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Three procedures were compared for their effectiveness in increasing the question-asking behavior of small groups of mildly retarded children. The token reinforcement procedure was found to be effective, while the modeling procedure, when used alone, was not effective in modifying question-asking behavior. However, the modeling procedure in combination with the token procedure produced the most rapid and significant performance change. The modeling procedure was viewed as having facilitated the reinforcing effect of the token procedure. The results of this study were compared with those of other studies which have investigated similar procedures for modifying verbal behavior.

COMPARISONS OF PROCEDURES FOR MODIFYING QUESTION-ASKING BEHAVIOR OF MILDLY RETARDED CHILDREN

by

Andrew S. Bondy

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Approved by

Marilyn T. Erickson
Thesis Adviser

APPROVAL PAGE

This thesis has been approved by the following committee of the Faculty of the Graduate School at The University of North Carolina at Greensboro.

Thesis Adviser Marilyn T. Erickson

Committee Members John M. Pratt

R. Stanley L. Smith

November 27, 1973

Date of Acceptance by Committee

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CHAPTER I

INTRODUCTION

Questioning is one form of information-seeking behavior. Skinner (1957) has classified question-asking behavior as a mand. As such, a question specifies its own reinforcer, which is the answer. For example, the question, "What is your name?" is reinforced by the answer, "My name is Andy." Making additional reinforcing consequences contingent upon question-asking should also tend to increase the rate of the target response class. An alternative viewpoint on questioning behavior is proposed by Allender (1969) who writes that 'search behavior' is maintained by intrinsic factors. This theory seems to indicate that manipulating consequent events to questioning would not influence the rate of the behavior.

The early research on questioning behavior with children consisted primarily of observational studies (Piaget, 1926; Yamamoto, 1962). Yamamoto (1962) has shown that with children the rate of questioning tends to increase with age. Stirling (1937) found that the rate of questioning behavior was positively correlated with IQ level. These studies suggest that retarded children show a deficit in question-asking behavior in comparison to

normal age-matched children. It would seem to be particularly important for retarded children to learn verbal skills such as question-asking in order to maximize their receiving of information about the environment.

Most of the experimental studies involving question-asking have dealt with manipulations of antecedent stimulus conditions, such as stimulus complexity, novelty, or incongruity (Berlyne & Frommer, 1966). While many studies have investigated procedures for modifying the questioning skills of teachers (Gall, 1970), only a few experimental studies have been designed to investigate the modification of questioning behavior with children (Rosenthal, Zimmerman, & Durning, 1970; Zimmerman & Pike, 1972).

Modeling has served as the training technique for the modification of a variety of language skills (Bandura & Harris, 1966; Sloane & MacAulay, 1968). Lahey (1971) found that a modeling procedure without immediate reinforcement was effective in modifying the use of descriptive adjectives. However, Bandura and Harris (1966) found that the modeling procedure they used was not effective by itself in modifying the use of prepositional or passive constructions.

The advantages of using token systems of reinforcement in academic situations have been well documented (Bandura, 1969; O'Leary & O'Leary, 1972). Token systems

have been utilized successfully to increase general verbalization level (Isaac, Thomas & Goldiamond, 1960) as well as to increase the rate of specific language forms (Hart & Risley, 1968). Token reinforcement systems are more resistant to satiation effects than are social praise reinforcement (Bandura, 1969).

This study had two primary aims: 1) to compare the effectiveness of a modeling procedure, a token procedure, and a combination of the two procedures for increasing the rate of question-asking behavior of retarded children, and 2) to determine whether reinforcing events not specified by questioning behavior can be used to modify that behavior.

CHAPTER II

METHOD

Subjects and Setting

Subjects (Ss) were pupils in 4th and 5th grade Special Education classes in two Greensboro Public Schools. Ss were administered an individual Slosson IQ test prior to the study. The mean age was 10.1 years, with an SD of 1.1 years and a range of 8.3 to 12.6 years. The mean IQ score was 70.1 with an SD of 4.8, and a range of 57 to 75.

A screening procedure (using material similar to that used during the study) was administered to assess the initial level of questioning behavior. Fifteen Ss from each school were tested, and the eight pupils with the lowest scores were selected for the study. These Ss were randomly assigned to two groups in each school.

The study was conducted during school hours in an unoccupied room in each school. Sessions were conducted three times a week with each session lasting approximately forty-five minutes.

Trainers

The Trainers (Trs) were four undergraduate students who were enrolled at the University of North Carolina at

Greensboro and received academic credit for serving as the Trs throughout the study. Prior to the study, each Tr was presented with arguments for and against the effectiveness of each of the experimental procedures. Each Tr was trained by the present author to use each of the procedures and was not informed during the initial Baseline condition as to which training procedure they would follow.

In order to familiarize the Trs with the procedures, the Trs participated in role-playing practice sessions with the present author. In addition, a brief practice session with the experimental groups was used to familiarize the Ss with the experimental setting. Periodically throughout the study the present author listened to the tapes recorded by each Tr to insure that each Tr was following the appropriate procedure.

Measurement and Reliability

Each Tr recorded the number of all questions asked by each S pertaining to the stimulus presented (i.e., requests to go to the bathroom, or asking when the session will be over, were not recorded). In addition, all sessions were tape-recorded by the Tr using an observable portable cassette tape recorder. Following each session, the four Trs exchanged tape cassettes and recorded the number of questions asked by each S. Thus,

each Tr rotated as reliability monitor for each of the other Trs. In this manner, each of the four Trs collected primary data and also served as a rater for the reliability computations for each of the other Trs. The reliability measure was the number of agreements divided by the number of agreements and disagreements.

Design

The Ss were randomly assigned to three training groups and one control group: Token (T), Model (M), Model and Token (MT), and the Control group (C). The design consisted of four experimental conditions: Baseline-1, Training-1, return to Baseline-2, and Training-2. Each condition of the study lasted for six sessions. Each group contained four children who experienced the procedure.

Procedure

Before each session began, Tr gave the following instructions to the Ss: "Today I am going to show you some pictures and tell you a little about each picture. After I show you the card, I want you to ask me any questions you want to about the picture. Do you understand? Remember, you should ask me questions about the picture." The procedure for the pre-Baseline assessment of question-asking was identical to the procedure for the Baseline condition, except that the S was alone in the former condition.

During Baseline-1 sessions, each Tr used eight stimulus pictures for each group.[1] Within a condition all groups viewed the same sets of stimulus pictures. These pictures consisted of large (16" x 24") photographs.[2] The content of these pictures included scenes of children and adults working and playing, pictures of animals or insects, and general pictures of mountains, fields, cities, schools, markets, etc.

After displaying a particular picture, Tr prompted general question-asking by saying "Let's all think of some questions we can ask about this picture." Tr then directed the prompt to each S in turn by asking, "Johnny, what question can you ask me about this picture?" The order in which Ss were called on was counterbalanced within each session. The order of Ss for each session was randomly determined.

During Baseline-1, no questions (other than the prompt) were modeled for the Ss. All questions were immediately answered. The Tr avoided providing social reinforcement (e.g., "That's good!") for question-asking. Five seconds without a response by S following a prompt was established as the criterion to proceed to the next picture, or the next S. The Tr used only two verbal prompts for each

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[1]For sessions in which one S was absent only six randomly chosen pictures were used. This procedure was followed on less than 4% of the total number of sessions.

[2]The pictures were selected at random from photographs made for classroom use by the Society for Visual Education, Inc., and prints made by Bowmar Publishing Corp.

stimulus presentation for each S. One prompt occurred when it became a particular S's turn to respond. The second prompt followed either five seconds of non-questioning behavior or immediately after the first question was answered. The procedure involving the prompts was followed for all groups across all four conditions.

During Training-1 Group T was instructed that each question asked would earn S a point on a public chart which could be exchanged at the end of the session to buy various items from a 'store.' This 'store' included food items to be purchased for various token ratios ranging from single token items (e.g., one M&M) to high-cost items such as ice cream. New items were continuously made available. The total number of points earned was placed on the chart immediately following an S's performance with each stimulus picture.

For Group M, Tr told the group that she would "ask some questions that you can ask." The Tr further gave instructions that the Ss were to try and ask questions just like she did, although they may ask questions of their own. The Tr modeled four questions for each picture for each S. For any given picture the Tr modeled the same questions for each S. Following any question by an S, Tr answered the question in a simple manner and provided no differential reinforcement for modeled vs. unmodeled questions. The

group was further instructed that no one was to answer the modeled questions that the Tr asked.

For Group MT, the token and modeling procedures were combined. Thus, Ss were given the same instructions as Group T about the point system and were given the same instructions as Group M about Tr's modeling behavior.

For Group C, the procedures used during Baseline-1 were maintained throughout all sessions. Since the addition of a token procedure was introduced for Groups T and MT, each S in Groups C and M was given an amount of reinforcement comparable to that earned by the token groups. In this manner, each group received approximately the same amount of reinforcement following each session for all conditions.

The third condition was a return to the baseline procedures for all groups (Baseline-2). However, the amount of candy that each S received at the end of each Baseline-2 session was equal to that received during the last session of the previous condition. This procedure was used to avoid confounding changing the amount of candy received with altering the group procedure.

The fourth condition (Training-2) was a replication of the procedures used during Training-1 with one exception. Whereas the Trs had worked with the same groups for the first three conditions, each Tr now worked with a different group while the Ss received the same procedure. The two

Trs not involved with a token procedure during Training-1 did follow one of the two token procedures. The Tr assignment to groups was randomly determined after the completion of the Baseline-2 condition. The change in Trs was an attempt to minimize Trainer x Procedure interaction effects.

Several problems concerned with the implementing of the procedure were encountered. Three of the Ss in Group C during Baseline-1 presented disruptive behavior at a high rate that could not be brought under control by the Tr or the present author within the first six sessions. Therefore, these three Ss were dropped from the study and were replaced by three Ss who had scored the lowest on the pretest of the remaining potential Ss. In addition, due to the temporal constraint of the school year ending, Baseline-1 was not utilized for the reconstructed group.

At the start of Baseline-2, one member of the MT group was hospitalized and could not continue with the study. Since it was thought that there might be definite sequential effects operating during the study, a replacement S was not selected. A second member of the MT group moved out of the school district before the completion of the study, and data for Sessions 5 and 6 of Training-2 could not be collected for the MT group.

CHAPTER III

RESULTS

The dependent measure was the mean number of questions asked per picture for each S. Inter-rater reliability was assessed for 70% of the experimental sessions, and the overall reliability was found to be 92.3%.

Figure 1[3] presents the mean number of questions asked per picture for each group for each session. Groups MT and T demonstrated substantial performance increases during the two Training Conditions. The performance of Group M did not appreciably change during the two Training Conditions, and Group C did not evidence any change across Conditions. Performance during Baseline-2 appeared to be similar to performance during Baseline-1 for all Groups.

A repeated measures (unweighted-means) analysis of variance for Groups MT, T and M for Sessions 1-4 for all Conditions revealed significant Group, Conditions, and Sessions effects (Table 1). Significant Group x Conditions interaction and triple interaction effects were also found. A comparison of means for Conditions revealed that the performance during Training-2 was significantly higher

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[3]The data are presented on a semi-log scale to facilitate the comparison among Groups during both Baseline and Training Conditions.

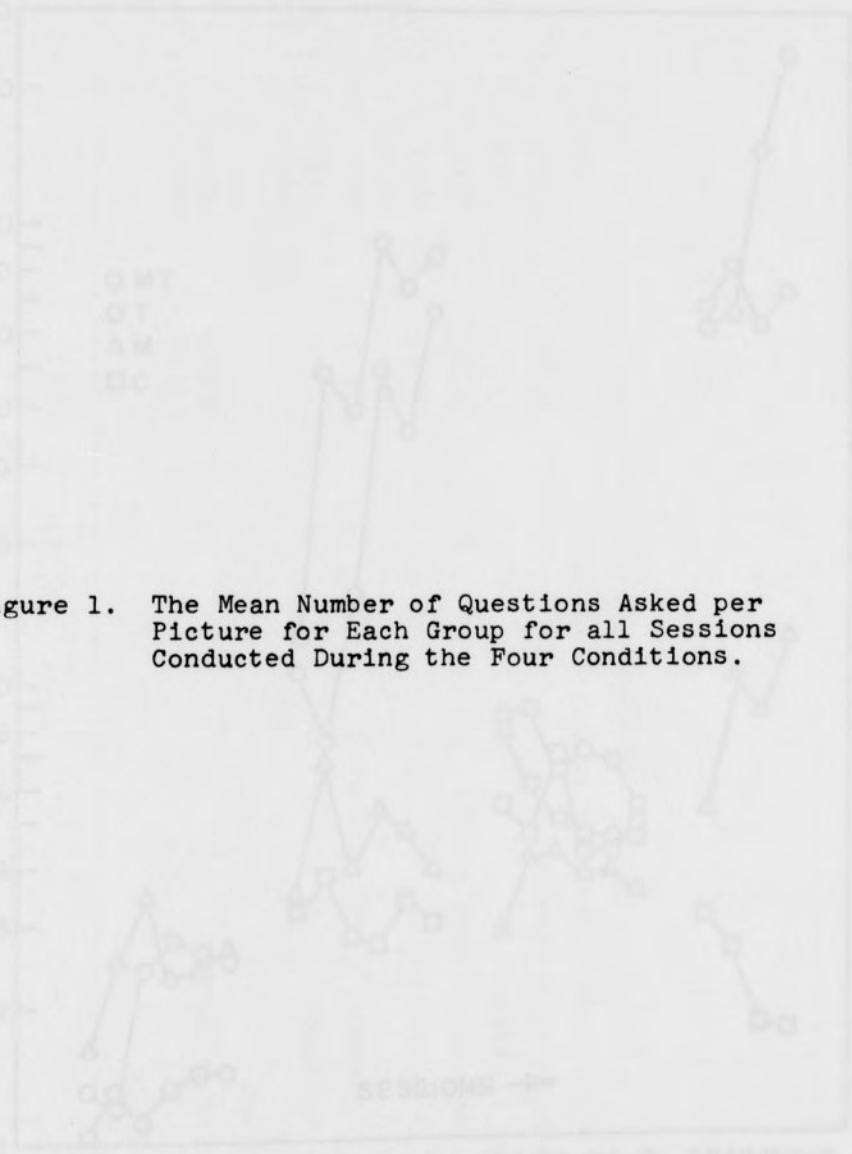

Figure 1. The Mean Number of Questions Asked per Picture for Each Group for all Sessions Conducted During the Four Conditions.

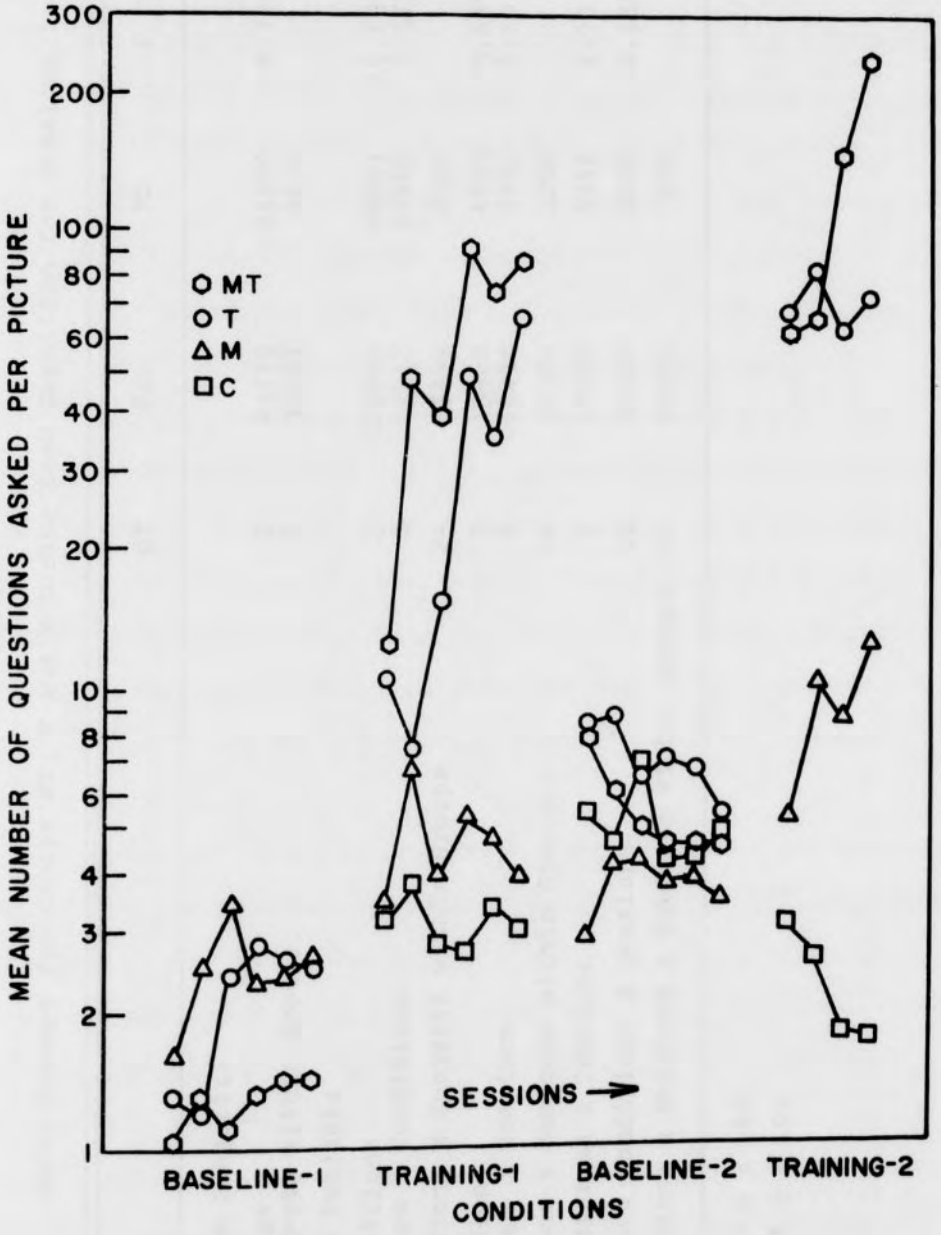
300
200
100
80
60
40
30
20
10
8
6
4
3
2
1
MEAN NUMBER OF QUESTIONS ASKED PER PICTURE
MT
T
M
C
SESSIONS →
BASELINE-1
TRAINING-1
BASELINE-2
TRAINING-2
CONDITIONS

TABLE 1

ANOVA Summary for Groups MT, T and M During Each Condition for Sessions 1-4

Source	df	SS	MS	F
Between Subjects				
Groups	2	43778	21889	4.72*
Subjects within Groups	8	37047	4630	
Within Subjects				
Conditions	3	120000	40001	16.69**
Groups x Conditions	6	62913	10485	4.37**
Conditions x Subjects within Groups	24	57494	2395	
Sessions	3	13962	4653	3.68*
Groups x Sessions	6	16210	2701	2.10
Sessions x Subjects within Groups	24	30306	1262	
Conditions x Sessions	9	17212	1912	1.99
Groups x Conditions x Sessions	18	36786	2043	2.13*
Conditions x Sessions x Subjects within Groups	72	68931	957	

* $p < .05$

** $p < .01$

($p < .05$) than Baselines 1 and 2. Subsequent Newman-Kuels analysis revealed that Group MT performed at a significantly ($p < .05$) higher level than Group M during Training-2.

A similar analysis of variance was performed for Groups MT, T and M for Baseline-1, Training-1, and Baseline-2. It appeared that the variance introduced by Training-2 (i.e., the extremely high scores for Group MT) could have masked possible significant changes during Training-1. This analysis revealed significant Group, Conditions, and Sessions effects (Table 2). All possible interactions were also found to be significant. A comparison of means found that the overall performance during Training-1 was significantly ($p < .05$) higher than the performance during Baseline-1 or 2. Newman-Kuels analysis revealed that only the performance of Group MT had significantly ($p < .05$) increased during Training-1.

A repeated measures analysis of variance was performed separately for the performance of Group C for the Training-1, Baseline-2, and Training-2 Conditions. No significant differences were found (Table 3), suggesting that the changes which occurred in the other Groups could not be attributed to practice effects alone.

To clarify the effects of the procedures within each Condition, an analysis of variance for repeated measures was performed for the individual Conditions. This analysis evaluated each Baseline Condition separately and thus

TABLE 2

ANOVA Summary for Groups MT, T and M for Conditions Baseline-1, Training-1 and Baseline-2 for Each Session

Source	df	SS	MS	F
Between Subjects				
Groups	2	9618	4809	5.21*
Subjects within Groups	8	7371	921	
Within Subjects				
Conditions	2	31596	15798	19.42**
Groups x Conditions	4	18945	4736	5.82**
Conditions x Subjects within Groups	16	13014	813	
Sessions	5	4269	853	7.51**
Groups x Sessions	10	2963	296	2.60*
Sessions x Subjects within Groups	40	4545	113	
Conditions x Sessions	10	9025	902	7.53**
Groups x Conditions x Sessions	20	6564	328	2.74**
Conditions x Sessions x Subjects within Groups	80	9573	119	

* $p < .05$

** $p < .01$

TABLE 3

ANOVA Summary for Group C for Conditions Training-1, Baseline-2, and Training-2 for all Sessions

Source	df	SS	MS	F
Conditions	2	101.8	50.9	4.76
Conditions x Subjects	6	64.1	10.7	
Sessions	5	7.7	1.5	1.15
Sessions x Subjects	15	19.9	1.3	
Conditions x Sessions	10	16.5	1.6	1.09
Conditions x Sessions x Subjects	30	45.4	1.5	

reduced the increased variance which occurred in the overall analysis due to combining Baseline and Training Conditions. Within Baseline-1, significant Group and Sessions effects were revealed (Table 4). Newman-Kuels analysis showed that Group MT performed significantly lower ($p < .05$) than Groups M or T. In addition, the overall Session 1 performance was found to be significantly lower ($p < .05$) than the performance during the subsequent Sessions. The mean number of questions asked per picture for Groups MT, T and M was 1.2, 2.1, and 2.5, respectively. Although there was a significant difference, the absolute difference was quite small, as was the variance within this condition.

The analysis of variance within Training-1 demonstrated significant Group, Session, and Group x Session interaction effects (Table 5). A comparison of Group means revealed that Group MT performed significantly higher than Groups M or C ($p < .01$) or Group T ($p < .05$). Newman-Kuels analysis for each Session showed no significant differences for Sessions 1 and 3. The performance of Group MT during Session 2 was significantly ($p < .05$) higher than the performance of each of the other Groups. During the last three sessions Group MT performed at a significantly higher level ($p < .01$) than Groups M or C. For Session 4, T performed at a significantly higher level ($p < .05$) than M or C, and during Session 6, T again performed significantly

TABLE 4

ANOVA Summary for Groups MT, T and M for Condition Baseline-1 for all Sessions

Source	df	SS	MS	F
Groups	2	21.39	10.69	6.83*
Subjects within Groups	9	14.08	1.56	
Sessions	5	10.92	2.18	5.08**
Groups x Sessions	10	7.87	0.78	1.83
Groups x Sessions x Subjects within Groups	45	19.31	0.42	

* $p < .05$

** $p < .01$

TABLE 5

ANOVA Summary for Each Group During Training-1 for Each Session

Source	df	SS	MS	F
Groups	3	51323	17107	9.79**
Subjects within Groups	12	20961	1746	
Sessions	5	14032	2806	9.19**
Groups x Sessions	15	16931	1128	3.69**
Sessions x Subjects within Groups	60	18319	305	

** $p < .01$

higher ($p < .01$) than M or C. No significant difference was found between MT and T for the last Session of this Condition.

An unweighted-means analysis of Baseline-2 revealed no significant effects (Table 6). The mean number of questions asked per picture for the last Session of Baseline-2 were: MT = 4.7, T = 5.4, and M = 3.4.

An unweighted-means analysis of Training-2 yielded a significant Group Effect (Table 7). A Group means comparison revealed that Group MT performed significantly ($p < .01$) higher than Group M or C. Furthermore, Group T also performed significantly ($p < .05$) higher than Group M or C. A Sessions mean comparison showed that the overall performance during Session 4 was significantly ($p < .05$) higher than during Sessions 1 and 2. Newman-Kuels analysis demonstrated that only the performance of Group MT significantly ($p < .01$) increased during Training-2.

TABLE 6

ANOVA Summary for Each Group During Baseline-2 for Sessions 1-4

Source	df	SS	MS	F
Between Subjects				
Groups	3	134.5	44.8	0.87
Subjects within Groups	11	567.4	51.5	
Within Subjects				
Sessions	5	25.7	5.1	2.07
Groups x Sessions	15	54.0	3.6	1.45
Sessions x Subjects within Groups	55	137.1	2.4	

TABLE 7

ANOVA Summary for Each Group During Training-2 for Sessions 1-4

Source	df	SS	MS	F
Between Subjects				
Groups	3	144600	48200	6.09*
Subjects within Groups	11	87175	7925	
Within Subjects				
Sessions	3	18126	6042	2.10
Groups x Sessions	9	55506	6167	2.14
Sessions x Subjects within Groups	33	94916	2876	

* $p < .05$

CHAPTER IV

DISCUSSION

The results of the present study have indicated that a token system of reinforcement was successful in improving the performance of question-asking (i.e., questions per picture) by elementary school-age mildly retarded children. The token system was effective when used as a unitary procedure or when coupled with a modeling procedure. The results also indicated that the modeling procedure, when used alone, was not effective in modifying the performance of question-asking. The performance stability of the control group demonstrated that the training procedures, and not merely practice-effects over time, were responsible for the performance changes noted.

One interesting finding was the clear and immediate recovery of baseline performance during the second baseline condition. The source of control for this effect may lie in the fact that the initial baseline procedures were designed and controlled by the experimenter and therefore able to be duplicated during Baseline-2. Further evidence of the control of the procedures was seen during the initial sessions of the second training condition. For both token groups, the initial performance during Training-2 was closer to the final performance during Training-1 than it was to the performance at the end of Baseline-2.

Although the rubrics 'modeling' and 'token system' were utilized, the results of the present study cannot be generalized to all such procedures. There are many variables within each procedure which can be altered without changing the general heading of the procedure. For example, Zimmerman and Pike (1972) successfully used a modeling procedure to modify the question-asking behavior of several elementary school children. Part of their modeling procedure, however, included a prompt for the children to imitate what the model had said. In the present modeling procedure, Ss were directed to attend to the model and subsequently a prompt for question-asking (not specifically imitation) was given. This difference in the use of the prompt and its temporal relation to the modeled behavior may be sufficient to account for the different results obtained in the two studies.

It is of interest to note how the modeling procedure used in this study appeared to interact with the token system. The within-condition analysis of Training-1 demonstrates that the MT group showed significant improvement as early as the second session and maintained a significant difference for the last three sessions. On the other hand, the T group demonstrated significant improvement only during the fourth and sixth sessions. Thus, while by the end of the condition both groups were performing significantly better than groups M or C, group MT had reached this statistical difference earlier in the condition. The modeling procedure

seems to have facilitated the initial interaction between the reinforcement contingency and the Ss' behavior.

Bandura and Harris (1966) found that a modeling procedure combined with an explicit reinforcement system was successful in modifying the use of the passive construction by normal children. They also noted that modeling procedures alone did not significantly modify the use of passive phrases or prepositional phrases. However, Lahey (1971) did successfully use a modeling procedure without an immediate reinforcement procedure to modify descriptive adjective usage by children enrolled in a Head Start program. Zimmerman and Pike (1972) also found a modeling procedure to enhance the performance of question-asking by children. The results of the present study found modeling to be ineffective alone in modifying question-asking behavior by mildly retarded children.

There are several factors which could account for the differences in the results of these studies. One factor may have been the use of different subject groups with different reinforcement histories for the imitation of adult modeled behavior. Therefore, the behavioral skill of imitating complex verbal behavior (which is needed prior to the introduction of the described modeling procedures) may not have been equally represented in the behavioral repertoires of each subject.

Furthermore, several differences in the modeling procedures were present such as the described differences in the relation between the prompt and the modeled behavior. Other differences include single subject (Bandura & Harris, 1966; Lahey, 1971) vs. small groups (Zimmerman & Pike, 1972; the present study), and the use of different stimulus materials. For example, Bandura and Harris (1966) used written words, Lahey (1971) used simple objects, Zimmerman and Pike (1972) used simple pictures, while the present study used complex pictures. It is not possible at the present time to determine the role played by each variable which might have been responsible for the different results.

Bandura and Harris (1966) also noted that a reinforcement (token) system alone was not successful in modifying the use of passive phrases by children. However, the same token system was effective in modifying the use of prepositional phrases. The authors reasoned that this difference was primarily due to the different base rates of the two verbal classes. Passive constructs were infrequently used by the children and thus were rarely reinforced. On the other hand, prepositional phrases had a substantial base rate and thus more frequently came into contact with the reinforcement contingency. Zimmerman and Pike (1972) also found that the use of a reinforcement system (praise) was not effective when used singly to modify question-asking. They also found the base rate of question-asking to be very

low. However, in the present study, while it was found that the base rate of question-asking was also very low, the reinforcement system (token) was found to be very effective.

There appear to be two primary reasons for the reported differences. First, the Bandura and Harris (1966) study was conducted in a single session. The children were given stars and told that they would receive presents in proportion to the number of stars earned at the end of the session. Thus, although the medium of exchange was distributed during the session, the back-up reinforcer was not received until the experimental session was concluded. In addition, the effect of the stars operating as conditioned reinforcers was not experimentally tested. Therefore, alterations in the performance of the children during the session cannot be attributed to the 'reinforcement' effect of the presents which had not yet been distributed. Secondly, while Zimmerman and Pike (1972) insure a reinforcement effect by using multiple sessions, they acknowledge that 'praise' was not a powerful reinforcer for the children used in the study. The present study has used multiple sessions and a variety of material reinforcers, many of which were verbally indicated as strong reinforcers by the children.

Several factors may have contributed to the low base rate performance by the Ss in this study. The Ss may have previously not received sufficient reinforcement for question-asking. This lack of reinforcement could have been

due to answers not being provided for the child, or having a question answered in such a complex manner that little useful information was derived. The social environment may also have provided numerous punishing consequences for question-asking such as "That's a dumb question!" or "Everyone knows that!" It may also have been the case that the Ss had poor imitation skills and had not learned questioning from the behavior modeled by adults and peers.

Several implications for the education of mildly retarded children may be derived from the present study. Under certain environmental conditions, retarded children can be taught to ask questions about stimulus materials. The data collected during the token conditions showed that while the number of repetitions of a type of question increased (i.e., "What's that?") the diversity of the types of questions asked also increased relative to the number of different questions asked during the baseline conditions.

The procedures used in the present study may easily be adapted to an existing token system established in any classroom. Future research may be directed at fading out the direct verbal prompt, introducing new and more complex stimulus material, and training children in the use of different questioning strategies. Rosenthal, Zimmerman, and Durning (1970) have successfully used a modeling procedure to induce topographical changes in children's questioning behavior. Research on whether increasing a verbal response

class via a token reinforcement procedure renders modeling procedures to be more effective in inducing within-class topographical changes would also be of value.

CHAPTER V

SUMMARY

Three procedures were compared for their effectiveness in increasing the question-asking behavior of small groups of mildly retarded children. The token reinforcement procedure was found to be effective, while the modeling procedure, when used alone, was not effective in modifying question-asking behavior. However, the modeling procedure in combination with the token procedure produced the most rapid and significant performance change. The modeling procedure was viewed as having facilitated the reinforcing effect of the token procedure. The results of this study were compared with those of other studies which have investigated similar procedures for modifying verbal behavior.

BIBLIOGRAPHY

Allender, J. A study of inquiry activity in elementary school children. American Educational Research Journal, 1969, 6, 543-553.

Bandura, A. Principles of behavior modification. New York: Holt, Rinehart, & Winston, Inc., 1969.

Bandura, A., & Harris, M. B. Modification of syntactic style. Journal of Experimental Child Psychology, 1966, 4, 341-352.

Berlynne, D., & Frommer, D. Some determinants of the incidence and content of children's questions. Child Development, 1966, 37 (1), 177-189.

Gall, M. The art of questioning in teachers. Review of Educational Research, 1970, 40, 707-721.

Hart, B., & Risley, T. Establishing the use of descriptive adjectives in the spontaneous speech of disadvantaged preschool children. Journal of Applied Behavior Analysis, 1968, 1, 109-120.

Isaac, W., Thomas, J., & Goldiamond, T. Applications of operant conditioning to reinstate verbal behavior in psychotics. Journal of Speech and Hearing Disorders, 1960, 25, 8-12.

Lahey, B. Modification of the frequency of descriptive adjectives in the speech of Head Start children through modeling without reinforcement. Journal of Applied Behavior Analysis, 1971, 4, 19-22.

O'Leary, K., & O'Leary, S. Classroom management: the successful use of behavior modification. New York: Pergamon Press, 1972.

Piaget, J. The language and thought of the child. New York: Harcourt, Brace & Co., 1926.

Rosenthal, T., Zimmerman, B., & Durning, K. Observationally induced changes in children's interrogative classes. Journal of Personality and Social Psychology, 1970, 16, 681-688.

Skinner, B. F. Verbal behavior. New York: Appleton-Century-Crofts, 1957.

Sloane, H., & MacAulay, B. Operant procedures in remedial speech and language training. Boston: Houghton Mifflin, 1968.

Stirling, M. An analysis of question asking by a group of preschool children in a controlled setting. Unpublished M.A. Thesis, University of Toronto, 1937.

Yamamoto, K. Development of ability to ask questions under specific testing conditions. Journal of Genetic Psychology, 1962, 101, 83-90.

Zimmerman, B., & Pike, E. Effect of modeling and reinforcement on the acquisition and generalization of question-asking behavior. Child Development, 1972, 43, 892-907.