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# A Study in Application of Positive Reinforcement for Improving Listening Achievement

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A STUDY IN APPLICATION OF POSITIVE REINFORCEMENT  
FOR IMPROVING LISTENING ACHIEVEMENT



A Thesis  
Presented to  
the Graduate Faculty  
Central Washington State College



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



by  
Ernest J. Bobko  
December, 1968

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## CHAPTER I

### THE PROBLEM AND DEFINITION OF TERMS USED

Frequently, teachers in the upper elementary grades are asked by students to repeat verbal directions and class assignments. Identical questions continue to be asked and answers repeated as a pattern of inattentiveness. Constant repetition of giving directions and assignments utilizes a considerable amount of time and reinforces a habit not conducive to good listening skills and practices.

Generally, the inability to comprehend simple verbal directions appears to fall within the area of listening awareness. Listening skills are not always taught in the elementary schools. The focus of developing listening skills through some systematic program does not often occur in many elementary classrooms. Teaching listening skills requires constant awareness on the part of the teacher and the student.

To meet a situation in which poor listening habits have been allowed to continue, the elementary classroom teacher must strive throughout the school year to develop in the student listening skills and an awareness for critical auditory perception. With the implementation of a formal program of instruction, progress will be apparent by the end of the school year.

## I. THE PROBLEM

### Statement of the Problem

The purpose of this study was to (1) determine the effectiveness of utilizing positive reinforcement techniques to improve listening awareness during the process of receiving verbal instructions; (2) evaluate the use of reinforcement schedules with and without positive reinforcement; (3) determine to what extent a formal program utilizing reinforcement procedure compares with the absence of such procedure in a classroom.

The study was conducted in two elementary schools located at Fort Lewis, Washington, in the Clover Park School District. Three fifth grade classes were involved.

### Importance of the Study

Elementary teachers have an excellent opportunity to approach the problem of developing listening awareness through a formalized system. Over 57.5 per cent of classroom time is spent in listening (37:634). In the intermediate grades, teachers are faced with children who cannot or do not follow directions without numerous repetitions and who cannot listen analytically or critically. The teacher has an opportunity to weave a program of improvement within the framework of curricula that will assist in developing good study habits with reference to listening skills.

Although many children in the upper elementary grades may have poor listening skills, an attempt should be made to instill an awareness of listening and the application of these skills for impending junior high school experience. The elementary teacher has a better opportunity for making a concentrated effort in this area than the secondary teacher, who does not have the same student for extended periods of time. For this reason, time is crucial, and the elementary teacher with the use of positive reinforcement procedures can place the student at an advantage by helping him develop listening awareness.

## II. DEFINITION OF TERMS USED

### Reinforcement

Any response A will reinforce any other response B, if and only if the independent rate of A is greater than that of B. For any pair of responses, the more probable one will reinforce the less probable one (27:220; 28:132).

### Reinforcement Schedule

A schedule of reinforcement is the statement of the contingencies on which reinforcement depends. These contingencies are specified in terms of the number of responses emitted and/or in terms of the passage of time (11).

## Listening

Listening is the act of acquiring the speaker's meaning by identification and interpretation of spoken symbols.

### III. LIMITATIONS OF THE STUDY

This study was limited to a comparison between two experimental groups of 26 and 21 children respectively, and one control group of 22 children, selected from the fifth grades of the public elementary schools at Fort Lewis, Washington, during the 1967-68 school year.

Many variables which were not controlled could have influenced the ratings of the groups in comparison with each other. Unmeasurable factors such as home background, personal experience, over-all health, and emotional stability of the groups could have affected the outcome. The classroom environment, quality of teaching, listening readiness, and established listening habits could have had some bearing upon the test ratings. Increased natural ability during the experimental period of the subjects, as well as increased familiarity with schedules, could have been reflected in the ultimate results.

Design requirements for three groups and population limitations at the Parkway elementary school by necessity imposed geographical solution in seeking the third fifth grade group at the Hillside elementary

school. Different administrative and/or classroom environmental background may have had effect upon the test results.

#### IV. ORGANIZATION OF THE REMAINDER OF THE STUDY

Chapter II is a review of the literature to investigate information in the area of listening, and to seek any reinforcement techniques that are now applicable and will relate to this study.

Chapter III discusses the experimental procedures and selection and utilization of fifth grade participants at Fort Lewis, Washington.

Chapter IV presents the results of the study and the statistical treatment of the data.

Chapter V contains the summary and conclusions of the study.

## CHAPTER II

### REVIEW OF THE LITERATURE

This chapter will review literature on listening, reinforcement theory, and reinforcement applicable to classroom use.

#### I. LITERATURE ON LISTENING

A great amount of time is devoted to listening. Children are so constantly bombarded, not only with physical environmental sounds, but with the sounds of peers and adults giving directions or at least wanting to be heard. Gerald Green in The Last Angry Man, a novel about the television industry, remarks, "The most overwhelming fact of the twentieth century is the assault on the public ear and eye, the incessant, relentless avalanche of useless information." David and Elizabeth Russell (30:1-4) state that perhaps there is so much of it that many children learn to ignore talk. Perhaps they "listen with half an ear" when the radio or television is playing and transfer this habit to the classroom when the teacher is giving directions.

In her book Easy in English, Applegate (3:12) remarks:

These are listening days, and most of our ears are surfeited with listening. Children are learning to turn off their attention as they turn off television. Schools and homes are going to have to teach not only the skills of listening, but how to be more discriminating in what we listen to.

Applegate lists six statements that describe an adult's listening habits as well as the child's. The modern child:

1. Will not listen to what he thinks is uninteresting.
2. Is influenced more by the dramatic than the logical.
3. Has a short listening attention span.
4. Does not know how to separate the essentials he hears from the non-essentials.
5. Is influenced more by voice than by truth.
6. Has a tendency to believe everything he hears from a machine.

The problem of getting people to listen is obviously not a new one, for in the twenty-first verse of the fifth chapter of Jeremiah, the prophet laments that his people "have ears but hear not."

Prior to 1950, little research has been done in the area of listening. Since that time at least 100 doctoral dissertations and over 120 master's theses have been written on studies related to component skills of listening, listening instruction, and listening in relation to other factors. Sam Duker in his Listening Bibliography has indexed a vast amount of literature and major studies in the area of listening totaling 880 separate listings (10:1-3).

Nichols pointed out that the earliest research in listening dates back to 1917. Up to 1943, only fourteen scientific studies of listening were available (24:154-163). Hackett reported less than fifty valid studies of listening in 1955 (14:349-351).

Dr. Miriam Wilt in her study found that elementary school children spent about two and one-half hours of the five-hour school day in listening (37:626-636). Wilt listed two purposes in her study: (1) to determine what percentage of the school day elementary school children are expected to listen, and (2) to discover if teachers are aware of the amount of time they expect children to listen. The teachers were asked to estimate the amount of time they believed children learn through listening. The data showed that teachers believed the children spent 25 per cent of their time learning through listening.

The study was followed by actual observation in nineteen elementary school classrooms and visits were of a day in length. During the period of observation, all language listening activities were timed; results indicated:

That children are expected to listen a large portion of the school day has been established by both the data from the questionnaires and from observations. Teachers estimated that children learned by listening 74.3 minutes, observations showed they listened 158 minutes. Whether they listen the one hour and fourteen minutes teachers think they do or the two hours and thirty-eight minutes the 530 children were supposed to be listening during the observations, the hypothesis that they are expected to listen a large portion of the day was found to be sound in the study.

That teachers are unaware of the amount of time they expect children to listen is proved by noting the difference between the amount of time teachers estimated on the questionnaires that children listen and the amount of time children were expected to listen, as determined by observations. If the children are listening almost twice as much as teachers estimate they do, then teachers are unaware of the amount of time they expect children to listen.



There is substantial evidence from the 19 classrooms visited that the majority of elementary teachers do not consciously teach listening as a fundamental skill of communication. This evidence, however, cannot be considered conclusive. In not a single classroom visited were there any indications that the teachers were helping the children to become better listeners. While teachers expect children to listen 57.5% of the time, purposes or standards were not mentioned. Children listened, half-listened, or daydreamed through the activities and the quality of listening was never evaluated. A room in which listening is important should show evidence in the types of listening activities and through the participation of the children in listening experiences. This evidence was conspicuous by its absence (37:633-634).

Rankin (29:629) established that 70 per cent of the average adult's working day was spent in some form of communication with 42.1 per cent of that time in the act of listening. Other research has shown that the average person retains only 50 per cent of what he hears, no matter how hard he concentrates, and two months later he can be expected to recall only 25 per cent of what was said (31:4).

Burns and Lowe in their book write that from infancy on, listening is a major means of learning (6:52).

The child gains much of his vocabulary, his sentence patterns, and his stock of ideas from listening. Listening skills are important in learning to read, for direct association of sound, meaning, and word form must be established from the start. The ability to identify sounds heard at the beginning, middle, or end of a word and to discriminate among sounds is an essential to success in analyzing words phonetically. The listening habits, good or poor, which the child acquires at home during the preschool

years and the listening habits developed in school have much to do with his success in learning.

Certain studies have been made to evaluate experimentally the effects of a program designed to develop certain skills in the listening process. Forty classes in the state of Iowa and several contiguous states were used. The Pinter Intermediate Test (Form B of the Pinter General Abilities Tests, Verbal Series) and the Elementary Battery (Form A of the Iowa Silent Reading Comprehension Tests) and self-prepared tests of listening ability were used for pretesting and final testing of the pupils. The initial testing of the self-prepared tests was presented by statements given followed by questions. In the latter presentation of self-prepared test, a story was presented, followed by questions. Reliability of the pretest was .79 and the final test, .86.

Five separate lessons, presented at one-week intervals, were given to the groups between pretesting and final testing. This was supplemented by training as normal listening situations arose. Lesson one dealt with accuracy in observing details. Lesson two included listening clues to word meanings. Lesson three dealt with oral directions, related details, and series of details. Lesson four concerned the relation between the main and supporting ideas.

The conclusions from the study demonstrated that teaching listening ability through instruction concerned with skills involved in the listening process can be effective. The effectiveness of listening

instruction was dependent on varying levels of intelligence. Some indication appeared to sustain that certain listening skills were more instructable than others. There was a .64 correlation between listening achievement and reading achievement, and a correlation of .66 between listening achievement and intelligence (26:315-320).

Hollow's study involved fifth-grade pupils enrolled in sixteen midwestern parochial schools to determine whether a planned program of listening instruction would improve the listening abilities. The experimental factor, systematic training in listening comprehension, was applied to the experimental group. A parallel group did not receive listening training and serve as a control group. Evidence from the study indicated that listening skills of fifth-grade pupils are improved by a planned program of instruction, and that children of low, average, and high intelligence benefit from instruction. Reading comprehension, spelling, total language, and intelligence factors are found to be related to listening comprehension. Factors such as sex, size of family do not seem related to listening ability (17:158-161).

Canfield attempted to find the answer to the question of whether listening skills are developed more effectively through normal use during the school day or through special lessons on listening. He found that the group that had direct instruction made the greatest gains, but the group receiving indirect instruction also made gains that were statistically

The mean gains of the two experimental groups suggested that pupils can and do profit from listening instruction (7:147-151).

Trivette (35:276-277) found that training in listening for the main idea, for details, and to make inferences affect the child's ability to listen for these purposes and that when specific listening comprehension skills are improved, other comprehension skills tend to improve.

Furness (13:525-531) has made an analysis of listening disabilities and their possible causes. These are listed in chart form and should prove helpful in diagnosing and correcting listening disabilities. Such factors as physiological, psychological, personality, and pedagogical are discussed.

Goldstein (15:49-53) sought to compare the listening and reading comprehension of fourth and sixth-grade children to determine how that relationship was affected by differences in mental age, chronological age, grade level, difficulty of material, length of passage, and sex. Some conclusions reached were that listening comprehension was significantly superior to reading comprehension for boys and girls in both grades. Listening comprehension showed a greater superiority over reading comprehension with easy material than with difficult material. There was no significant relationship between length of passage and comprehension. The difference between listening and reading comprehension decreased as mental and chronological age increased.

Listening and reading reach equivalence in both word recognition rate and in word-per-minute rate during the early part of the sixth grade. In the latter part of the sixth grade or the seventh grade, reading appears to gain sufficient efficiency to cause it to be preferred over the usual act of listening in many learning situations.

Anderson (2:215-224) remarks:

Except in isolated instances, virtually the only instruction in listening that children and young people receive in the schools is the quite useless admonition of "pay attention" and "listen carefully." Listening, at all educational levels, has been the forgotten language art for generations.

Letton (23:181-185) stated that evidence to show that listening is taught in our schools is scarce. She criticized the treatment of listening as a phase of some other subject in textbooks. She also found suggestions for teaching listening "fuzzy" and "uninspiring."

Heilman (16:283-285) examined textbooks on teaching for suggestions of teaching listening. He found that eleven out of fifteen textbooks published between 1946 and 1954 did not mention listening in the table of contents nor in the index. Even though curriculum guides recognized the importance of listening, the suggestions given for listening instructions were "vague." Dixon concludes:

From the appearance of the first research on listening in 1917 to the present, the record of the place of listening among the language arts is a chronicle of neglect. Overlooking listening is accentuated by its preeminence as a phase of communication. The momentous impact of listening competence in the lives of children and adults--and especially in contemporary international affairs--

demands that it be raised from its low estate to a place of prominence in educational research and in the curriculum. Truly, listening is a fecund area of research and writing and a prolific field for creative instruction. Teaching the karma of listening merits large scale, coordinated research and a crash program in education to promote listening competence (9:287).

## II. LITERATURE RELATING TO FACTORS OF LISTENING

Although receiving auditory communication is generally referred to as listening, the act is broken down into three stages: hearing, listening, and auding. Taylor (31:6) defines the three processes as follows:

Hearing is used to designate the process by which speech sounds in the form of sound waves are received and modified by the ear. The various factors that modify the hearing of speech sounds are shown with arrows. [Referral to a chart.]

Listening refers to the process of becoming aware of sound sequences. In listening to speech, the person first identifies the component sounds and then recognizes sound sequences as known words through the avenues of auditory analysis, mental reorganization, and/or association of meaning. . . .

Auding refers to the process by which the continuous flow of words is translated into meaning. Auding involves one or more avenues of thought-indexing, making comparisons, noting sequence, forming sensory impressions, and appreciating.

It is acknowledged that the factors that act on the process of translating speech sounds into meaning may vary in the order in which they occur and will change in their importance from one listening situation to another. Many of them, while depicted separately, will act in combination.

Taylor (31:6-14) lists auditory acuity, masking, fatigue, and binaural considerations as factors that must be considered in a student's ability to receive speech sounds. "Auditory acuity may be thought of as the ability to respond to various frequencies (tones) at various intensities (levels of loudness)." Human speech ranges from 125 to 8,000 cycles per second, but the range between 500 and 4,000 cycles per second are of the most concern in hearing of speech. Frequencies between 1,000 and 2,500 c.p.s. furnish most cues and are judged most critical.

"The intensity, or loudness level, found in everyday speech will range typically from 55 decibels (faint speech) to 85 decibels (loud conversation)." The amount of loss considered as serious varies with researchers. A significant loss is regarded anywhere from 6 d.b. to 15 or 20 d.b.'s. These losses above the 1,000 c.p.s. are most critical to the intelligibility of speech and therefore their detection is of importance. Varying estimates place 5 to 10 per cent of the number of children with hearing loss.

The next factor to influence hearing is masking, a condition in which the message being listened to is made less audible by the superimposition of other sounds, for sounds of the same frequency can alter one another.

Of importance, then, is that background noises, conversation of other children, and conversation of the teacher can have the effect of masking. Children with low levels of auditory discrimination and those that are

affected with degrees of hearing loss may be affected by the noise level in the classroom.

"Auditory fatigue may be thought of as a temporary hearing loss." Monotonous tone and repeated sounds at certain frequencies are considerations of inducing auditory fatigue.

Binaural hearing is compared to the localizing effect of stereopsis.

Localizing refers to the listener's ability to place sound source or judge its distance and direction. Such judgments are based on the intensity of the sound arriving at each ear and on the difference in the time it takes for the sound to reach each ear.

The implications are that the listener when exposed to masking situations or fatigue, intensity of sound creates a situation in which more masking and fatigue are generated, causing less intelligibility. Conversely, single sound sources with more intensity are likely to produce greater intelligibility of aural messages.

Bruner (5:142) in his chapter "On Coping and Defending," suggests inattentiveness as a result of a pre-emptive metaphoric structure either as an assimilative or avoidant activity. As a result of both forms:

Each requires a constant scanning of the environment for whatever might be relevant to the core conflict that is the source of trouble. The result is a highly distracting preoccupation: children with this kind of difficulty miss out on a good deal of what is going on because they have such an absorbing investment in scanning the world for danger. It is not surprising, then, that teachers often



report that these children are inattentive or that they never participate in class discussions. Our children in treatment often missed what the next day's assignment was--either literally or in the sense of not grasping its purpose--and it has occurred to us that perhaps the time of maximal upset and defense comes just as they are getting into new material and unknown situations, as at the moment of a new assignment.

Factors which influence listening are attention, concentration, auditory analysis, mental reorganization, association of meaning, rate of input, and unrelated associations. "Attention may be thought of as the directing of awareness; concentration, as sustaining of attention" (31:6-14). Of importance in this area is the speaker's ability to utilize every means available in maintaining the attention of the listener and to provide a classroom environment conducive to sustaining attention. Temperature, acoustics, auditory distractions are considerations that classroom teachers must be aware of or the listener's attention may wane.

While attending, the listener is identifying and recognizing sounds. The listener may use a combination of auditory analysis, mental reorganization, and meaning to accomplish this.

When using auditory analysis, the listener is very conscious of the characteristics of the sound. He relies heavily on auditory discrimination when the aural message is less meaningful or meaningless. He compares the sounds he hears with those he is familiar with, generally noting likenesses and differences. Though unaware of doing so, he is responding to changes in frequency (pitch or tone), intensity (volume), periodicity (rhythm), and the manner in which these changes take place.

Auditory analysis is utilized when listening for the first time to words of a foreign language, in phonetic analysis of words in reading and in spelling, and in the mimicry of voices.

Another factor affecting the awareness of speech sounds and patterns is that of mental reorganization. "In using mental reorganization, the listener employs a system that will aid retention" (31:11). Syllabication, grouping of long lists of numbers or letters in sub-groupings, and the mental rehearsal of sound sequences are some methods of reorganization the listener may employ.

Association of meaning is related to the listener's experience and background, and the ability to use aural context clues in the response to the speaker's manner of delivery. This includes the speaker's tone quality, mood, phrasing, emphasis, and organization of ideas.

The next factor considered in listening after identification of sound or the recognition of sound sequence is the rate of input.

In general, most of the studies showed that the listener preferred a speaking rate between 150 and 175 words per minute. If, however, the content was judged difficult by the listener, a slower rate of delivery was preferred (31:12).

If the content is at a comfortable academic level or below, it appears that adjustments to rate of input is within the capability of the listening mechanism.

In addition to the factors mentioned, unrelated associations may distract from or alter the pattern of communication. The listener's emotional reaction to particular words and phrases may cause misinterpretation. Subjective meanings to certain words may recall personal experience of the listener and provide the unrelated association.

Taylor (31:13) suggests that the more mature listener may have a difference between his listening rate and thinking rate by as great as three to four hundred words per minute.

This is suggested by the fact that the average speaking rate is 150 words per minute, while reading rates will sometimes range above 500 words per minute.

Thinking skills used during the auditing act are quite similar to those employed during reading, writing, and speaking. It is for this reason that reading and listening measurements involving these common attributes correlate highly and that training in these skills through listening activities produces a gain in both reading and listening.

Another factor influencing auditing is indexing, whereby the listener assigns relative values to information, with consideration of main ideas, supporting details, and the separation of relevant from irrelevant information. The other factors include making comparison, noting sequence, forming sensory impressions, and responding to the esthetic nature of a message.

### III. LITERATURE RELATING TO REINFORCEMENT AND ITS APPLICATION

The concept of reinforcement has made decided inroads in educational practices during the past decade. Travers (34:223) remarks that very little is still known in educational circles concerning reinforcement research. The Cooperative Research Branch, United States Office of Education, contract number 2-10-010, has undertaken a very extensive survey of the subject area covering approximately 600 sources. Resource material of reinforcement is abundant; difficulty lies in the various definitions of the term. Travers categorizes definitions into two classes:

The first of these classes of definitions refers to a particular set of conditions under which learning is known to occur and in turn implies the definition of a response and of a response characteristic. The definitions are such that if one can identify a response, a response characteristic, and a reinforcer contingent upon the response, then a condition has been identified under which learning occurs.

Definitional procedure in this class is useful in the design of experiments and can identify a learning situation in terms of few characteristics. Variables not included in the definition can be experimentally tested.

"In the second class of definitions, the term reinforcement refers to a variable within a system of variables which constitute a theory" (34:22 ). Hull (21; 22) falls within this theoretical framework. The reinforcer goes beyond its observed effect and is related to events as drive reduction and the development of habit strength and other

conditions. The term reinforcement then becomes part of an overriding established system of knowledge about learning.

Thorndike was a leader in the application of psychological knowledge to education. In Educational Psychology (32), he stimulated efforts to uncover facts about learning. Thorndike was one of the first reinforcement theorists. His later work led him to state the law of effect, which stated that any S-R connection will be strengthened if its formation and occurrence are satisfying. Repetition alone will not strengthen a connection, he concluded, but will make it possible for the law of effect to do so (33:62-63).

B. F. Skinner of Harvard University is especially interested in controlling responses that seem to occur without direct stimulation. These responses seem to be emitted by the organism rather than elicited by obvious stimuli. Because the functioning of this behavior appears to be operating in or on the environment, Skinner termed it operant behavior (8:39). The environment is usually affected by the operant behavior and generates stimuli which feed back to the organism. Some of these feedbacks have the effects termed by laymen as reward and punishment. "Any consequence of behavior which is rewarding or, more technically, reinforcing, increases the probability of further responding" (4:35-55). Skinner's success in controlling the operant responses of rats and pigeons was accomplished by manipulating reinforcement in an experimental device

called the skinner box. Shaping of complex behavior in animals was accomplished by Skinner.

Premack's definition of reinforcement falls within a class of its own. It is upon Premack's definition that reinforcement is applicable in this thesis. Premack (27:220) states that "any response A will reinforce any other response B, if and only if the independent rate of A is greater than that of B." Premack (28:132) further amplifies this definition: "For any pair of responses, the more probable one will reinforce the less probable one."

In using Premack's differential probability principle, Addison and Homme (1:8) in a broader sense, apply "reinforcing event," rather than the more conventional term "reinforcing stimulus." Homme (18) and Homme and Tosti (19:14-16) have refined and extended the differential probability principle of Premack to comprise a motivational system. This system is called the Contingency Management System (CMS) (1:8).

The present form of CMS divides the student task into discriminable trial units. A contracting system is employed in which some amount of defined task behavior (e.g., arithmetic) is demanded for some interval of RE (e.g., three minutes of painting).

The application of the differential probability principle demands that the contingent RE behavior be, in fact, higher in probability at the moment it is engaged in than the task. Often this is not as simple as it sounds. In relatively mature SSs, the REs are relatively stable; a RE (e.g., playing Chess) is likely to remain a RE for days, weeks, even months. Since this is so, contingency contracts can be laid out in advance. But this is not the case with very young humans, as demonstrated by both preschool "Anglo" and Indian children on whom the system was tried.

The reinforcing event quoted above has given way to the reinforcing menus. High probability events are listed on the menu whereby the subject may select an event that is a high probability at the moment. Interesting stick figures and schematic line drawings are depicted on the menus. With the menu, high levels of activity are generated and ample activities listed to fill the needs of the subject.

Contingency management, utilizing Premack's principle, by its simplicity provides the practical application of reinforcement at all levels and with effective results. At the elementary school level, this form of technology can be administered by the classroom teacher in successive approximations to solicit the final behavior that the teacher wants (20:2). Homme (20:1), commenting on contingency management, states:

The central theme in teaching contingency management is a simple and obvious one: The likelihood that behavior will recur depends on its consequences. To teach someone to become a skilled contingency manager, one simply has to teach him to take this fact for all organisms, at all times, and that it is important even in the case of seemingly trivial bits of behavior, on the grounds that larger, more important response classes are built from them. As a matter of fact, it seems to be turning out that the difference between an excellent contingency manager and a not-so-excellent one is a willingness to reinforce approximations early in the game. . . . .

Most of this behavioral repertoire is not needed by a contingency manager. The realization of this has made it possible repeatedly to show (Allen, Buell, Harris & Wolf, 1964; Ayllon & Michael, 1959; Davison, 1965; and Sulzer, 1962) that a contingency manager (sometimes called a behavioral engineer) can be trained in a very short time--sometimes in a matter of days, or even hours.

Consumables and token reinforcers are the subject of a large number of studies. O'Leary explains:

Where the usual methods of social approval have failed, token reinforcement systems have proven effective (Birnbrauer, Bijou, Wolf, & Kidder, 1965; Birnbrauer & Lawler, 1964; Birnbrauer, Wolf, Kidder, & Tague, 1965; Quay, Werry, McQueen, and Sprague, 1966). Token reinforcers are tangible objects or symbols which attain reinforcing power by being exchanged for a variety of other objects such as candy and trinkets which are back up reinforcers. Tokens acquire generalized reinforcing properties when they are paired with many different reinforcers. The generalized reinforcer is especially useful since it is effective regardless of the momentary condition of the organism (25:637).

A modification of the contingency management system could therefore utilize tokens for exchange of items listed on reinforcement event menus.

In summary, this review of literature has historically traced various studies conducted in listening. Research has shown that the formal teaching of listening will improve listening achievement and that listening does correlate with other academic areas.

The interaction of many factors with listening can contribute or distract from its effectiveness. Awareness of the characteristics of the listening mechanism should provide the teacher with informational clues to better respond in teaching listening skills.

Finally, technology in the form of the construct of reinforcement has provided a tool that will enable the teacher to consider its use in the improvement of listening achievement.

The next chapter will discuss the groups studied and the methods used.



## CHAPTER III

### METHODS AND PROCEDURES

#### I. GROUPS STUDIED

For the purpose of investigating the utilization of reinforcement as a method for achieving listening awareness, three fifth-grade classes consisting of sixty-nine pupils were selected from two schools in the Fort Lewis, Washington, area. The two experimental groups were located at Parkway Elementary School, and the control group was located at Hillside Elementary School.

#### II. MATERIALS USED

The Sequential Tests of Educational Progress, Listening, Forms 4A and 4B, from the Cooperative Test Division of the Educational Testing Service, were administered before and after reinforcement procedures were initiated.

Each subject was provided with Reinforcement Schedules and a Reinforcement Event Menu. (See Appendix for copies of these forms.)

#### III. SELECTION OF STUDENTS

The research groups consisted of children of military personnel stationed at Fort Lewis, Washington. The students, members of three

fifth-grade classes, were made available by the administrators of the Parkway and Hillside elementary schools.

Military housing regulations designate geographical areas for quarters assignment, and in general the assignment thereof is determined by military rank. The military personnel residing within the two school boundaries consisted of the lower and middle noncommissioned officer ranks. Socio-economic factors by administrative requirement, therefore, are similar in the population characteristic. In this respect, the three available groups were parallel.

This study was not designed to evaluate academic achievement. The intellectual level of the students was not a consideration for matching. Only routine classroom procedures were used by teacher participants giving verbal assignments and the student response by listening and recording. Correct responses were reinforced, not academic endeavor or achievement.

Premack's differential probability hypothesis is notable not only for what it says, but for what it does not say. Homme quotes:

"Of any two responses, the more probable one will reinforce the less probable one in middle-class or upper-class children"; it does not say: ". . . in white children"; it does not say: ". . . in emotionally nondisturbed children"; it does not say: ". . . as long as the S has not come from a different culture." What is being said is that, as long as the S is an organism, the differential probability rule will hold (20:4).

The utilization, therefore, of the Premack differential probability construct--reinforcement--is not contingent upon matching intelligence quotient and socio-economic considerations, but requires only that the subject is an organism. Therefore, the selection of research groups were included within the design for observable effects of reinforcement only.

#### IV. METHODS EMPLOYED

Statistical analysis was applied utilizing the t test of significance employed in the pretest and later in the post test of all three groups. For correlation purposes, the level of significance was established at .05.

#### V. PROCEDURE

The study was conducted over a period of four consecutive weeks during the 1967-68 school year within the scope of regular classroom activities.

Group A (26 students) and Group B (21 students), located at Parkway School, were designated as experimental groups; Group C (22 children), located at Hillside School, was designated as the control group and operated without experimental activity except as recipients of two administered tests. Immediately prior to initiating

the experimental activity, Form 4A, Sequential Tests of Educational Progress, Listening, was administered to each group.

Each member of groups A and B were issued individual folders containing a reinforcement schedule for each week and Group A members' folders contained in addition a reinforcement event menu.

Teachers of Groups A and B were instructed to present classroom assignments orally once and only once, without repetition. Students in both groups were instructed to enter the assignments in written form upon the reinforcement schedule in designated space. If a student asked for a repeat of the assignment, the teachers would not comply, but would answer with statements such as "Your assignment has been given."

After having given an assignment, the teacher of Group A would immediately proceed to check each individual's reinforcement schedule to determine if a correct entry had been made. A token reinforcer in the form of a colored paper star was placed only on the student's reinforcement schedule exhibiting a correct written response. Additionally, a social reinforcer was verbalized to each student with correct entry, such as "fine," "good," etc.

Initially, if any student in Group A obtained one complete day of correct entries to all verbal assignments given by the teacher, the token reinforcers then would be applied by the student toward selecting any item listed as an activity on the reinforcement menu or toward a

desired selection of his own choice. In substance, the token reinforcers now were exchanged for items on the reinforcement menu. It is here that the third form of reinforcement takes place. An activity selected by the student from the reinforcement schedule was "paid off" immediately, or as each situation could be applied. The time span between selection of activity and participation in activity varied from the immediate to one day. Minimal delay occurred due to availability of activity, arrangement and coordination with other teachers and personnel, and when supervisory and safety considerations were involved with the child.

Subsequent requirements for activity selection from the reinforcement menu were based upon two completed days of correct entries, and finally upon three days of correct entries.

Group B was not reinforced in either of the three areas, but prior to leaving school, each reinforcement schedule was collected by the teacher and items encoded for correct entries. The student's folder was returned the morning of the following day.

Group C operated as a regular class, receiving no material nor reinforcement.

The teachers of Groups A and B operated independently within the framework of school curriculum, administrative policy, and classroom procedure.

Following the four-week study, Form 4B of the Sequential Tests of Educational Progress, Listening, was administered to Groups A, B, and C.

## CHAPTER IV

### RESULTS OF THE STUDY

The purpose of this chapter is to analyze the data compiled from the study, to present the findings in tabular form, and to evaluate its application to the null hypothesis.

#### I. NULL HYPOTHESIS

It is hypothesized that there will be no significant change in the ability to attain listening awareness in any of the three groups as tested.

In statistical form, the hypothesis can be stated: Reject the hypothesis if  $\underline{t} < -\underline{t}.050$  or  $\underline{t} > \underline{t}.050$ ; accept the hypothesis (or reserve judgment) if  $-\underline{t}.050 \leq \underline{t} \leq \underline{t}.050$ , where  $\underline{t}$  and the number of degrees of freedom are to be calculated as  $N1 + N2 - 2$  (12:265).

#### II. RESULTS

Table I presents measures of variability of Groups A, B, and C relative to measurement between pretest, listed as Test 1, and the post test, labeled Test 2. From this table, it can be seen that the data on Group A provides that any correlation between the tests greater than .387 is significant; for Group B, any correlation greater than .412 is significant; and for Group C, control, any correlation greater than .432 is significant.

TABLE I  
ANALYSIS OF GROUP MEASUREMENTS OF VARIANCE

	Group A	Group B	Group C
<u>Means</u>			
Test 1	264.269	265.500	260.142
Test 2	266.076	268.000	260.000
<u>Standard Deviation</u>			
Test 1	11.255	8.319	11.913
Test 2	9.380	10.132	11.202
<u>Variance</u>			
Test 1	126.684	69.214	141.928
Test 2	87.993	102.666	125.499
<u>Standard Error</u>			
Test 1	2.20	1.77	2.59
Test 2	1.83	2.16	2.44
Sig +	.387	.423	.432
Correlation	.766	.791	.902



The computation of a Pearson product-moment coefficient of correlation for Group A was found to be .766, for Group B, .791, and for Group C, .908. The high correlations between tests of each group denote that the differences in each group were not significant and that the relative position of individuals within the group had not changed. From this correlation it can be inferred that the three groups did as well before as after testing.

Table II depicts t-test results. The notation "A1" denotes Test 1, Group A, while "A2" denotes Test 2, Group A. The t-tests were performed intra- and intergroup. With the exception of tests B2 and C2, there were no significant differences between groups. The significant difference attributed to Tests B2 and C2 will be discussed in Chapter V.

With reference to Group A and B, and A and C, the null hypothesis is accepted in that there is no significant difference as measured by testing to include judgment that positive reinforcement increased listening awareness. The test of significance of the difference between the sample means was based on a two-tailed Student-t distribution at the .05 level. There is a significant difference between Group B and Group C and for these groups, the hypothesis is rejected.

Table III shows the relationship between verbal assignments given by the teachers in Group A and Group B, the group mean of correct entries on the reinforcement schedule, and the percentage of correct

TABLE II

INTER- INTRAGROUP MEASUREMENTS OF t-TEST RESULTS

	B1	B2
* A1	-.434	-1.207
A2	.225	- .677

GROUP A WITH GROUP B

	C1	C2
A1	1.209	1.296
A2	1.863	1.296

GROUP A WITH GROUP C

	C1	C2
B1	1.702	1.821
B2	2.324	2.452

GROUP B WITH GROUP C

\* A1 denotes Group A Test 1  
 A2 denotes Group A Test 2

responses in entering verbal assignments on reinforcement schedules in relation to the total verbal assignments, From the data in Table III, it can be concluded that Group A made 28.4 per cent more correct entries on reinforcement schedules than Group B. A discussion will follow in Chapter V.

TABLE III  
REINFORCEMENT DATA

	Group A	Group B	Difference
Total number of verbal assignments	44	49	
Mean of correct entries	38.8	29.3	9.5
Per cent of correct entries to total	88.1%	59.7%	38.4%

Table IV lists the different activities selected by students in Group A from the reinforcement menu. A summary of this data provides that a mean of 3.4 events per student could occur.

TABLE IV  
SUMMARY OF REINFORCEMENT MENU DATA

Activity	Number Reinforced
Work in kitchen	28
Free Recess	1
Correct papers	10
Work on hobby	7
High interest center	27
Work in lower grades	12
Free period	1
School patrol	3
Library	1

$\bar{X} = 3.4$  events per student

## CHAPTER V

### SUMMARY AND RECOMMENDATIONS

#### I. SUMMARY

This paper has presented a study on the effects of utilizing positive reinforcement in an experimental group to measure the achievement in listening awareness. Measurements were made against a second experimental group with criteria identical to the first experimental group with the exception that there was no positive reinforcement procedure. The control group performed in normal classroom setting without experimental procedure involved.

Analyses of the Pearson product-moment coefficient of correlation and the Student-t tests between the experimental groups and the control group supported the null hypothesis and therefore its acceptance. Student-t tests between Group B and Group C rejected the hypothesis.

The limitations purported in Chapter I presented variables not controlled that could have influenced the test results of both groups. These included unmeasurable factors such as home environment, personal experience, overall health and emotional stability of both groups. Different classroom environments including teaching procedure and established listening readiness may have had bearing on the results.

That there is no significant difference in the test between Group A and Group B may be attributable to other factors. The fact that students in Group A were accustomed to being reinforced during the period of the study may have had negative effects on the post test results, in that group members received no reinforcement for participating in the test, which may have decreased motivational attitudes towards the test.

In Group B, the very act of entering verbal assignments in written form on the reinforcement schedule may have increased listening awareness through increased familiarity and association with the schedules, thereby establishing the habit of listening skill procedure. The  $t$ -test result showing a significant difference of 2.452 between test B2 and test C2 (see Table II) supports the possibility of self-reinforcement through reinforcement scheduling in Group B as measured by its absence in Group C. Similarly, encoding reinforcement schedules daily by the teacher of Group B may in itself have acted as a reinforcing agent. Further, awareness as to the differences in procedure between Group A and Group B members may also have been a motivational force.

The data in Table III indicates that reinforcement occurred in Group A 28.4 per cent over that of Group B. The responses to total verbal assignments as shown in Table III may be interpreted to mean a higher degree of listening awareness through reinforcement procedure in Group A than in Group B. The relationship in  $t$ -test results on the post

test between Groups B and C give added weight to the supposition that levels of semi-reinforcement were possible in Group B but not in Group C.

In summary, measurements of variation between the pretest and post test support the null hypothesis in part. On the other hand, comparison of Groups B and C on the post test indicates that reinforcement has to some measure contributed to listening awareness. In addition, teachers in Groups A and B reported less requests for repeating lesson assignments after initiation of this study.

## II. RECOMMENDATIONS

The summary and conclusions purported in this study have given rise to the following recommendations.

1. Further studies be implemented in the application of reinforcement theory and procedure within the area of listening awareness.
2. Control measures be more stringent in the manipulation of the independent variables.
3. Matching on a 1 - 1 basis on intelligence and achievement be considered in group selection for any further study of this subject.
4. Comparisons be made between the method used in this study (utilizing reinforcement for increasing listening awareness) and other formal methods or techniques.

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## APPENDIX

REINFORCEMENT SCHEDULE

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_

SUBJECT	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
ARITHMETIC					
READING					
ENGLISH					
SCIENCE					
SOCIAL STUDIES					
HEALTH					

## REINFORCEMENT MENU

SELECT ONE ACTIVITY THAT YOU WOULD LIKE TO PARTICIPATE IN

- \_\_\_\_\_ Free reading period  
 \_\_\_\_\_ Work in kitchen  
 \_\_\_\_\_ High interest center  
 \_\_\_\_\_ Library period  
 \_\_\_\_\_ Do research project  
 \_\_\_\_\_ Assist student in lower grades  
 \_\_\_\_\_ Give a special report (Extra credit)  
 \_\_\_\_\_ Be leader in a discussion or panel group  
 \_\_\_\_\_ Correct papers  
 \_\_\_\_\_ Free PE or recess period  
 \_\_\_\_\_ Work on hobby  
 \_\_\_\_\_ Choose another activity you would like \_\_\_\_\_
- 

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_