeed even on a long-standing behavior, using retarded subjects, without greatly disturbing the normal work routine.

Krop (1971), combining various facets of all of these previous studies, used a brain-damaged, emotionally disturbed, mentally retarded, hyperactive child to shape the attending behavior. Krop applied operant conditioning procedures to shape the attending behavior of the hyperactive child. Krop used an occupational therapist to give both primary and secondary reinforcement contingent upon non-hyperactive behavior. The results were a significant reduction of the hyperactivity after treatment. The reduction was maintained after a four-week post-check.

Another operant procedure that has been proved effective in modifying hyperactive behavior is the use of token reinforcement systems. A study by Ryback and Surwit (1971) used parents as sub-professionals to treat hyperactive children. In this study it was demonstrated that personnel other than psychologists could be used with success in the treatment of hyperactivity. Ryback and Surwit's study increased the range of possible applications by using parents. The parents used token reinforcement to increase the academic motivation and achievement. A token was given for desired behavior; then the tokens that were earned by the children were exchanged for privileges or gifts. It was concluded from their study that it was possible for parents, trained in behavioral

procedures such as token reinforcement, to condition into hyperactive children academic motivation and achievement.

Quay, Sprague, Werry, and McQueen (1967) used both primary reinforcement and secondary reinforcement in the conditioning of hyperactive children. The primary reinforcement was candy, and the secondary reinforcement was social praise. It was demonstrated that the value of behavioral methods on groups had great importance and wide application for use in the classroom. A group of aggressive and hyperactive children were used to condition an increase in visual orientation toward the teacher during the time the teacher was reading a story. After a baseline was established, whenever one of the hyperactive children looked at the teacher for a full ten seconds while she was reading a story to them, a light from a box attached to the desk of the student flashed, and the primary reinforcement of candy or the secondary reinforcement of social praise was given immediately. The study proceeded by using only the primary reinforcement, candy, which increased the mean rate significantly. Next, the secondary reinforcement, praise, was added. This produced a mean increase which was significantly greater than that of primary reinforcement alone. During the extinction phase, the mean rate dropped greatly. The authors concluded that behavioral methods could be applied to groups of hyperactive

children with significant results and that secondary reinforcement, social praise, combined with primary reinforcement, such as candy, produced better results than if either method were used exclusively.

The preceding studies are only a few which demonstrate that the use of behavioral techniques have been found to result in more immediate changes in behavior than various other forms of psychotherapy (Wolpe, 1969; Wetzel, 1971).

The following study is an investigation as to the effectiveness of peer, monetary, and verbal reinforcement of a hyperactive child.

## Method

### Subject and History

The subject was a first-grade child who had been diagnosed as hyperactive by a local psychiatrist. The subject was a seven-year, four-month-old male of dull normal to average intelligence as defined by the Weschler Intelligence Scale for Children. The subject was, since the age of three, living intermittently with his parents and with an aunt. From the limited medical and developmental history, it was noted that the mother's health was good during her pregnancy. No information was available about the delivery or birth weight. No



developmental history was known except that toilet training was accomplished at approximately two years of age. The subject experienced periods of relapse of enuresis until the age of four. The subject was hospitalized before the age of two for "choking and fever." At the age of five the subject was put under the custody of the aunt and uncle.

The subject was talking very little until a year following this guardianship. After the subject started talking, it was noted that there were problems with his speech. The subject's brother, who is a year older and an average student, also did not speak for about a year. Upon questioning by the aunt and uncle, it was discovered that both had been severely abused physically a great number of times. The father was described as having had difficulties with chronic alcoholism and difficulties with an explosive temper.

The subject was tested by the Psychological Services of the Dallas Independent School District the previous year because of "hyperactive" behavior in the classroom. During testing it was reported that the subject was immature due to his lack of abilities to concentrate on and invest in tasks over a period of time. Also, he was seemingly quite unsure of himself and sought feedback from the examiner frequently as to the accuracy of his responses. In the observation of the problem-solving behavior by the examiner, it was

noted that the subject attacked the problem with concentrated effort. When the subject appeared involved in a problem, he would become less restless. When the subject started to experience any form of failure, it was also noted that he became "hyperactive." It was also noted during testing that the subject dragged his heel slightly when walking. When this was brought to the subject's attention, the subject picked up his feet and walked more normally; but the subject fell at one time while walking around a corner.

The examiner observed that while the speech was easily understandable, there was a slight difficulty in the speech.

The tests given to the subject included the following:

TABLE I

PSYCHODIAGNOSTIC EXAMINATION RESULTS

<u>Test</u>	<u>Results</u>
<u>Stanford Binet Intelligence Scale</u>	
Form L-M . . . . .	I.Q. 91 Average
<u>Wechsler Intelligence Scale for</u>	
<u>Children</u> . . . . .	Verbal Scale I.Q. 84
	Performance Scale I.Q. 101 Average
	Full Scale I.Q. 91 Average
<u>Hutt Briskin Revised Bender</u>	
<u>Gestalt</u> . . . . .	Below maturational norms. Equivalent to five-year old

TABLE I (Cont'd)

<u>Test</u>	<u>Results</u>
<u>Illinois Test of Psycholinguistic</u> <u>Abilities</u> . . . . .	Psycholinguistic age 6.6 Auditory association age 5.3 Auditory sequential memory age 5
<u>Harris Test of Lateral</u> <u>Dominance</u> . . . . .	Adequate knowledge of left and right Hand preference left Eye and foot preference right

The overall intellectual functioning, as demonstrated on the Wechsler Intelligence Scale for Children and on the Stanford Binet Intelligence Scale, was in the low-average range. Verbal abilities fell in the dull normal range, while the non-verbal abilities fell within the mid-average range. It was felt that the subject's verbal potential was much better than was measured, because of the subject's restless behavior, which was detrimental to his performance. In the verbal performance the subject, according to the examiner, demonstrated a near-average fund of factual information, but his range of ideas and his knowledge as to the meaning of words were very much underdeveloped. The subject's verbal expression abilities were also very much underdeveloped. The subject's ability to use judgment in response to practical everyday type of problems was found to be adequate, even though the subject had a tendency to rely on others for

aid in the solving of a problem. The subject was found to possess a good ability to generalize and to form various verbal comparisons. With numerical reasoning, which employed blocks or other concrete, tangible stimuli, the subject experienced no difficulty. With numerical reasoning which involved mental calculation there was difficulty.

The Harris Test of Lateral Dominance showed that the subject had an adequate knowledge of left and right. The hand preference was left, whereas the eye and foot preference was right.

In the non-verbal area, the subject was able to organize and work toward an unknown goal. The visual skills along with speed and coordination skills were found to be adequate, as well as his skills to integrate part-whole relationships on puzzle-like tasks.

His performance on the Bender Gestalt designs indicated immature visual-motor perception. His ability on the Illinois Test of Psycholinguistic Abilities showed that all visual-motor and auditory-vocal areas were adequate. An electroencephalogram (EEG) was also given and was interpreted as showing possible brain damage present.

The subject exhibited behavior patterns which the school staff and the guardians considered to be interfering with the progress of development. The behavior exhibited included an almost constant movement of his body, even while seated. He would sit on the side of his chair, wrap limbs around the legs of the chair. The subject

constantly emitted very frequent, loud, and irritating remarks that were often irrelevant. This verbal behavior produced a conflict with both adults and peers. On the playground he was in a constant state of conflict with peers, which usually resulted in physical confrontation.

Due to the subject's constant movement, academic work was rarely completed. His constant movement also interfered with the ability to concentrate, or to listen to a verbal set of instructions. Academic work showed attempts which, according to the teacher, were impulsive and unplanned.

### Apparatus

The apparatus used in this study consisted of a red light mounted on a 6 X 6 X 1-inch section of wood and controlled by the experimenter through the use of a switch. This light was placed on a desk in front of the subject. A chair was placed beside the subject to hold a plastic receptacle for the secondary reinforcer, pennies.

### Procedure

The behavior to be changed was the amount of time the subject remained seated properly. The dependent measure was observing each fifteen seconds to see if the child fulfilled all of the following conditions;

- a. Posterior on the bottom of the chair.
- b. Facing forward or toward the teacher.
- c. All four legs of the chair on the floor.

If all the above criteria were satisfied, a tally was made.

Observation was made every fifteen seconds for a period of thirty minutes from 10:00 to 10:30 a. m. , Monday through Friday, in a public school classroom.

The experiment consisted of a sequence of four periods. The baseline period was first in order to determine the rate of appropriate behavior, meeting the specified conditions of the dependent variable. This behavior was counted at fifteen-second intervals.

The reinforcement period began with the subject being reinforced for each appropriate behavior as defined by the dependent variable. The first form of secondary reinforcement was that of pennies. A red light was flashed; the subject then had to meet the criteria of the dependent measure for fifteen seconds. The light would flash again, signifying the end of the fifteen-second interval. At this time, if the subject had met the criteria, a penny would be immediately placed in the plastic container beside the subject's chair. After this had been done a number of days, the reinforcement was then withdrawn.

Next, the secondary reinforcer of pennies, given in the same manner as before, was paired with another secondary reinforcer, that of peer reinforcement. This peer reinforcement was in the form of encouragement from the peers in the class for the subject to "be good." This encouragement was brought about by telling the peers in the class that for every ten pennies the subject received, they would receive one. The reinforcement was again withdrawn and the behavior allowed to revert to the level of the baseline behavior.

The reinforcement from the subject's peers only came next. This reinforcement consisted of encouragement before and after class by his peers and a phrase such as "you're doing good," or the word "good" during the class. The reinforcement was withdrawn, and the behavior as defined by the dependent variable was allowed to revert to the level of the baseline behavior.

Another form of secondary reinforcement, known as verbal reinforcement, was added to the monetary and peer reinforcers. The verbal reinforcement was the word "good" or "very good," said to the subject by the experimenter at each fulfillment of the criteria of the dependent variable, as well as a peer saying "good." This was in addition to a penny being placed in the plastic container beside him

Again, the subject was allowed to revert to the baseline behavior.

Finally, the verbal reinforcement alone, in the form of "good" or "very good," was given to the subject after each correct response as defined by the dependent variable.

The reversal period consisted of letting the dependent measurement recede to the baseline level after each type of reinforcement was withdrawn. This was done in order to demonstrate the effectiveness of each reinforcement variable. The return to the reinforcement period each time was done to discover the level of effectiveness of the independent measures upon the dependent measure.

### Results

The mean per cent of appropriate behavior with each independent variable, along with the baseline, is shown in Table II. The method used for calculation of the level of effectiveness of the dependent variable was as follows: total per cent of appropriate behavior for five days / total possible per cent for five days. The effectiveness of the various independent variables was measured by the degree of appropriate behavior as defined by the dependent variable.



TABLE II  
MEAN PER CENTS OF APPROPRIATE AND INAPPROPRIATE  
BEHAVIORS

	Baseline	Monetary	Monetary plus Peer	Peer	Monetary plus Peer plus Verbal	Verbal 1st	Verbal 2nd
Mean Per Cent of Appropriate Behavior	15	39	68	56	72	59	64

By examination of Table II it is evident that the subject's appropriate behavior was the lowest during baseline. The subject only met the conditions of the dependent variable an average of 15 per cent of the total possible time.

The use of only monetary reinforcement was found to be the least effective reinforcement procedure of any of the tested secondary reinforcers in bringing about the desired behavior. A mean per cent of only 39 per cent of all possible appropriate behavior was found.

The use of monetary combined with peer reinforcement produced a greater effectiveness than that of the monetary reinforcement alone. This use of both monetary and peer reinforcement produced

a mean per cent of 68, whereas the monetary reinforcement alone produced only a mean per cent of 39.

The use of both monetary and peer reinforcement together produced a slightly greater effectiveness than that of the second period of verbal reinforcement. This mean per cent was 64, as compared with the latter of 68 per cent. The use of both monetary and peer reinforcement together produced an even greater effectiveness than the effectiveness of the first period of verbal reinforcement. In this procedure a mean per cent of 59, compared with the other of 68.

The use of both monetary and peer reinforcement together produced a greater effectiveness than the effectiveness of the peer-only reinforcement, which was found to have a mean per cent of 56, compared with 68.

The use of only peer reinforcement produced better results than the reinforcement procedures of money alone. It produced less effective results than the reinforcement procedures of monetary, peer, and verbal reinforcements in combination, than monetary paired with peer reinforcement, and than either period of verbal reinforcement.

The use of monetary, peer, and verbal reinforcement combined was found to be the most effective in producing the highest mean

per cent of appropriate behavior as defined by the dependent variable.

The use of verbal reinforcement in the first period produced better results than reinforcement procedures of only monetary or only peer, but less effectiveness than the reinforcement procedures which used monetary and peer reinforcement together, or monetary peer, and verbal reinforcement together.

The second period of verbal reinforcement was also found to be more effective than the first period of verbal reinforcement. It was also found to be more effective than the reinforcement techniques which use only monetary or only peer reinforcement, or the first period of verbal reinforcement.

The method used for calculation of the dependent variable in Figures 1 through 7 was as follows: number of correct responses / total possible number of correct responses. By examination of Figure 1, it is evident that the quantity of appropriate behavior that occurred during the initial day due to reinforcement was highest with the monetary, peer, and verbal reinforcement combinations. In comparing Figure 1 with Figure 4, it is evident that peer-only reinforcement is less effective in reinforcing appropriate behavior than is monetary, peer, and verbal reinforcement in combination. In comparing Figure 1 with Figure 2, it is evident that monetary

reinforcement alone is less effective in bringing about appropriate behavior than are monetary, peer, and verbal reinforcement in

Per Cent of  
Appropriate  
Behavior

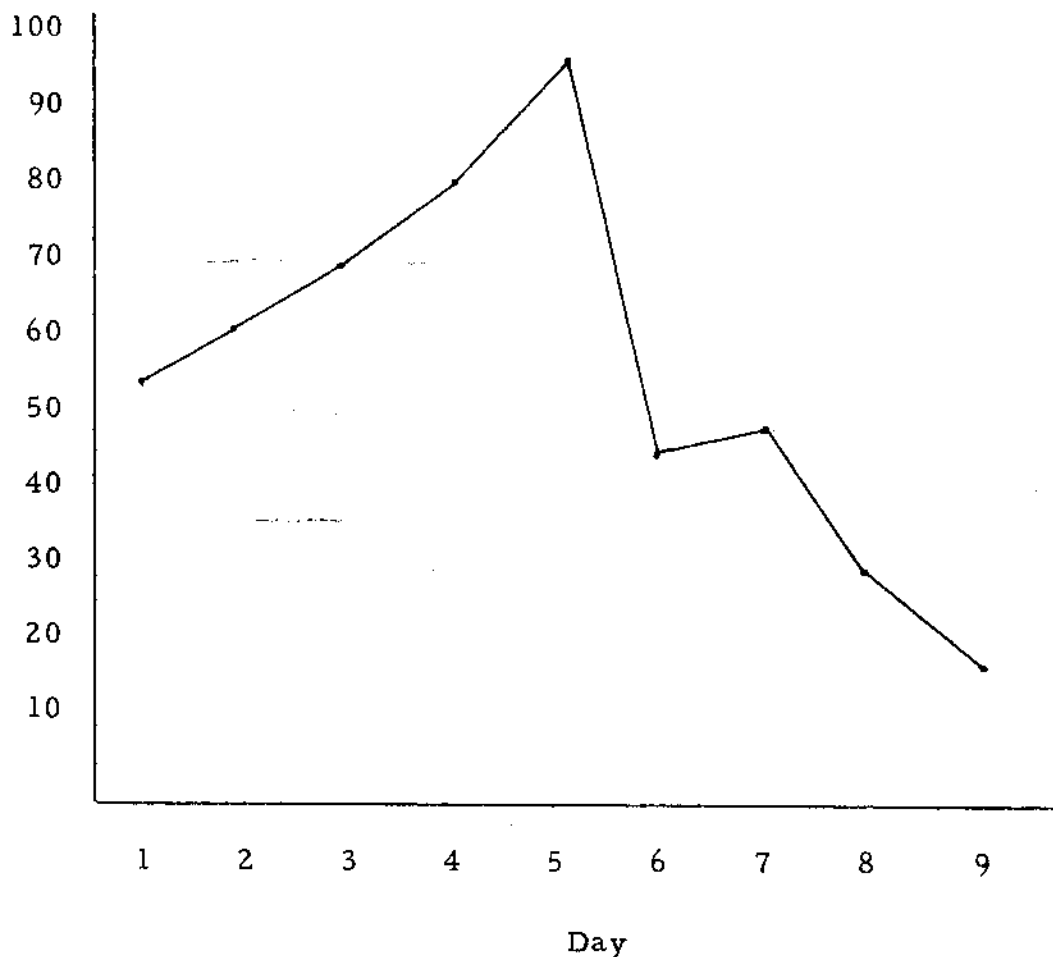


Fig. 1--The effectiveness of monetary, peer, and verbal reinforcement.

combination. In comparing Figure 1 with Figure 5, it is evident that verbal reinforcement alone is less effective in bringing about appropriate behavior than are monetary, peer, and verbal.

The lowest in the magnitude of appropriate behavior was found to be with the monetary reinforcement alone, as shown in Figure 2.

Per Cent of  
Appropriate  
Behavior

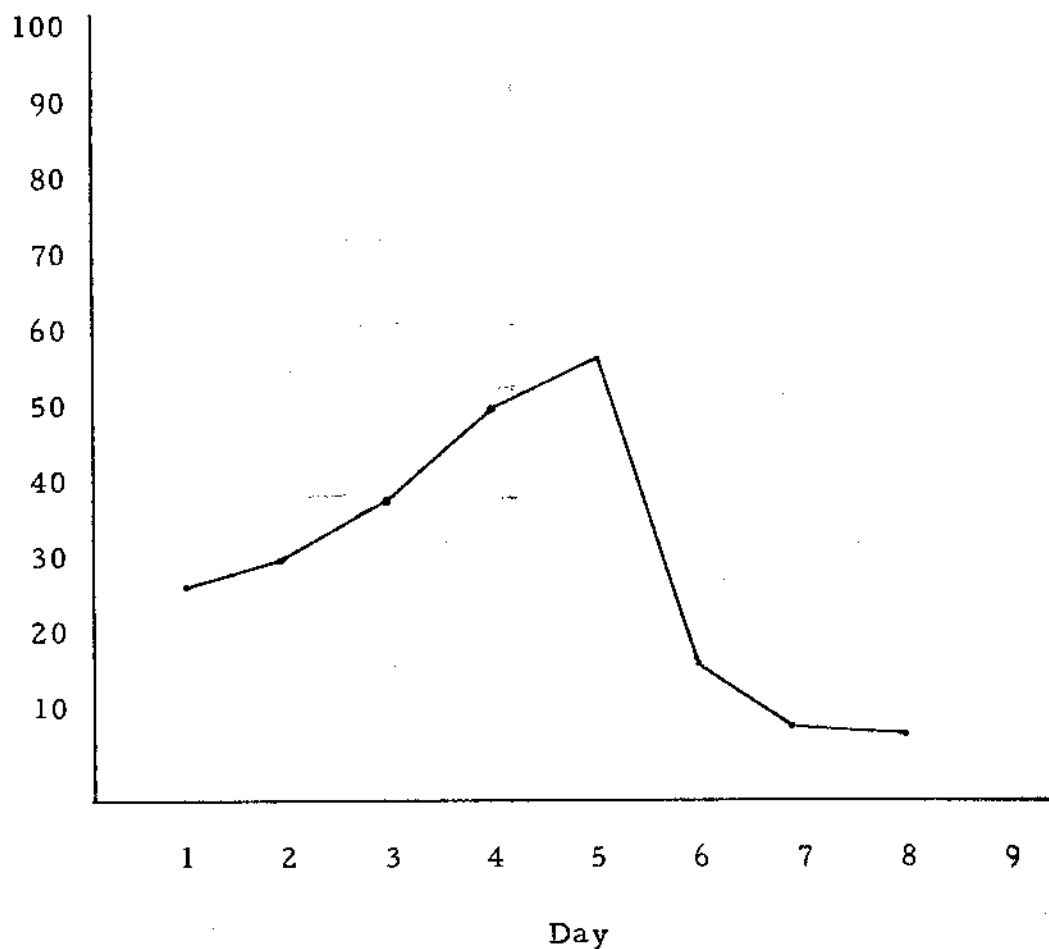


Fig. 2--The effectiveness of monetary reinforcement alone.

In comparing Figure 2 with Figure 1, it is evident that the addition of verbal reinforcement in combination with monetary and

peer reinforcement produced a much higher rate of appropriate behavior than did reinforcement involving money only.

By examination of Figure 3, it is evident that the monetary and peer reinforcement combination was found to be higher in amount of appropriate behavior that occurred during the initial day than

Per Cent of  
Appropriate  
Behavior

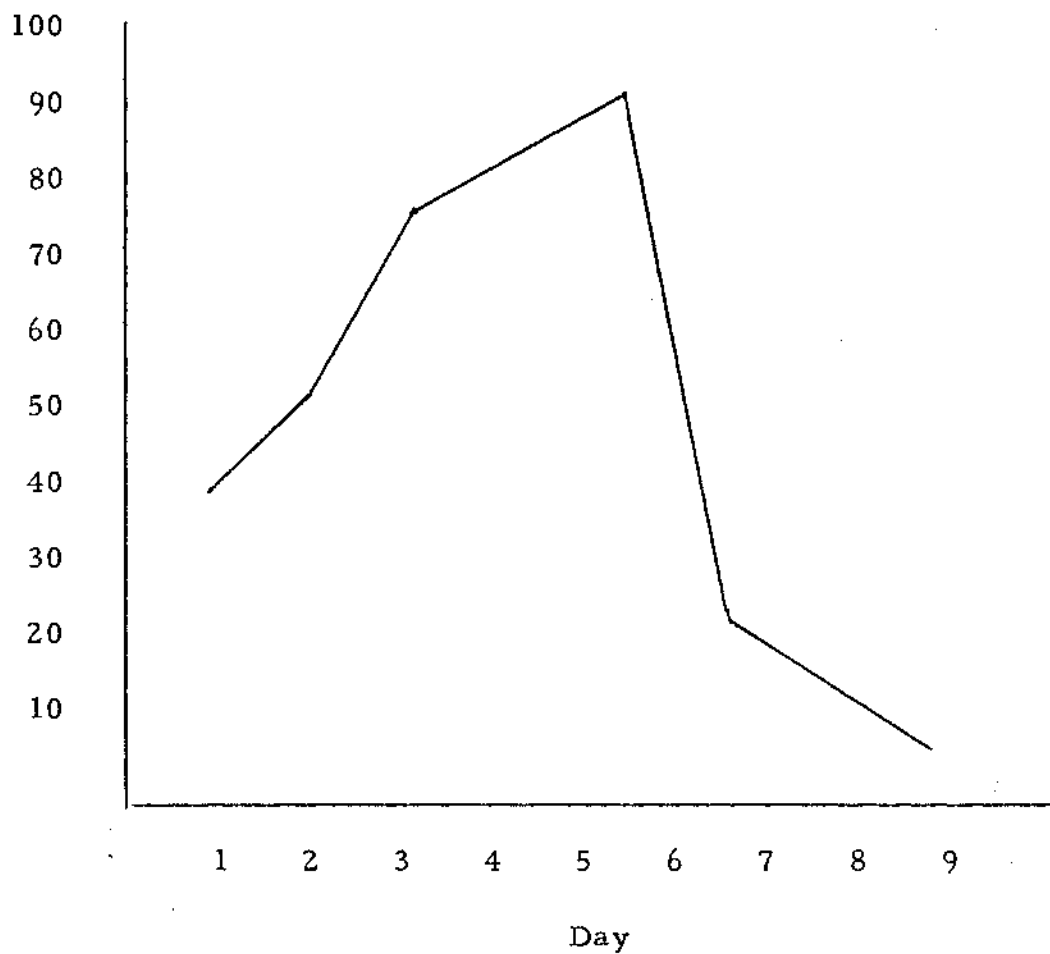


Fig. 3--Effectiveness of monetary and peer reinforcement paired.

either period of verbal reinforcement, as well as higher than the monetary-only form of reinforcement. The monetary and peer combination of reinforcement was found to be lower in amount than the monetary, peer, and verbal combination of reinforcement or the peer-only form of reinforcement.

Examination of Figure 4, effectiveness of peer reinforcement only, shows that it is evident that the amount of appropriate behavior that occurred during its initial day of onset was 42 per cent.

In comparing the effectiveness of peer reinforcement alone (Figure 4) with the effectiveness of monetary and peer reinforcement (Figure 3), it is evident that the amount of appropriate behavior that occurred during Figure 4's initial day was at a higher level than that which occurred during Figure 3's initial day.

Examination of Figure 1, monetary, peer, and verbal reinforcement, shows that the amount of appropriate behavior that occurred during the initial day was 52 per cent.

Comparing Figure 4, peer-only reinforcement, with Figure 1, monetary, peer, and verbal reinforcement, it is evident that the monetary, peer, and verbal combination produced a higher level of appropriate behavior during the initial day for the reinforcer.

Upon examination of Figure 5, effectiveness of the first verbal reinforcement period, it is seen that the quantity of

appropriate behavior that occurred during the initial day was 32 per cent. In comparing Figure 5 with Figure 1, it is evident that the

Per Cent of  
Appropriate  
Behavior.

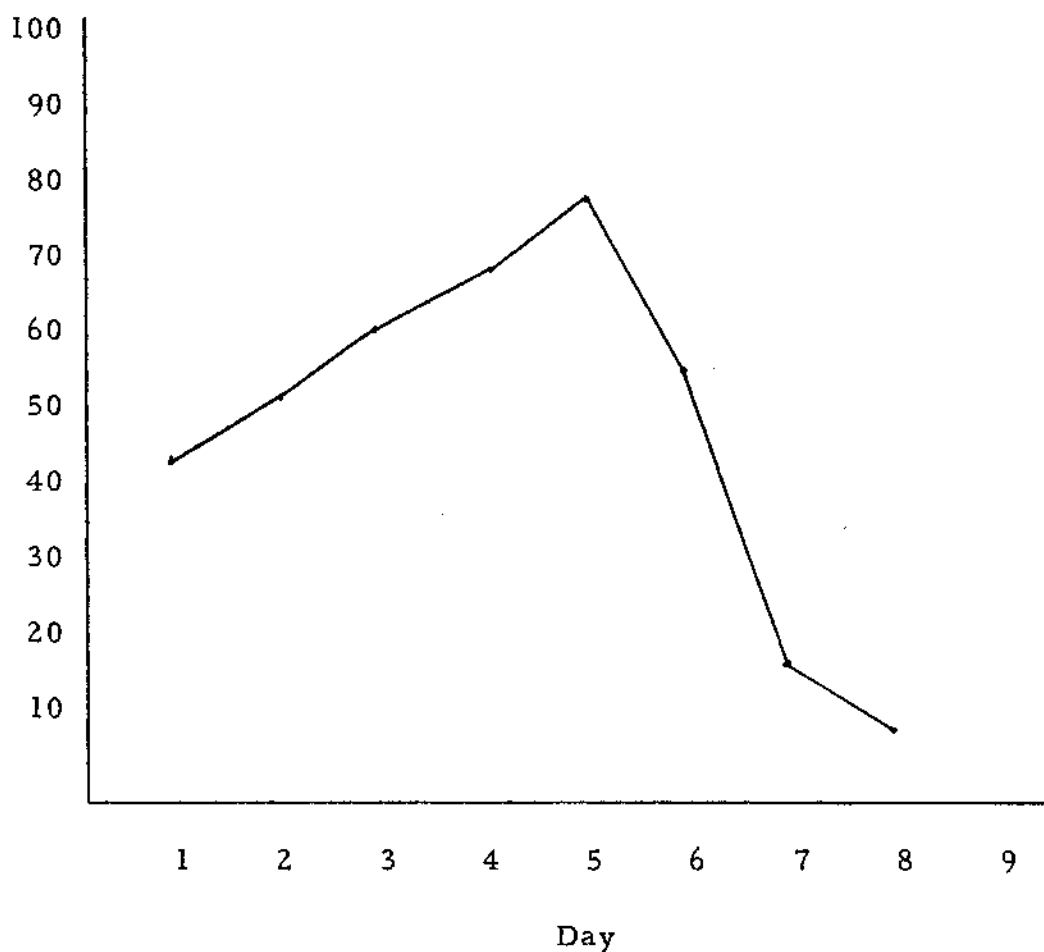


Fig. 4--The effectiveness of peer reinforcement alone.

monetary, peer, and verbal combination form of reinforcement is more effective in bringing about more appropriate behavior on the initial day of reinforcement. In comparing Figure 5 with Figure 2,



effectiveness of monetary reinforcement only, it is evident that Figure 5 shows greater effectiveness than does Figure 2 in establishing more appropriate behavior on the initial day.

Per Cent of  
Appropriate  
Behavior

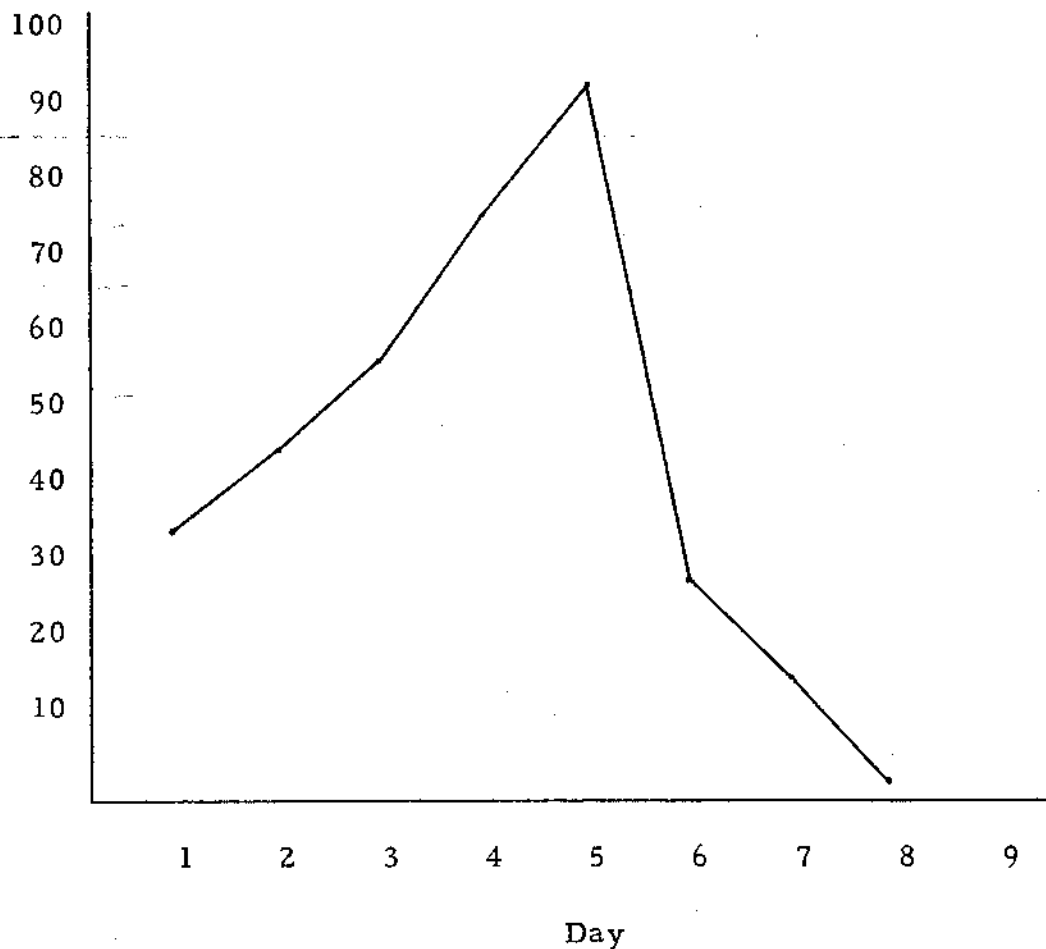


Fig. 5--The effectiveness of the first verbal reinforcement.

After examination of Figure 6, effectiveness of second verbal reinforcement, it is evident that the quantity of appropriate

behavior that occurred during its initial day was 37 per cent. In comparing this with the other five figures, it is evident that this period

Per Cent of  
Appropriate  
Behavior

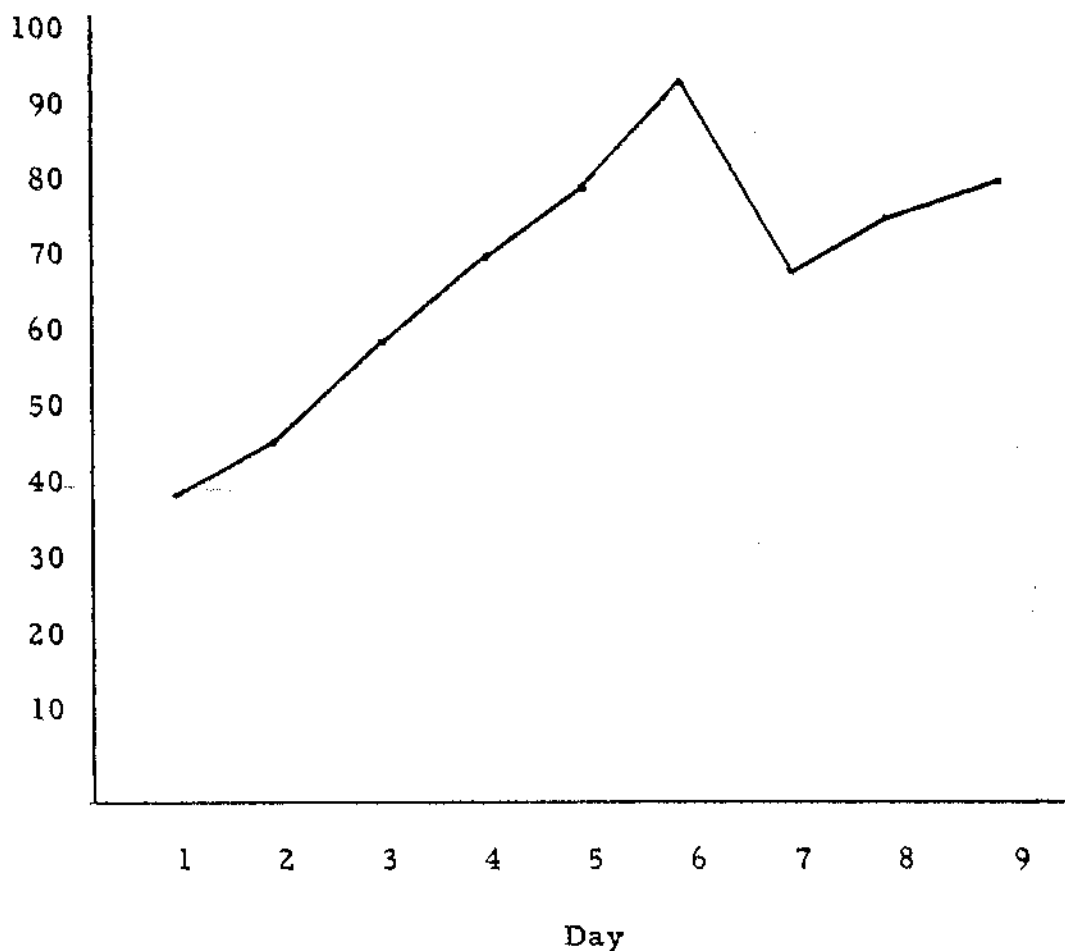


Fig. 6--The effectiveness of the second verbal reinforcement.

of verbal reinforcement shows a greater effect on the appropriate behavior than do the periods shown in Figures 5 or 2, but less than those shown by Figures 1, 3, and 4.

Upon examination of the baseline, Figure 7, it is evident that the magnitude of appropriate behavior that occurred was below that of any reinforcer or combination of reinforcers used.

Per Cent of  
Appropriate  
Behavior

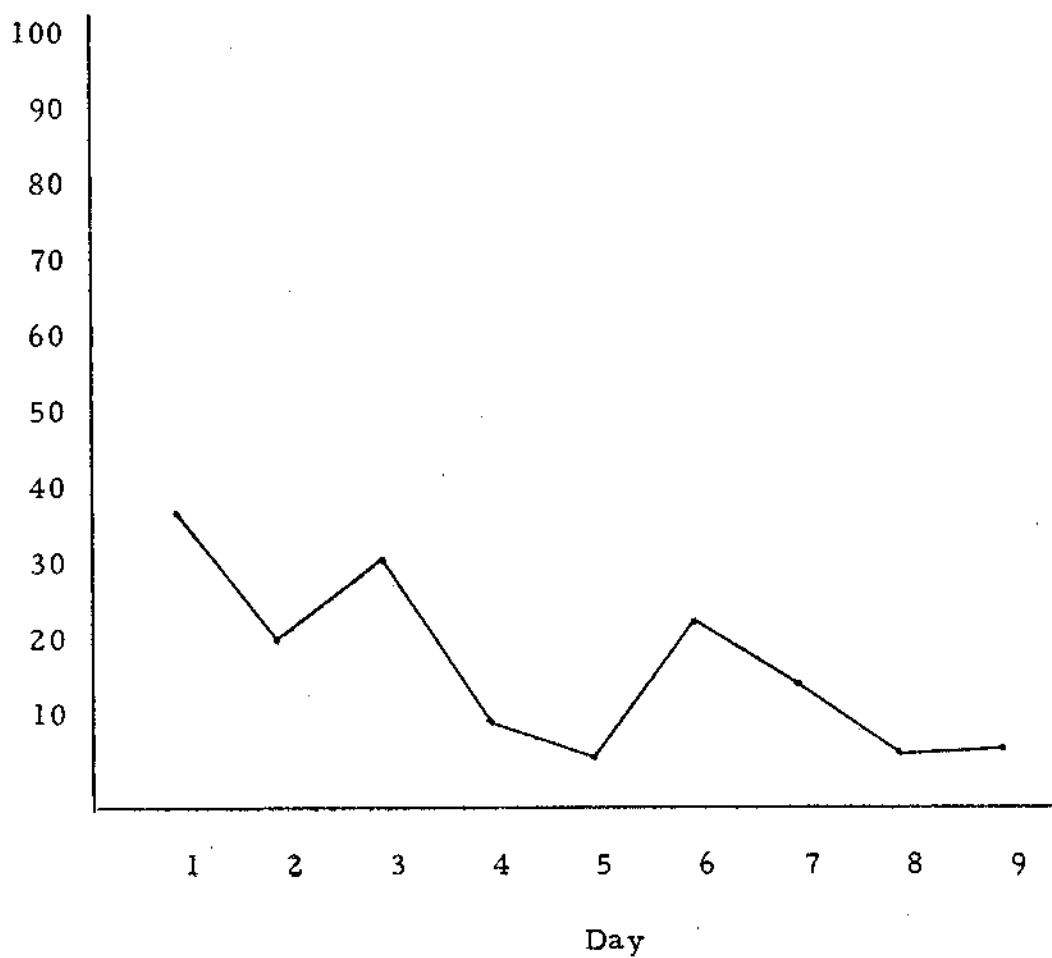


Fig. 7--Baseline

### Discussion

The purpose of this study was to investigate the effectiveness of various secondary reinforcers. As this study was explorative, there were no hypotheses made.

Several interesting results were found in this study.

Results indicated the following: (1) Peer reinforcement was more effective than was monetary reinforcement. (2) Monetary reinforcement alone was the least effective reinforcer. (3) Monetary, peer, and verbal reinforcement combined was the most effective reinforcer. (4) Verbal reinforcement alone or paired with some other form of reinforcement produced a higher level of appropriate behavior than any reinforcer used alone.

The results obtained in this study were not as high as those obtained by Hall, Lund, and Jackson (1968). Hall, Lund, and Jackson, using operant techniques, obtained a 5 to 20 per cent level of inappropriate behavior after treatment. A study by Madsen, Becker, and Thomas (1968), using operant techniques, obtained a 15.1 per cent level of inappropriate behavior in a classroom after treatment. The present study obtained, at the maximum level of effectiveness, a 28 per cent of inappropriate behavior after treatment.

Peer reinforcement was found to be a more effective reinforcer than was monetary reinforcement. In a study by O'Leary and Becker (1967), a token reinforcement was put into effect in a classroom. It was found that the inappropriate behaviors decreased from 76 per cent to 10 per cent during the reinforcement period. In the present study, during the token reinforcement period, inappropriate behaviors decreased from 85 per cent to 62 per cent (see Table II). The finding that peer reinforcement was more reinforcing than was the monetary reinforcement could be explained on the basis of deprivation. The subject, due to his aggressive behavior on the playground and in the classroom, was avoided by almost all other children. When the peer reinforcement was initiated, the subject quickly came under stimulus control of peer reinforcement, as shown by the rate of the appropriate behavior and the level that was obtained when the effectiveness of monetary reinforcement alone (see Figure 2) is compared with the effectiveness of peer reinforcement alone (see Figure 4). In a study by Kuypers, Becker, and O'Leary (1968), a token system used in a classroom failed due to a lack of social reinforcement being emitted by the teacher. A possible explanation of the monetary reinforcement being the least effective (see Figure 2) is that all of the other reinforcers involved some form of social reinforcer. The combination of monetary and peer reinforcement

involved the social reinforcer of the peers' encouragement for the subject to earn as much money as possible, which would enable them to earn a penny for every ten pennies he earned. The peers would receive pennies contingent upon appropriate behavior of the subject. This was reinforcing for the peers and increased the probability of them reinforcing the subject for appropriate behavior. This was reinforcing for the subject because of his prior deprivation schedule of reinforcement from his peers. Therefore, this peer encouragement was a powerful source of social reinforcement. In a study by Buehler, Patterson, and Furniss (1966), it was found that peer reinforcement was one of the strongest reinforcers occurring naturally in a classroom.

In another study, by Kounin, Frieson, and Norton (1966), it was found that peer reinforcement was one of the most valuable in managing problem children. It was noted in this study, during the peer reinforcement paired with monetary reinforcement period, that the subject's rate of daily fights on the playground dropped to less than weekly, and ceased altogether before the end of the school year.

Kuypers, Becker, and O'Leary (1968) found that a token system could be designed to enable the social reinforcers to become more effective as a controlling agent. At the point where the social reinforcers gain stimulus control of the organism, the token system

can then be removed. It was emphasized that without the social reward paired with the token reward, the token system could not be so effective or lasting. The findings by Kuypers, Becker, and O'Leary (1968) did much to explain the high degree of effectiveness of the monetary, peer, and verbal reinforcement by producing the largest quantity of appropriate behavior.

In a group of studies by Toews (1969), verbal reinforcement and social reinforcement were paired for use in the classroom to modify various behaviors. These reinforcements were found to be effective for both group and individual subjects in increasing the amount of appropriate behavior. In another study, by Zimmerman and Zimmerman (1962), verbal reinforcement was used in a classroom to increase the rate of correct responses of problem children.

In a study by Thomas, Nielsen, Kuypers, and Becker (1970), verbal reinforcement was paired with social reinforcement. It was found that gross motor movements of a problem child were reduced from 34.5 per cent to 6.9 per cent. In the present study the results were similar in that the subject's gross motor movements were reduced from 85 per cent to 36 per cent, by use of verbal reinforcement alone. A possible explanation for the effectiveness of verbal reinforcement used in this study was the consistent application of the verbal reinforcement.

Deese and Hulse (1967) pointed out that effectiveness of a reinforcement can be measured by such things as the amplitude of response. The results of this study demonstrated that the amplitude achieved for each independent variable on the initial day correlated directly with the mean per cent of appropriate behavior for that particular reinforcement.

The use of behavioral or operant techniques used in this study produced rapid and demonstratable results that would not have normally occurred in the environment without intervention, if studies such as Levitt (1957) are to act as a reference point.

The findings of this study suggested that there are, contained within the classroom, effective reinforcers that can be used in a classroom to modify behavior without changing the normal teaching activities.



## REFERENCES

- Bard, P. & Mountcastle, V. B. Some forebrain mechanisms involved in expression of rage with special reference to suppression of angry behavior. In P. L. Isaacson (Ed.), Basic readings in neuropsychology. New York: Harper & Row, Publishers, 1964.
- Bender, L. A visual motor gestalt test and its clinical use. New York: American Orthopsychiatric Association, 1938, 149.
- Bostow, D. E. & Bailey, J. B. Modification of severe disruptive and aggressive behavior using brief timeout and reinforcement procedures. Journal of applied behavior analysis, 1969, 2(1), 31-37.
- Buehler, R. E., Patterson, G. R. & Furniss, J. The reinforcement of behavior in institutional settings, 1966. Cited by D. H. Meichenbaum, K. S. Bowers, & R. R. Ross, Modification of classroom behavior of institutionalized female adolescent offenders. Behavior research & therapy, 1968, 6, 343-353.
- Burks, H. F. The hyperkinetic child. Exceptional children, 1960, 27, 18-26.

- Burks, H. F. Issues in school psychology. Journal of school psychology, 1968, 6(4), 284-292.
- Clements, S. D. & Peters, J. E. Minimal brain dysfunction in the school-age child. Archives of general psychiatry, 1962, 6, 185-197.
- Costello, C. G. (Ed.) Symptoms of psychopathology: A handbook. New York: John Wiley & Sons, Inc., 1970.
- Davis, F. Uncertainty in medical programs: Clinical and functional. In B. H. Stoodley, Society and self. New York: The Free Press, 1962, 174-184.
- Eisenberg, L., Gilbert, A., Cytryn, L., & Molling, P. A. The effectiveness of psychotherapy alone and in conjunction with perphenazine or placebo in treatment of neurotic and hyperactive children. American journal of psychiatry, 1961, 117, 1088-1093.
- Kounin, J. S., Frieson, W. V., & Norton, A. E. Managing emotionally disturbed children in regular classrooms. Cited in R. Grieger II & J. B. Mordock, General guidelines for conducting behavior modification programs in public school settings. Journal of school psychology, 1970, 8(4), 259-265.

- Freeman, R. D. Special education and the electroencephalogram: Marriage of convenience. Journal of special education, 1967, 2, 61-73.
- French, G. M. & Harlow, H. F. Locomotor reaction decrement in normal and brain-damaged phesus monkeys. Journal of comparative physiological psychology, 1955, 48(4), 496-501.
- Gardner, W. I., Cromwell, R. I., & Foshee, J. G. Studies in activity level: II. Effects of dital visual stimulation in organics, familials, hyperactives, and hypoactives. American journal of mental deficiencies, 1959, 63, 1024-1033.
- Glidewell, J. C., Mensk, I. N., and Gildea, M. C. Behavior symptoms in children and degree of sickness. American journal of psychiatrics, 1957, 114, 47-53.
- Greiger, R. N., Mordock, J. B., and Breyer, N. General guidelines for conducting behavior modification programs in public school settings. Journal of school psychology, 1970, 8(4), 259-265.
- Hall, R. V., Lund, D., & Jackson, D. Effects of teacher attention on study behavior. Journal of applied behavior analysis, 1968, 1, 1-12.

- Hippius, H. Long term pharmacotherapy of schizophrenia. In M. Rinkel (Ed.), Biological treatment of mental illness. New York: L. C. Page & Co., 1966, 497-506.
- Krop, H. Modification of hyperactive behavior of a brain damaged, emotionally disturbed child. Training school bulletin, 1971, 68(1), 49-54.
- Kuypers, D. S., Becker, W. C., and O'Leary, D. K. How to make a token system fail. Exceptional children, 1968, 35, 101-109.
- Lashley, K. S. Studies of cerebral function in learning. Psychobiology, 1920, 2, 55-136. Cited by J. L. Schulman, J. C. Kaspar, and F. M. Throne. Brain damage and behavior. Springfield, Illinois: Charles C. Thomas, Publisher, 1965, 22.
- Levitt, E. E. The results of psychotherapy with children: An evaluation. Journal of consulting psychology, 1957, 21(3), 189-195.
- Madsen, C. H., Becker, W. C., & Thomas, D. R. Rules, praise, and ignoring: Elements of elementary classroom control. Journal of applied behavior analysis, 1968, 1, 139-150.

- Menkes, M. M., Rowe, J. S., & Menkes, J. H. A twenty-five year follow-up study on the hyperkinetic child with minimal brain dysfunction. Pediatrics, 1967 39(3), 393-399.
- Merchenbaum, D. H., Bowers, K. S., & Ross, R. R. Modification of classroom behavior of institutionalized female adolescent offenders. Behavior research and therapy, 1968, 6, 343-383.
- Ogden, D. F. Psychodiagnostics and personality assessment: A handbook, Los Angeles, California: Western Psychological Services, 1971, 3-5.
- Oklahoma State Department of Education, Special Education Section. Learning disabilities. Oklahoma City, Oklahoma, 1970.
- O'Leary, K. D. & Becker, W. C. Behavior modification of an adjustment class: A token reinforcement program, 1967.  
Cited in M. Whitman and J. Whitman, Behavior modification in the classroom. Psychology in the schools, 1971, 8(2), 176-186.
- Pascal, G. R. & Suttell, B. J. The bender-gestalt test. New York: Grune & Stratton, 1951, 48.

- Patterson, G. R. An application of conditioning techniques to the control of a hyperactive child. Cited in Patterson, G. R., et al., A behavior modification technique for the hyperactive child. In A. M. Graziano, Behavior therapy with children. New York: Aldine-Atherton, 1972, 341.
- Paul, B. D. Mental disorder and self-regulatory processes in culture: A Guatemalan illustration. In B. H. Stoodly, Society and self. New York: The Free Press, 1962.
- Quay, H. C., Werry, J. S., McQueen, M., & Sprague, R. L. Remediation of the conduct problem child in the special class setting. Exceptional children, 1966, 32, 501-515.
- Ryback, D. & Surwit, R. S. Sub-professional behavior modification and the development of token reinforcement systems in increasing academic motivation and achievement. Child study journal, 1970-71, 1(2), 52-68.
- Scheff, T. J. Mental illness and social processes. New York: Harper & Row, Publishers, 1967.
- Strauss, A. A. & Lehtinen, L. E. Psychopathology and education of the brain-injured child. New York: Grune and Stratton, 1947.

- Thomas, D. A., Nielsen, L. J., Kuypers, D. S., and Becker, W. C.  
Social reinforcement and remedial instruction in the elimination of a classroom behavior problem. Journal of special education, 1970, 2(3), 291-302.
- Toews, J. M. The counselor as contingency manager. Personnel and guidance journal, 1969, 127-133.
- Ullmann, L. P. & Krasner, L. A psychological approach to abnormal behavior. Englewood Cliffs, New Jersey: Prentice-Hall, 1969.
- Walker, H. M. & Buckley, N. K. The use of positive reinforcement in conditioning attending behavior. Journal of applied behavior analysis, 1968, 1(3), 245-250.
- Wasik, B. H., Senn, K., Welch, R. H., & Cooper, B. R.  
Behavior modification with culturally deprived school children: Two case studies. Journal of applied behavior analysis, 1967, 2(3), 181-194.
- Werry, J. S. & Quay, H. C. Observing the classroom behavior of elementary school children. Exceptional children, 1969, 36, 461-464.
- Werry, J. S. & Sprague, R. L. Hyperactivity. In C. G. Costello (Ed.) Symptoms of psychopathology. New York: John Wiley & Sons, 1970, 397.

- Wetzel, R. Use of behavioral techniques in a case of compulsive stealing. Cited in A. M. Graziano, Behavior therapy with children. New York: Aldine & Atherton, 1972, 264.
- Whaley, D. L. & Malott, R. W. Elementary principles of behavior. New York: Appleton-Century-Crofts, 1971, 940.
- Wolpe, J. The practice of behavior therapy. New York: Pergamon Press, 1969, 220.
- Zimmerman, E. H., & Zimmerman, J. The alteration of behavior in a special classroom situation. Journal of experimental analysis of behavior, 1962, 5, 59-60.