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Alteration of Pupil Produced Noise in a Public School

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ALTERATION OF PUPIL PRODUCED NOISE IN A PUBLIC SCHOOL

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INTRODUCTION

In the past few years, increasing emphasis on the principles of operant conditioning discovered in the psychological laboratory has led to effective application of behavior modification techniques to numerous settings (Ulman and Krasner, 1965, Krasner and Ulman, 1965, Ulrich, Stachnik and Mabry, 1966). More recently, these techniques and procedures have been utilized in the field of education (Quay, Werry, Mc Queen and Sprague, 1966, Whelan and Haring, 1966, Zimmerman and Zimmerman, 1962, etc.). This work, so far confined to selected areas of special education for exceptional children, shows promising results.

Quay, Werry, Mc Queen and Sprague (1966) discuss methods of remediating conduct problems in a special experimental classroom where behavior modification principles were systematically applied. Five pupils were trained to attend to visual orientation to the teacher utilizing a silent, unobtrusive delivery system for candy reinforcers. Another child was provided candy and token reinforcement for correct responses to individual instruction designed to remedy deficient academic skills while another child was taught basic social skills utilizing token reinforcement with successive stages. These authors emphasize the importance of applying behavior modification to behavior problems in the regular public school classroom.

Whelan and Haring (1966) also comment on the application of behavior modification techniques in classrooms for exceptional children. Acceleration in frequency of appropriate behaviors was noted when these behaviors were followed by positive reinforcers such as praise and food.

A decrease in inappropriate behaviors was noted when they were followed by a withdrawal of attention. These authors caution that reinforcing contingencies must often be worked out for each individual subject and that to be effective, the principles of reinforcement and extinction must be systematically applied.

Another study, Zimmerman and Zimmerman (1962) presents two cases in which behavioral changes were effected by use of social reinforcement (attention) of appropriate behavior and extinction (ignoring) of inappropriate behavior. In one case, the experimenter ignored misspelling and other inappropriate behavior and attended to correct responses, resulting in the desired increase of appropriate and decrease of inappropriate behaviors. In the second case, the desired elimination of tantrum behavior, irrelevant verbal behavior and baby talk was brought about through systematically ignoring those responses and reinforcing appropriate behaviors with attention.

A nursery school study by Harris, Johnston, Kelly and Wolf (1964) describes the use of social reinforcement (attention) to restore walking behavior in place of crawling behavior. Adult attention was systematically given for upright behavior and crawling behavior was ignored. Crawling behavior was rapidly replaced by the more desirable walking behavior. Reversals clearly demonstrated control by social reinforcement.

Hewett (1967) writes of a study in classrooms for exceptional children in the public schools and in an institution for the emotionally disturbed. This special classroom makes use of the techniques of op-

erant conditioning to help children in acquiring a hierarchy of educational tasks in an appropriately structured environment with meaningful rewards for learning. Another paper by Valett (1966) delineates the principles considered most important to applying reinforcement theory to the classroom.

Two studies reported in the literature effectively deal with groups of individual subjects. One study (Patterson, 1965) reports on how a hyperactive child was controlled in a classroom setting. A light and counter apparatus was placed on his desk to indicate reinforcements of candy and pennies which were later divided among the class. The class, in turn, was supportive and socially reinforced his efforts of desirable behavior. Homme, de Baca, Devine, Steinhorst, and Richert (1963) applied a method of behavioral control based on the Premack principle to a group of nursery school youngsters. Initially the subjects emitted a high rate of undesirable behaviors such as running around the room, screaming, pushing chairs, ignoring verbal instructions, etc. These high probability behaviors were then used as reinforcers contingent on desirable behaviors. Later, they were able to earn tokens with which they could buy high probability behaviors. Control was virtually perfect after a few days.

These studies clearly indicate that the systematic application of operant conditioning procedures has been found a highly effective technique for modifying behavioral problems in the classroom. Thus far, the application of these techniques, however, has been mainly confined to special education and institutional classrooms for the exceptional

child and individuals as opposed to groups. It is the contention of the present author that the methodology and procedures of behavior modification can and should be investigated for utilization in the regular public school classroom and with groups of persons whose combined behavior needs altering.

The principles of positive reinforcement may hold extensive implications, not only for methods of coping with deviant behavior, but with the basic methodologies of education itself since the primary concern of educators is with learning, and behavior modification itself is an outgrowth of a scientific learning theory. This basic common interest in learning makes the alignment of learning psychologists with educators both obvious and imperative. Such an alignment can only add greatly to both disciplines since such an innovation as operant techniques would basically consist of a methodological approach to curricula currently in use. The greatest benefit in terms of increased productivity and adjustment would be to the children, the overwhelming abundance of whom are presently enrolled in regular classrooms.

Regen (1966) indicates that school psychology today is primarily associated with a testing technology whose method of handling behavioral problems is to place the children possessing them somewhere out of the classroom. This need not be the case. It is overt behavior incompatible with academic learning with which educators must deal and therefore this is the problem with which school psychologists as well, should deal. This is imperative if school psychology is to be effective. Exploration of reinforcement techniques for use in regular classrooms

can, as suggested by the previously cited studies, arm educators with powerful tools for effectively eradicating much behavior which is both unacceptable and incompatible with the goals of education as well as to accelerate and increase the occurrence of more desirable behaviors. It is also suggested that much of this can be done without removing the problem individual from the setting. It is more sensible to deal with the problem in the setting in which it arises, both in terms of economics and, more importantly, in terms of helping the child adapt successfully to the environment in which he will later be expected to survive.

Perhaps the most valuable contribution of behavior modification to problem behavior is in terms of prevention of its occurrence. With an understanding of the variables which produce objectionable, non-adaptive behavior, teachers can adequately program their classrooms such that the probability of the occurrence of such behavior is minimized by the strengthening of more desirable behaviors compatible with educational goals and good adjustment. In cases where such maladaptive behaviors do arise, they could often be dealt with before they were allowed to reach critical proportions.

In development of behavior modifying techniques for use in the regular classroom, investigators must concern themselves with techniques which are both practical and economically feasible for use by individual teachers. Such techniques, to be used effectively, may depend on the teacher's acquiring a working knowledge of the principles of reinforcement. The problems encountered will largely determine the

procedures to be utilized, which, because of practical considerations, will often best be group control techniques. The study to be presented here attempts to fulfill the above requirements of practicality, economic feasibility, problem orientation, and group control technique.

METHOD

Subjects

The subjects were twenty-nine fourth grade students enrolled at the Indian Lake Elementary School, a public school of the Vicksburg, Michigan school system. The twenty-nine students were a regular public school classroom comprised of fifteen girls and fourteen boys.

Apparatus

The experiment was conducted in a 27' x 27' public school classroom equipped with desks and facilities for twenty-nine students and the teacher. The door was closed to limit extraneous noise. A General Radio Corporation model 710-A sound level meter was used to measure the sound intensities during all phases of the experiment. An SRA electric timer with a buzzer was used to signal the time periods. A plastic whistle was used by the experimenter to signal to the pupils that they had exceeded the sound intensity limits.

Data were recorded by an observer seated in the rear center of the classroom with a watch and clipboard. Data were recorded on sheets of paper in decibels read from the sound level meter dial directly.

Procedure

The study was conducted during a free-study period which generally occurred between 9:00 a.m. and 11:00 a.m. daily. The class was noted

to be excessively noisy during this period. The sessions recorded range in duration from approximately 40 to 60 minutes each day. These periods normally occurred five days a week, Monday through Friday.

For purposes of this study, the entire class of twenty-nine pupils was treated as a single responding organism. The decibel intensity readings are a total of the noise produced by the entire class.

Baseline data were recorded every three minutes on the minute by an observer seated in the rear of the classroom monitoring the decibel meter. Data from the experimental and reversal phases of the experiment were recorded in the same manner, but utilizing one minute intervals with a reading recorded every minute on the minute. The change to minute interval recordings was to increase the sensitivity of measurement during the experimental phase but means computed utilizing three minute intervals indicated that the data was not significantly altered by use of the one minute intervals.

Prior to the first experimental phase, the teacher informed the pupils of the procedures by which they, as a group, could earn extra gym time. They were told that a timer would be set at 10 minutes and allowed to run to zero, at which time a buzzer would sound. Each time the buzzer sounded, the class would receive two extra minutes added to their gym period and a two minute break to talk, ask questions, sharpen pencils, or whatever they wished before beginning the next ten minute period. If, however, the class became too noisy at any time during the ten minute period, the observer would blow a whistle and reset the timer

to the full ten minutes, regardless of how many minutes had elapsed. During the reversal phase, the students were simply told that the previous conditions were not in effect.

It was arbitrarily decided that the noise level limit be set at 42 decibels. Thus, the experimenter constantly monitoring the sound meter dial would sound meter dial would sound the whistle and reset the timer for each class-produced infraction in excess of 42 decibels. A 42 decibel limit proved reasonable since the room without students registers between 36 and 37 decibels. Sound level readings taken in other classrooms during similar free study periods indicated an average near 42 decibels to be generally acceptable to the teaching staff.

RESULTS

The results were recorded on sheets used by an observer seated in the rear of the room monitoring the sound level meter. The data for all phases of the experiment are represented in figure one, each point on the graph representing the average sound level reading for one session. The vertical axis indicates the sound level reading in decibels of sound intensity. The horizontal axis denotes the trial with the vertical broken lines separating the phases of the experiment. The first phase represents data collected before any contingencies were placed on the classroom sound level, the experimental phase indicates the application of reinforcement contingencies, the reversal phase is the return to the non-contingent conditions, and the second experimental phase is the reinstatement of reinforcement conditions.

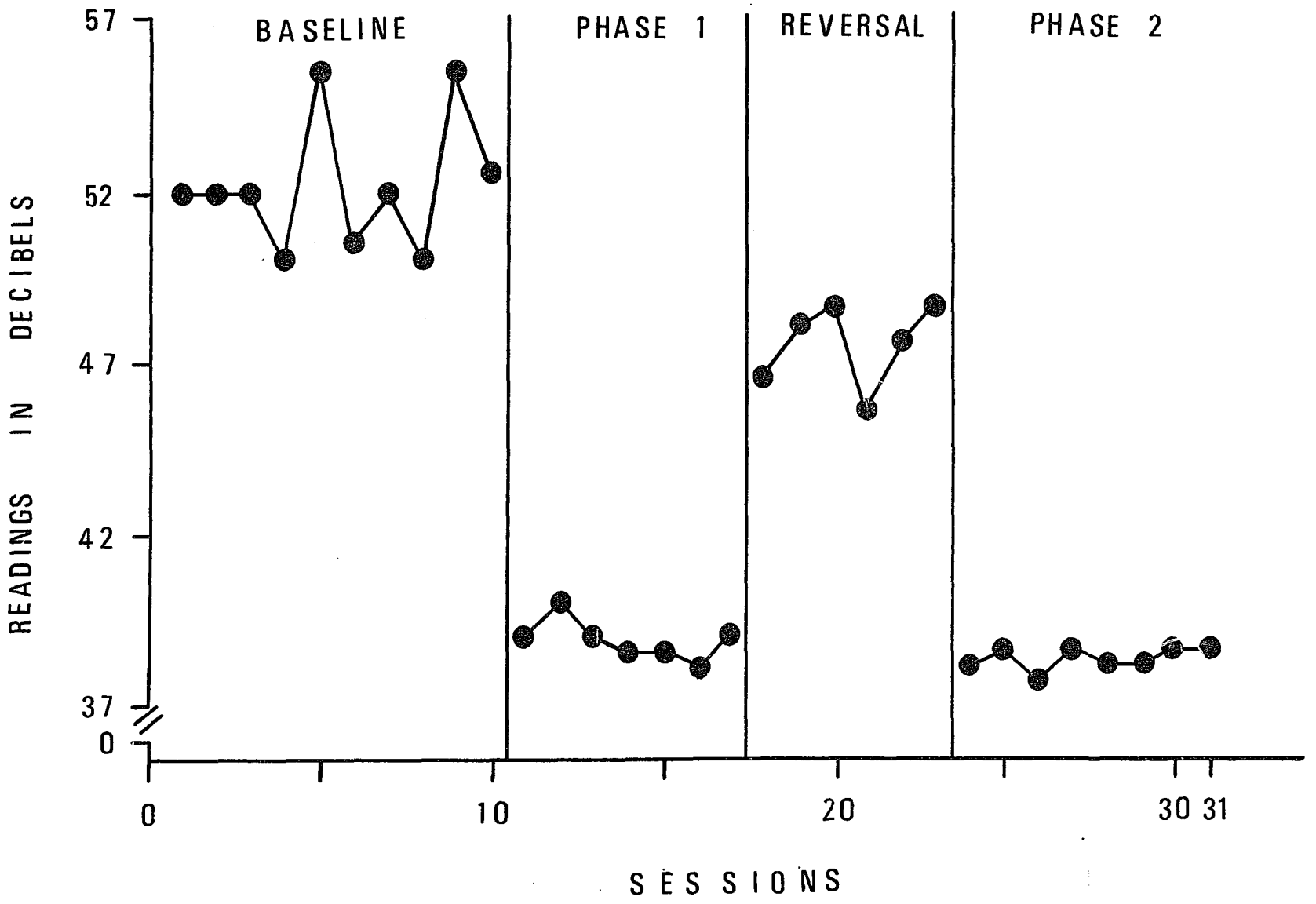
Evidence of the degree of supression of sound intensity is readily observed by comparison of the average sound level readings of the baseline, experimental, reversal and second experimental phases of the study. The mean readings of ten sessions of baseline data in decibels are: 52, 52, 52, 50, 55.5, 50.5, 52, 50, 55.5 and 52.5. These readings all indicate a relatively high level of sound intensity for a regular public school classroom study period. The first session of the experimental phase shows an immediate drop from the preceding baseline reading of 52.5 to 39 decibels, a drop of 13.5 decibels in sound intensity. The 39 decibel reading indicates that the students were producing little extraneous noise since the classroom without the students present reg-

istered a sound level between 36 and 37 decibels. This low sound level was maintained as seen by the average sound level reading for the first experimental period. These readings were 39, 40, 39, 38.5, 38.5, 38 and 39 decibels. The reversal period, during which the baseline conditions were again in effect, shows an immediate increase in sound intensity to 46.5, 48, 48.5, 46, 47.5 and 48.5 decibels. These readings, while intermediate to the baseline and experimental phases, more closely approximate the baseline readings. The second experimental phase, during which the reinforcement contingencies were again in effect, indicates an immediate suppression of sound levels to 38, 38.5, 37.5, 38.5, 38, 38, 39 and 39 decibels. Again, the drop was immediate with no apparent transition or gradual reduction of sound level during the first or subsequent sessions.

Along with the primary effect of the reduction in sound levels, several interesting side effects were noted by the teacher and experimenters. Several pupils were observed to successfully extend social pressure to their more deviant peers to cooperate in the attainment of reinforcement. At the same time, two individuals who had been under surveillance as classroom problems were observed to largely cease their disturbing antics of noise-making, walking about and manifestation of assorted bizarre behaviors such as waving arms and jumping up and down. Out-of-seat behavior, previously a general classroom problem, was reduced to the point where it was no longer considered a problem by the teacher. The teacher also reported that the quality as well as the quantity of work turned in showed improvement. It was also

noted that the effects of these procedures tended to generalize to the rest of the day. That is, when an experimental trial was run in the morning, the children remained relatively quiet throughout the remainder of the school day without the experimental conditions being in effect. The collection of accurate data on these behaviors should be carried out in the future.

Figure 1. Graph illustrating data of all phases of the project.



DISCUSSION

The results of the present study clearly indicate that under certain specific circumstances, control and suppression of sound intensity levels can be demonstrated in the regular elementary school classroom. The immediate increase of sound intensity during the reversal and its immediate suppression with reinstatement of reinforcement contingencies strongly indicate that the reinforcement contingencies were the crucial variable.

Quay, Werry, Mc Queen, and Sprague (1966) point out that the economics of public schools require the development of group techniques which will allow children to be handled by as few adults as possible. They further point out that it is crucial at this stage that the techniques which have been developed on an individual basis be extended to group situations. While the present studies' treatment of an entire class as a single responding organism was here dictated by the nature of the problem encountered, it also exemplifies a technique fulfilling the above requirements. In developing methods which are both economically feasible and practical for application to the entire classroom, group procedures such as this likely hold the most promise of success and acceptance by concerned teachers.

The noted effectiveness of this technique in the suppression of out-of-seat behavior and disturbing antics further suggests its application in the control of individual behavior problems. This technique may prove useful in control of many unacceptable classroom behaviors since they are usually found to be noise producing. It may

also be helpful in the promotion of study habits since studying is generally quite compatible with quietness.

It is hoped that similar future studies dealing with the problem of sound level control will lead to development of a method which is fully automated utilizing electronic equipment. Such equipment could conceivably become an integral part of every classroom with sound control problems.

SUMMARY

A procedure for suppression and control of sound intensity levels in a regular school classroom setting was investigated in this study. A sound level meter was used to measure sound intensities throughout the study. The class was reinforced with a two minute break and a two minute addition to their gym period for maintaining unbroken ten minute quiet periods (below 42 decibels). Transgressions of the 42 decibel limit resulted in delay of reinforcement.

The results indicated that these procedures were highly effective in suppression and control of sound intensity levels. These results were discussed in terms of future implications and applications.

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