EFFECT OF REINFORCEMENT UPON THE QUESTIONING ACTIVITY OF
TWO CULTURALLY DEPRIVED CHILDREN

by

Billie Jeanne Underwood

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STATEMENT BY AUTHOR

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SIGNED: Billie J. Underwood

APPROVAL BY THESIS DIRECTOR

This thesis has been approved on the date shown below:

V. A. CHRISTOPHERSON
Professor of Home Economics

August 12, 1966 Date
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ABSTRACT

Studies have been conducted in which numerous behaviors of young children have been demonstrated to be modifiable by the application of operant conditioning techniques. The purpose of the present investigation was to determine the efficacy of using reinforcement principles to control the questioning behavior of a young child.

Books were read to two Mexican-American boys, aged five, in individual sessions in which they were invited to ask questions. Reinforcement was given or withheld after each question and the variation in frequency of question-asking was recorded for each condition. For one subject, the positive reinforcer was praise; for the other, candy was used as the conditioner.

The increase in question-asking under periods of conditioning and the decrease when reinforcement was withheld led to the conclusion that the questioning behavior of both subjects had been under the control of contingencies of reinforcement introduced by the investigator.
Many preschool education texts have emphasized the necessity of providing the type of environment which will stimulate curiosity, an environment in which children learn how to seek information. Moore and Richards (1959) said that one of the goals of a good school is the fostering of an atmosphere in which the child is encouraged to question. Wann, Dorn, and Liddle (1962) stated that curiosity, questioning, and seeking are some of the basic characteristics of scientific inquiry, and that if adults would encourage intellectual curiosity and growth they must provide the setting in which children can question and investigate.

It is possible, however, that exposure to even the richest program might leave some of the children uninvolved; they would be spectators and not participants. To these children, questioning may be an activity which has not been rewarding nor even pleasant, in some cases. A curriculum devised to encourage the whole-hearted, enthusiastic, self-motivated pursuit of knowledge will have to have a two-pronged attack. The program must be rich in stimulating ideas; but the teacher must also find a method of encouraging the act of questioning, of actively seeking answers.

This questioning activity has received attention from educators of older children. Carpenter (1964) declared that children must be made
aware of questioning as a learning technique and they must become conscious of the quality of their own queries. She said that the challenge to the teacher lies in their ability to accomplish this without killing the spontaneity of their questions. Carner (1963) believed there is little doubt that questioning activates the thinking processes. He concluded that critical reading depends upon the ability to ask the proper questions at the proper time. The ability to ask these vital questions does not occur automatically, and, consequently, children must be taught how to ask questions at the various levels.

The recognition and encouragement of creativity in children has been a lively issue in education in recent years. The search to identify the factors which make up creativity has highlighted the relationship between creativity and curiosity. Torrance (1965) declared that one of the most common and persistent characteristics of the creative person is his tendency to ask questions about the things that puzzle him. Since he is attracted to the puzzling, the unknown, and the unusual, the creative child's questions are numerous and provocative. One of the requirements for a more creative kind of education would be the recognition of the need for asking questions.

Fahey (1942) summarized several studies of language development and concluded that the questioning activity is the major form of oral speech among children of preschool age, comprising ten to fifteen percent of the conversation. This percentage declined sharply by seven. He suggested that the later reduction is the result of inhibition at home and at school.
In a study of the determinants of the incidence and content of children's questions, Berlyne and Frommer (1966) deduced from their data that disparity, inconsistency, and stimulus-change were variables which induced intellectual curiosity, as manifested by questioning. They also found differences from one age level to another with respect to the incidence of questions and the kinds of questions asked. There was no clear-cut reinforcing effect of providing answers to the children's questions.

Arousal was the basic concept advanced by Berlyne (1965) after many laboratory studies of curiosity. He described it as a condition, induced by conceptual conflict, which has much in common with a drive. This concept of arousal is based on neurophysiological findings, and an organism in this condition will seek to lower arousal. This constitutes intellectual curiosity and can be relieved by the acquisition of knowledge. When the subject achieves a solution, questioning behavior ceases. If that solution is followed by a rewarding condition, the activity which preceded it is also reinforced and the subject is more likely to try that form of activity again. The higher the initial level of curiosity, the greater the curiosity reduction and thus the more effective the learning is likely to be.

Analyzing questions asked by young children, Isaacs (1948) concluded that children's curiosity might well be found to vary with individual temperament, with native trend of interest, with intelligence, general social setting, and with educational influences. He felt that what is needed is a collection of studies of the
development of the questioning activity of different children with adequate attention to the way in which they are provided with the instrument for expressing this interest. The natural curiosity of children depends upon adults for a long time; the adult should provide the child with the ampest opportunities for active experiences of every significant kind, together with guidance.

In a study of the effect of an educational program upon language development, Dawe (1942) used as subjects eleven matched pairs of children from an orphanage. Special training was given to the experimental group; they were read to, taken on trips, exposed to a greater variety of stimulation and then compared with the control group on several types of information and vocabulary tests. One result was an increase in the number of intellectual questions from 2.64 to 10.55 per hour.

Encouraging intellectual curiosity is important in all classrooms, but it appears even more urgent in those with students from culturally deficient backgrounds. These are the students who appear least motivated to question and to seek out answers which might help bridge the gap between their limiting subculture and the majority culture.

Young (1941), Smith (1935), and Templin (1957) conducted studies whose data showed variations in the frequency of questions asked by children from different socio-economic classes. In all these studies, children of parents in professional groups were superior in the number and kinds of questions they asked. McCarthy (1954) used structured
situations with toys and books to record the conversation of a group of children, carefully selected for age, sex, and socio-economic status. Some of her findings were that questions made up 14.4 per cent of the conversation of children in upper socio-economic classes; 7 per cent of those in the lower class.

Lewis (1963) felt that one major reason for these differences lies in the fact that the questions asked by children in the lower-class levels are received with apathy or even antagonism so that questioning never becomes a rewarding activity for them. Gray and Klaus (1965) suggested that the lower-class child receives a smaller amount of reinforcement for questioning in an atmosphere where the major concern is with coping rather than with shaping behavior; in fact, reinforcement is more likely to be given for those behaviors that make coping easier. In the absence of adults in the home, their source of reinforcement is more likely to be peers, siblings, or their own sensations. It follows that there is less verbal reinforcement. In such an environment, the "natural curiosity" of the child may wither from lack of encouragement.

Kohn (1954), in an interview survey of social class and parental values, related that working-class mothers were likely to value obedience highly, with less value placed upon the imaginative or questioning child. Maccoby and Gibbs (1954) said that the results of their research showed that the lower-class mother was less willing to be bothered by the child and expected him to be quiet in the house. The deprived child frequently has not learned how to ask and answer questions,
according to Riessman (1962). Home is a crowded, busy, active, noisy place where no one child is focused upon. There are too many children for this, and the parents have too little time.

It was predicted by Taba (1964) that in 1970 forty to fifty per cent of all elementary school students everywhere will be from minority groups. It would appear that an important goal for any preschool program which aims at overcoming the cultural deficits of these children would be an active encouragement of their questioning activity. The purpose of this study is to examine the possibility of using a specific tool which could implement programs designed for these disadvantaged children. The particular tool to be examined is the use of operant conditioning to increase the frequency of questions asked in a classroom situation.

In the operant conditioning framework, questions are a form of verbal behavior. Skinner (1957) defined verbal behavior as behavior reinforced through the mediation of other persons. One type of verbal behavior is the mand; a question is a mand which specifies verbal action and in which the behavior of the listener reinforces the questioner. The behavior of the speaker is classified in terms of the characteristics of the mediating behavior of the listener. This varies from the traditional practice of defining questions in terms of the speaker's intention. According to Skinner (1957), intention may be reduced to contingencies of reinforcement. Developing this same theme, Ferster (1965) stressed that such a functional analysis of behavior has the advantage of specifying the causes of behavior in explicit environmental events that are identifiable and manipulable.
A baseline technique will be used in this investigation in which the child serves as his own control. An attempt will be made to bring the questioning behavior of the child under the control of the experimental variables, recording the variations in the frequency of the questioning when they are presented or removed.

Use of these principles and research techniques seems justified in the light of the advantages described by Bijou and Baer (1960) in their discussion of this type of research in child development:

This technique is extremely efficient in many ways. It yields a law of behavior applicable to a particular child, not to a group mean that may correspond to no actual child. If it is easily replicated in a number of individual children, it is a general law. If not, then the changes in experimental technique, which the experimenter must use in order to replicate it in other children, may often give a meaningful clue to the nature of each child's past history.
CHAPTER II

REVIEW OF LITERATURE

No operant conditioning studies have been conducted which used children's questions as the dependent variable; in fact, there are few studies in which children's speech is the behavior under experimentation.

Epstein and Liverant (1963) had as subjects 135 boys, aged 5 to 7, who had been rated on a semi-projective measurement of sex-role identification. Forty boys with the highest and forty with the lowest scores were assigned to the experimental groups. The situation involved responses made by the subjects to questions asked by male or female investigators. The questions were about representational family figures, with "Good" used as the reinforcer for "Father" or "Mother" as the reply. Conditioning occurred in all groups but male experimenters were more effective reinforcing agents than female reinforcers and "Mother" was more generally conditioned than "Father" in both the high and low-masculine groups. The results strongly supported the hypothesis that boys with strong masculine ego-ideals perceived male adults as more effective reinforcers than those with weak masculine ego-ideals.

In an exploratory study to determine if speech rate could be modified by reinforcement, Salzinger and Salzinger (1962) had as a reinforcing agent a light in a paper-mache clown which lighted up when the correct response was given. Four experimental situations were used,
varying the schedules of reinforcement; the subjects were 16 children, ages 5, 6, and 7, from a private day school and 48 children, ages 6 and 7, from public schools. The subjects were told to keep talking and make the clown happy. In all four experimental situations, there was an increase in the rate of talking when reinforcement was administered; there was a corresponding decrease in rate or stabilization at the previous conditioning rate when it was withhold. This was especially pronounced with "talkers". Reinforcement produced a conditioning effect only if a minimum number of reinforcement was administered. For these subjects, reinforcement was not effective unless the subject received at least ten reinforcements. It appeared that the children from the private school, most of whom came from professional middle-class homes, were more verbally fluent than the public school children from a lower socio-economic group. The operant level for speech rate in the private school group was just as high as the conditioning rate of the public school group.

As predicted in behavior theory, the group with the lowest response rate during extinction as well as the greatest decrease in rate from conditioning to extinction was that group with the fewest reinforcements and on fixed interval schedules. The highest response rate during extinction was recorded by the group which had been given variable ratio scheduling. They concluded that speech could be treated as behavior in and of itself, and not as a symbolic representation of underlying meaning.
The effect of verbal reinforcement has been the focus of several studies. An associative learning task conducted in a classroom situation by Schmidt (1941) yielded no data to support evidence that favored either praise or blame as the "best" incentive. He did find statistically significant differences in tests given by different teachers.

Grace (1948) used a class of sixth graders as subjects who performed a learning task in a classroom. Three types of verbal statements were used: positive, neutral, and negative. The differences among the three conditions were not statistically significant, but, irrespective of the order of presentation, the superiority of fewer mean errors with positive statements over neutral statements was statistically significant. Four-fifths of the group responded most efficiently to either positive or negative statements; one-fifth worked best with neutral statements.

Fifty-one third grade students were divided into two sections, one-half of which received verbal reinforcement. They were assigned arithmetical tasks daily and the students who were to receive reinforcement were praised before the whole class for their work on the preceding day. Another third grade classroom served as a control group. Auble and Mech (1953) found that the control class which received no reinforcement made as many correct responses as the reinforced group, but made more errors. The investigators suggested that verbal reinforcement has the property of reducing variability of performance in routine tasks. The non-reinforced half of the experimental group
apparently showed some effects of mediation of the reinforcing verbal stimuli. In 1953, Auble and Mech separated a class of third graders into three sections. One section received continuous, daily verbal approval from the teacher; one section was given partial reinforcement on the second, fourth, and sixth days; the third section received no verbal approbation. There was no difference in resistance to extinction between the continuously-reinforced and the partially-reinforced groups for either errors or correct responses. They hypothesized that the superiority of partial over continuous reinforcement in other studies was a function of whether trials are massed or spaced, the latter condition being more usual in classroom situations. Again, the group who did not receive direct reinforcement also improved over their baseline measurement, doing as well on acquisition and extinction as did the two reinforced groups.

Utilizing a marble game as a motor-skill task, Zigler and Kanzer (1962) used forty second-grade children as subjects. Twenty were middle-class; twenty were lower-class. Analysis of their data revealed that all types of verbal reinforcers were more effective with middle-class than lower-class children, but praise reinforcers such as "Good" or "Fine" were more effective for the lower-class; "Correct" or "Right" for the middle-class. They theorized that being right for a middle-class child was more often associated with primary and secondary reinforcement. The effectiveness of attention and praise as reinforcers diminishes with maturity, being replaced by the reinforcement inherent in the information that one is correct. This latter type of reinforcer
appears to serve primarily as a cue for the administration of self-reinforcement. This process is necessary in the child's progress from dependency to independence. They concluded that the lower-class child is developmentally slower in making this progress; therefore, verbal reinforcers are less effective because of their abstract quality.

Terrell and Kennedy (1957) studied the relative effects of verbal praise, reproof, candy, and tokens on the acquisition and transposition learning of a simple discrimination problem. Their randomly-selected subjects were eighty children, ages four and five, and eighty children, ages eight and nine. The data showed the candy-rewarded group learned significantly more quickly the transposition task; they were significantly superior to all but the token-rewarded group on the acquisition task.

Employing subjects from both middle and lower-class background, Terrell, Durkin, and Wiesley (1959) tested 485 children, ages five, six, ten, and eleven, in a simple discrimination learning task. The middle-class children did better with a light flash as an incentive; the lower-class children did better with candy. They concluded that the evidence indicated middle-class parents place greater emphasis on learning for learning's sake. A material incentive appears to be more important to the lower-class subjects, possibly because these children are too preoccupied with obtaining material, day-to-day necessities of life to learn the value of symbolic incentives. They also theorized that the lower-class children are more deprived of candy and this deprivation may result in intensification of desire for candy.
Brackbill and Jack (1958), in a study of the function of reinforcement values in children's discrimination learning, divided sixty white, male, middle-class boys, with a MA of 63.6 months, into two groups. The first group had a choice of candies alone; the other group had a choice of marbles, charms, or candy. There was a significantly smaller standard deviation for the group with the choice of reinforcers. Experimenters using simple analysis of variance designs often find the size of within-group variability to be more impressive than between-group difference. The investigators suggested that the use of individually-determined reinforcers would reduce such error variance. They speculated, also, that allowing the subject to choose his own reinforcer would work for maximization of motivation. In a practical application of this point, they felt that schools use only one type of reinforcer--the grade. But grades are not equal in reinforcing value, and, in view of this, teachers might obtain better academic performance from their poorer students by offering other individually determined incentives.

Staats et al. (1964) studied the acquisition of reading responses using multiple schedules of reinforcement with four children, aged four. They received marbles for correct responses, which they could trade for a plastic trinket, an edible, or a penny. Or they could be saved for exchange for a larger toy. They concluded from their data that the acquisition of complex responses are sensitive to the manipulation of important independent variables. In a similar study, Staats (1964) stressed that a token reinforcement system could shift
with variation in a child's momentary and long-term deprivation or satiation.

Reinforcement principles were applied systematically to several behaviors of young children in a nursery school in a combination of research and practical application. Johnston et al. (1966) used adult attention and approval to improve a boy's skill on a climbing-frame. Behaviors which increasingly approximated climbing were reinforced until climbing was achieved. Harris et al. (1964) helped a nursery school child to substitute well-developed walking behavior for recently re-acquired crawling behavior, used by the child as a form of withdrawal. The data strongly indicated that adult attention was the significant independent variable, and that adults were very powerful reinforcers for the child. Hart et al. (1964) demonstrated the effects of social reinforcement on the operant crying of two nursery school children. Teachers systematically applied reinforcement procedures; they gave no attention to outcries, unless the child was actually hurt, and gave immediate approving attention to behaviors that were more appropriate to mildly distressing situations. Within a week, operant crying had practically disappeared in each case. Reversal of procedures reinstated operant crying responses.

The regular teachers of these children carried out these procedures in the course of their professional work. Harris et al. (1964) declared:

Application of reinforcement principles to nursery school children may be an important step in the process of learning more about child behavior and its relation to guidance practices.
CHAPTER III

METHOD

Selection of Subjects

Two Mexican-American boys who were attending a branch of the Tucson Nursery School, during the summer of 1966, were selected as subjects. The Tucson Nursery School is supported mainly by United Community funds; the children's parents pay small fees, according to family income. The income must not exceed a set limit and eligibility is determined by the social worker employed by the school. Her judgment of their financial status is relied upon by the investigator for the determination of their position in a lower socio-economic class.

The enrollment at the child-care center varies monthly from forty to eighty children, with two or three teachers for the whole group. They are divided into two sections from 9 to 11 a.m., with one teacher supervising activities for the five-year-olds; one teacher directing activities for the younger children. The morning activities include a fifteen-minute story time.

There is a continual change in personnel; the subjects have had three teachers since January, 1966. The present teacher declared, "Oh, none of these children ask questions at story time."
Description of Subjects

Tony N., 5 years, 4 months, lives with his mother; brother, 4; and his stepfather of less than a year. The stepfather's employment is not known by the social worker; his mother does piece-meal work at a clothing factory. She is described by the social worker as a very conscientious mother who talks and reads to Tony. He comments readily and frequently when spoken or read to. He came to each session with apparent eagerness, although he occasionally twisted and chewed his shirt.

David L., 5 years, 2 months, lives with his mother, a clerk at an aircraft company; a brother, 3; and his father, a printer, now unemployed. David enjoys baseball and other outdoor activities. He spoke rarely during the sessions, but came very readily each time.

Selection of Books

Twenty-four preschool and primary books of science and social studies were selected from a group of forty submitted to two experienced kindergarten teachers for their decision as to the question-eliciting properties of the books. A consultant for the Headstart program who has had experience working with culturally disadvantaged children helped in the initial selection.

Five were large picture books with twenty-two pages; the others were smaller and with more pages. Forty pages were used in each of these. From the text, the material to be read to the children was chosen to be of as similar length as possible.
However, it is recognized by the investigator that the content of the books did vary and their intrinsic interest to the child may have varied also, but the aim of the study was to duplicate the reality of a kindergarten teacher reading different books to a child.

A list of these books is in the Appendix.

**General Procedure**

Each boy was read to in an individual meeting, with the sequence of order alternated. These sessions lasted fifteen to twenty minutes and were held twice a day, from 8:30 a.m. to 9:00 a.m. and from 3:30 p.m. to 4:00 p.m. The children were met on the playground or in the playroom and invited into a smaller room. At the beginning of each meeting, the boys were told they could ask any questions they liked and were shown the pictures. Then, the investigator read the edited text, preceding this with another statement that they could interrupt at any time.

Each session was recorded on tape, with later transcription in which the questions asked were recorded for each child. These were separated later into those asked during the picture presentation and those asked during the reading. They were also separated into three categories: questions of classification, of causality, and others.
Specific Procedure

Tony N.

The first three sessions with Tony served to establish as a baseline his normal rate of questioning during this story-time. In three of the next five sessions he was rewarded with expressions of praise. "That's a good question!" was used for questions beginning with "How come?" or "Why?". When the number of his questions decreased, he was reinforced for every question. For five extinguishing periods, his questions were not answered; he was politely told, "Maybe we'll get the answer later" or "Later, Tony,". A period of reconditioning followed for five sessions in which his questions were answered; for another five sessions he was both answered and praised for each question. When the other subject was given candy as part of his reinforcement procedure, Tony was given a few pieces at the beginning of each of the meetings to prevent any feelings of injustice he might feel if David spoke of his candy.

David M.

Three sessions were used to establish a baseline measurement for David; four were spent in an attempt to condition him with praise. In the next five period, he was given an M & M for each question asked; he received no candy for asking questions during the following five sessions of extinction, although he was given a few at the end of the meeting. The final periods were used to again reward him with candy for each question. During the period of reinforcement the candy was held in the
lap of the experimenter. It was necessary to prompt this child at the first session of reinforcement periods so that his questions could be rewarded. For example, the investigator would ask, "Would you like to ask me about that?" These questions were not recorded for tabulation.
CHAPTER IV

RESULTS AND DISCUSSION

Description of Subjects

Two Mexican-American boys who attended the Tucson Nursery School in the Summer of 1966 served as subjects. Tony N. was 5 years, 4 months old; David L. was 5 years, 2 months old.

Results

Tony N.

One hundred eighteen questions were asked by this child; one before the session started, 63 with picture presentation alone, and 54 while being read to. He asked 87 classificatory questions, 20 questions of causality and 11 questions of other categories, in 24 sessions. These data are shown in Tables 1 and 2.

His baseline measurement of 5 to 6 questions showed him to be the "questioner" of the two subjects. It had been decided to differentiate the conditioning of his questions and only questions of causality would be rewarded. At the first period of conditioning, he asked 17 questions, 8 of which were questions beginning with "How come?" or "Why?". Immediately after each of these questions he was told "Good question!" or "That's a good question!". In the succeeding meeting he asked 8 questions, only one of which could be rewarded. In the third
Table 1
FREQUENCY OF QUESTIONS BY CATEGORY

<table>
<thead>
<tr>
<th>Category</th>
<th>Tony</th>
<th>David</th>
</tr>
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<tbody>
<tr>
<td>Classification</td>
<td>87</td>
<td>21</td>
</tr>
<tr>
<td>Causality</td>
<td>20</td>
<td>26</td>
</tr>
<tr>
<td>Other</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total questions</strong></td>
<td><strong>118</strong></td>
<td><strong>54</strong></td>
</tr>
</tbody>
</table>

Table 2
FREQUENCY OF QUESTIONS BY SITUATION

<table>
<thead>
<tr>
<th>Situation</th>
<th>Tony</th>
<th>David</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before pictures</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>With pictures</td>
<td>63</td>
<td>9</td>
</tr>
<tr>
<td>With story</td>
<td>54</td>
<td>45</td>
</tr>
<tr>
<td><strong>Total questions</strong></td>
<td><strong>118</strong></td>
<td><strong>54</strong></td>
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session he asked only two questions, neither of which received praise. It was feared that all questions were being extinguished so at the next session each of his five questions were rewarded. He asked seven questions at the last meeting of this period.

In this child's period of extinction, his questions were not answered; he was told "Later, Tony" or "Let's wait and see if the book tells us." He never reached his baseline measurement. Since his baseline measurement had been high, there was a possibility that receiving answers was rewarding for this child so in the first period of five reconditioning sessions he was answered but not praised. Again, he did not reach baseline. During the final period of five reconditioning sessions, Tony was answered and praised. In each of these, he asked questions at a rate higher than his extinction or baseline measurement. In the last two meetings, he almost doubled his highest baseline measure, although he never reached the high peak of the first period of conditioning.

The effect of these periods of reinforcement and reinforcement withdrawal are depicted in Figure 1.

David L.

David asked 54 questions in 22 sessions; 9 with pictures alone, 45 with the story. Twenty-one of his questions were of a classificatory nature; 26 of a causal nature; 7 of another nature. These data are listed in Tables 1 and 2.
David's baseline measurement of 0 to 1 questions established him as a "non-questioner." The first attempt to condition him was with praise and was unsuccessful; his frequency never exceeded baseline. During this and the next conditioning period it was necessary to prompt him by saying, "Do you want to ask me about that?" in order that he could be reinforced. This was no longer necessary when candy was introduced as the reinforcer and the subject saw the bag. These prompted questions were not recorded for tabulation. The candies were held in the investigator's lap. The candy, which was visible to the child, may have served as a discriminative stimulus, a stimulus which marks the time or place when an operant will have reinforcing consequences.

In his period of extinction, David's questions were answered but he was not given candy for questioning, nor was the candy held in his view, but he was given a few pieces after the session. His frequency of questioning during this time was that of the baseline measurement. In the last five sessions the candy was again in sight and he was reinforced by a piece for each question. He asked nine times more questions than at any time during baseline or extinction.

These variations are depicted in Figure 2.
**Figure 1** - Questions asked by Tony under reinforcement

* Reinforcement given only to questions of causality
Figure 2 - Questions asked by David under reinforcement
Discussion

The questioning activity of both boys was demonstrably manipulated by the contingencies of reinforcement-withdrawal introduced by the investigator. The results of this study lend credence to the possibility that questioning is a behavior which can be strengthened by operant conditioning. As predicted by Skinner (1957), it was behavior reinforced through the mediation of another person; the probability of occurrence of this certain class of verbal responses was controlled by the experimenter. Like other operants, it acquired strength and continued to be maintained in strength when responses were followed by reinforcement; it lost strength when they were not.

There was a difference in the functional value of the reinforcers used for the two subjects. Bijou and Sturges (1959) declared that positive reinforcers were those classes of stimuli which strengthen the behavior they follow. He observed that the only way to find out which stimuli are reinforcing is to observe the behavior after presentation contingent upon a response. For Tony, verbal approval was a positive reinforcer; it was not for David, for whom candy served in that capacity.

When praised for asking questions, Tony's frequency of questioning, except for two early periods, was always above his baseline or extinction measurement and was apparently still increasing when the sessions ended. Baer (1962) declared that variations in effectiveness which social reinforcement shows for individual children reflect both their differing histories of social conditioning, and describe their present personality traits. The approval of an adult female may be
reinforcing for Tony because he has had the close attention of his mother; between her divorce and remarriage, there must have been a period when she spent much time alone with her sons. If the social worker's account of Tony's being read to frequently is valid, the combination of a book and a female adult may serve as a setting in which the attention of an adult would be reinforcing. Cohen (1954) hypothesized that generalized conditional reinforcers such as verbal approval have probably acquired their reinforcing properties through association with primary rewards or through higher-order conditioning with other secondary rewards connoting security, affection, nurturance, etc., in the history of the individual.

Another possible explanation for the importance of the role praise plays in Tony's life may lie in his current daily separation from his mother and her remarriage. A new stepfather undoubtedly pre-empts some of the attention which had been Tony's. Gerwitz and Baer (1958) found that social isolation increased reliably the reinforcing power of adult approval for children as a positive function of the degree to which it was sought in other settings. The high number of classificatory questions may signify that his questions are primarily bids for attention. Franco (1965), in a structured projective test found considerably larger correspondence than could be expected by chance between kindergarten children's perception of their mother and their teacher.

To end speculation about Tony's past and begin speculating about his future, the rapid effect upon this child's questioning activity of
not being answered or praised may be suggestive of the effect of an overburdened teacher in an overcrowded classroom who does not have the time nor the inclination to place a premium on a child's questions.

The data indicate that verbal approval was not a successful conditioner for David's questioning behavior. There are few clues with which to spin a web of his reinforcement history, but it is known that David and his father relish athletics. Perhaps an outdoor activity with a male investigator would prove to be a setting in which verbal approval would be a positive reinforcer for this subject.

Candy was an effective reinforcer for David and might also have been for Tony; its relative effectiveness when compared to social approval was not tested in this study. The use of verbal approval of the teacher has long been considered as a proper adjunct to successful teaching but the use of candy and other material objects may not seem to be a step in the direction of inculcating learning for learning's sake. An illustration of the use of extrinsic reinforcement in child psychotherapy offers a clue to the way they might be used as a step along the way to self-reinforcement. Patterson (1965) related that disturbed children at the end of treatment were significantly more responsive to social reinforcers dispensed by their therapist; he had gained additional status as a reinforcing agent. The data did not reveal whether this effect was due to the association of the therapist with candy and money or due to the relationships formed during the conditioning trials.
Staats (1965) affirmed that in his treatment of non-reading in a culturally deprived juvenile delinquent the extrinsic reinforcement was gradually decreased until reading became reinforcing in itself.

Although it is necessary to take a number of samples in a number of situations in order to get a stable index of a child's language responses, David apparently could be classified not only as a "non-questioner" but also as a "non-talker" in a classroom situation. The use of special tools seems to be justifiable to increase his use of language in an academic setting.

Deutsch (1965) wrote the following in a discussion of the role of lower-class status in language development:

If language cannot be used as an elaborating form of communication, school loses much of its socializing and teaching capabilities, regardless of the curriculum content. As a consequence, for a significant proportion of these children, functional motivation may not exist in terms of the learning strategies demanded by the school situation.

It is interesting to note that though some of David's earlier questions were inappropriate, they became more appropriate. More than half of his questions were of causality.

This short, exploratory study stimulated thoughts of doing more research in this area and the following paragraphs deal with variables not treated but which should be considered in further investigation. A proposal for such research is in the Appendix, the design of which includes these considerations.

The question of retention is important; both boys listened attentively but there was no measurement of how many of the answers
were remembered. Future studies should include such a measurement and an attempt to determine the amount of information gained from the presentation of facts by the experimenter and that gained by the answers given the children's questions.

Another emphasis to be placed in subsequent studies would be the discriminative reinforcement of questions asked by a subject like Tony to shape more queries of causality. Discriminative reinforcement was attempted early which resulted in a decrease in all questions. Perhaps this could be successfully done later after a high rate of overall questioning has been established.

Conditioning was administered on a continuous, fixed ratio schedule of reinforcement. Findings from many laboratory studies have demonstrated that for a given number of reinforcement a variable ratio, intermittent distribution is associated with more resistance to extinction. An intermittent schedule of reinforcement is more apt to occur in classroom situations and should be the goal worked toward in experimental studies. With periodic reconditioning a child could be taught to keep trying. He could be given regular measures of approval at first, then later only occasionally so that he will not give up at the first sign of disapproval.

The content of the books was considered in the design of this study in that they were selected to have eliciting properties as similar as possible. It is recognized, however, that the books must have varied in these qualities and books are not the only, not even the best, means to pique children's curiosity. Carpenter (1963) pointed this up
when she said that really significant questions arise when children are manipulating and exploring actively. They do not question freely in an atmosphere which establishes the book, the teacher, or the parent as sole sources of knowledge.

Table 2 reveals that Tony asked 62 of his 118 questions when shown the pictures alone; David asked only nine. There is a hint in this that visual stimuli play a larger role in Tony's life, but this is attenuated by the fact that the children were permitted to look at the pictures while the books were read. A well-balanced investigation would include many opportunities for seeing, tasting, hearing, touching, and smelling many things from the physical, social, and biological world. From his studies of curiosity, Berlyne (1960) has formed the conclusion that both cue stimuli and motivation stimuli are needed to propel a quest for knowledge.

In summary, this study has demonstrated that the questioning behavior of two Mexican-American boys was influenced by the reinforcement procedures instituted by the investigator. The implications of this conditioning appear relevant to the implementation of programs designed for the development of verbal expressions of curiosity in young children, particularly the culturally deprived.
CHAPTER V

SUMMARY

This study was undertaken to determine if the questioning behavior of a preschool child could be strengthened by reinforcements administered by the investigator. If that behavior was weakened by the withdrawal of those reinforcements and again strengthened by their reappearance, questioning would seem to be influenced by the consequences of its occurrence.

The subjects were shown pictures in preschool or primary books of science and social studies and were read equal, pre-selected portions of the text as the children viewed the pictures again. Before each picture presentation and each reading, the subjects were invited to ask the investigators any questions. All sessions were recorded on tape for later tabulation and categorization of classification and causality.

Two Mexican-American boys, aged five, served as subjects. Three baseline measurements were taken of the frequency of their question-asking; then, individual contingencies of reinforcement were introduced for each subject.

Four unsuccessful trials were made in an attempt to condition one subject with an expression of praise for each question asked; this frequency never exceeded baseline. This period was followed by five
sessions in which his questions were rewarded with candy. In four of
these five readings, the subject asked four questions, his highest
baseline measurement had been one. With removal of the candy
reinforcement, his frequency of questioning again ranged from 0 to 1;
with the reintroduction of candy, his frequency climbed to 4, 5, 7 and
finally 10 questions at his last two sessions.

The other child's baseline measurement ranged from 5 to 6
questions; with the introduction of verbal approval in the first
conditioning period it increased to 17. At this time reinforcement was
given only for questions of causation and his frequency decreased in
the next two sessions to 7 and then to 2 so all his questions were
rewarded with praise in the final two sessions of this period; it again
increased to 7. Extinction time for this subject consisted of not
answering his questions; his level dropped below baseline. To determine
if answers alone had been a strong reinforcer, he received answers alone
in his first period of reconditioning. Again, he did not reach baseline
level, but when praise was added to the answers his frequency of
question-asking climbed from 2 to 11 questions.

The following conclusion was reached from an interpretation of
the data: The questioning behavior of two Mexican-American boys had
been conditioned by the reinforcements experimentally manipulated by
the investigator.
APPENDIX A

DESIGN FOR FURTHER RESEARCH

Introduction

Preschool education plays a very important role in programs for culturally deprived children by providing them with rich and varied experiences. But exposure alone is not enough; personnel in the preschool field must develop ways of insuring active participation from these children. Techniques must be utilized to increase their questioning behavior, their ability to seek answers. If this could be accomplished at the preschool level, their entry into more formal academic learning could be eased.

The groups to be tested are much smaller than in conventional classrooms, yet self-motivated students who have learned first to question, then ultimately to seek out their own answers are the true aim of education. Classrooms in the not-too-distant future may not consist of thirty children sitting in rows waiting to be taught en masse, but rather, of individuals or small groups engaged in independent pursuits of knowledge.

Subjects

One group of six culturally deprived children, aged five, who attend one of the Tucson Nursery Schools.
Another group of six children, aged 5, to serve as a control group.

**Method**

From 9:00 to 10:00 a.m. each day for five days a week, one of the groups will be taken from their large playroom to a smaller room and with the experimenter serving as teacher will have an enriched program of science and social science experiences. The other group will receive the same exposure from 10:00 to 10:30 a.m., with the time alternated for the two groups.

The only difference between the control group and the experimental one will be that the latter are to be conditioned by a token reinforcement system for questions they ask.

**Conditioning System**

At the beginning of the program, any questions of information will entitle the child to a token dispensed by the teacher which can be exchanged at the end of the session for a plastic trinket, pennies, or an edible which can be given at snack or lunch time. Or the child may save his tokens to exchange for a larger toy. When the majority of the children are responding at a stable rate and that rate has remained stable for three days, a change will be made. The teacher will tell the class that the rules are being changed and tokens will be given out at only certain times. For forty-five minutes questions will be rewarded with tokens; for fifteen minutes praise for the question will be the reinforcer. Again, when a stable rate has been achieved by the majority
over a three-day period, the schedule of reinforcement will be thinned, this time to thirty minutes of token reinforcement and thirty minutes of praise. There will be a gradual thinning of this schedule until there are fifteen minutes of token reinforcement and forty-five of praise, and, finally, only verbal approval will be used as the reinforcer. This same schedule and procedure will be followed alternating verbal approval with a smile or a nod until only facial cues are used as conditioners. When it appears that the majority of the group is responding at a stable rate on this schedule of reinforcement, the experimenter will begin differentially reinforcing only those questions which appear framed to get information regarding causation or explanation.

Handling of Data

A teacher's aide would be employed to record all the questions asked during the sessions of both the experimental and the control groups. Both the total number and kinds of questions asked would be tabulated for both groups.

At the end of three months, the children of both groups, in individual interviews, will be asked questions regarding the material which had been covered. This test will include an equal number of questions made up from information given the children by the teacher and from answers to questions which they had asked.
APPENDIX B

LIST OF BOOKS READ TO CHILDREN


LIST OF REFERENCES


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