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USE OF NEW AUDIO-VISUAL TECHNIQUES TO TEACH MENTALLY-RETARDED CHILDREN.

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DEPENDENCY LEARNING, THE ACQUISITION AND DEVELOPMENT OF PERSONAL INTERRELATIONSHIP VALUES, WAS STUDIED AS A TECHNIQUE FOR FOSTERING AUDIOVISUAL ACADEMIC LEARNING AMONG 54 YOUNG, EDUCABLE MENTAL RETARDATES. SOME OF THESE SUBJECTS WERE TAUGHT TO VALUE SIMULATED DEPENDENCY MODELS. THESE MODELS WERE CONSISTENTLY PAIRED WITH SUCH REWARDING STIMULI AS GAMES, TOYS, AND EDIBLES. AFTER SEVERAL WEEKS OF ACQUIRING DEPENDENCY WITH THE MODELS, THESE CHILDREN AND OTHER SUBJECTS, HAVING NO EXPOSURE TO THE MODELS, WERE SHOWN A SERIES OF AUDIOVISUAL PRESENTATIONS IN WHICH A MODEL FIGURE PERFORMED NOVEL RESPONSES. MEASURES OF THE EXTENT TO WHICH THE SUBJECTS LEARNED THESE RESPONSES WERE MADE IMMEDIATELY FOLLOWING THE AUDIOVISIUAL PRESENTATIONS, AND 1 WEEK LATER. STATISTICAL COMPARISONS WERE MADE OF THE LEARNING AND RETENTION SCORES WHEN TASKS WERE PRESENTED (1) BY A VALUED MODEL VERSUS AN UNFAMILIAR MODEL, (2) IN INDIVIDUAL VERSUS GROUP SETTINGS, (3) UNDER INTENTIONAL VERSUS INCIDENTAL LEARNING CONDITIONS, AND (4) BY A TEACHER VERSUS A VALUED MODEL. RESULTS INDICATED THAT SUBJECTS WHO VALUED THE FILM MODEL PERFORMED BETTER THAN SUBJECTS WHO WERE EXPOSED TO AN UNFAMILIAR FILM MODEL. ALL SUBJECTS, HOWEVER, WERE ABLE TO LEARN FROM THE AUDIOVISUAL PRESENTATIONS. GROUP VERSUS INDIVIDUAL VIEWING CONDITIONS AND INTENTIONAL VERSUS INCIDENTAL LEARNING CONDITIONS, WHEN COMPARED, APPEARED TO HAVE LITTLE AFFECT ON THE CHILDREN'S OVERALL PERFORMANCE. ALL SUBJECTS OBTAINED HIGHER SCORES UNDER THE TEACHER PRESENTATION AS COMPARED TO THE AUDIOVISUAL PRESENTATIONS USED IN THIS STUDY. (JH)

USE OF NEW AUDIO-VISUAL TECHNIQUES TO TEACH MENTALLY-RETARDED CHILDREN

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Dependency refers to the child's learning to value other people; for the young child, the acquisition of dependency is contingent upon good mothering coupled with a reasonable amount of anxiety about the loss of this parental nurturance (McCandless, 1961). The acquisition of dependency at an early age is considered by social learning theorists to be the prerequisite for effective socialization: strong dependency relationships facilitate the accomplishment of the extensive range of intentional and incidental learning that should occur in the preschool years. If the child has acquired inadequate dependency relationships, the extent of his intentional learning may be sharply reduced. Of equal importance at the preschool level is the fact that relatively little incidental learning will occur because the child is also likely to have poorly developed imitative tendencies (Bandura & Walters, 1963).

The importance of the preschool years as a learning period has long been recognized for the child of normal intelligence (McCandless, 1961). Recent evidence suggests that this period is also of great importance to the retarded child. In a longitudinal study of the effects of preschool training on the social and mental development of young retarded children, Kirk (1958) found that children who attended preschool generally showed increased rates of mental growth and tended to maintain the increased rates. Educational opportunities in the preschool years may be a crucial factor in insuring that the retarded child reach his optimum level of intellectual functioning.

If the retarded child is to gain maximum benefits from educational training in the preschool years, his capacity for intentional and incidental learning must be developed fully. The retarded child is capable of intentional learning. When comparisons are made between normal and retarded

children matched on mental age, and using tasks within the capability of the retardates, the major difference between the two groups is that the retardates learn later than the normal group, this lateness being related to their slower rate of intellectual development (Kirk, 1962, 1963).

There are no studies of incidental learning in preschool retardates but those that have been conducted with older retardates show clearly that the retardate is capable of incidental learning, but does not reach his potential for this learning. In a review of the literature on learning in retardates, Denny (1963) proposed that this incidental learning deficit may be a factor in the retardates' generally poor performance on learning tasks. He states:

> "Perhaps the retarded are poor performers because they are much poorer incidental learners than normals. Perhaps they learn little in the ordinary course of events, requiring special stimulation, guidance and motivation to learn effectively." (p. 134).

Denny believes that it should be possible to develop appropriate motivational procedures and special training techniques to overcome an appreciable portion of the retardates' learning difficulties.

It is our opinion that the deficit in incidental learning and difficulties in intentional learning are, in turn, one consequence of a partial failure in dependency development. While the primary cause of the retardate's learning difficulties is undoubtedly his intellectual deficit, an important secondary cause may be the motivational deficit of not valuing other people enough to want to be like them. If a strong dependency relationship could be established between a retardate and a clear unambiguous model, this relationship should greatly facilitate the retardate's intentional and incidental learning from the model.

The purpose of the present study was to determine whether the dependency relationship could be used to increase the effectiveness of

audio-visual teaching techniques with young educable mental retardates. The three phases in this research were (1) fostering dependency learning by teaching the retardate to value a model. The conditions of learning simulated those accompanying dependency learning in the early mother-child relationship: the model was paired consistently with rewarding stimuli in situations in which the mental retardate was the sole participant and these rewarding interactions were intermittently available to him; (2) exposing the retardate to a series of audio-visual presentations in which the model performed responses. Taped commentaries actively encouraged imitation of the model, i.e., intentional learning, or merely described the model's behavior, i.e., incidental learning. Individual and small-group presentations of the audio-visual materials were compared; and (3) measuring the extent to which the retardate learned the responses that the model exhibited.

Method

Subjects: The subjects (Ss) were 31 boys and 23 girls from the pre-school and primary classes for the educable mentally retarded in the the Children's Health Council and the Palo Alto Schools. All Ss were free of gross motor, sensory, and emotional defects and were not on any medication that could influence their learning ability. The Ss ranged in chronological age (CA) from 3 years, 4 months, to 10 years, 8 months, with a mean of 6 years, 11 months, and a SD of 21.37 months. All Ss had been given the Stanford-Binet, Form L-M, Intelligence Test, or other equivalent measure. Their mental age (MA) ranged from 2 years, 4 months, to 7 years, 4 months, with a mean of 4 years, 6 months, and a SD of 15.30. The present MA was extrapolated from the present CA and the recorded IQ. The IQ's ranged from 45 to 93, with a mean of 65.13 and a SD of 12.33. Five of the IQ's were

above 80: two of these Ss were in the Control Group and the other three were all in different Experimental Groups.

Two other pre-experimental measures were obtained . each S: one was a measure of dependent behavior, the other was a measure of ability to learn from audio-visual presentations.

Measures of dependent behavior:

(a) Behavior Unit Observations - Each S was observed for twelve 10-minute periods in both classroom and free-play situations. Trained observers rated the S on scales describing five categories of dependency: instrumental dependency, seeking reassurance, seeking physical proximity, negative attention-getting behavior, and positive-attention-getting behavior. The categories were similar to those used by Beller (1955); the definitions of these categories are contained in Appendix A. A S's score on each category was the total number of times the behavior defined by the category occurred in the two hours of observation. The scores for the five categories were combined to form a single score referred to as the Dependent Behavior Score. Percentage agreement was used as a measure of inter-observer agreement. It was obtained by dividing the number of agreements between the two observers by the number of agreements plus the number of disagreements. Inter-observer agreement was 89 percent.

(b) Teacher Ratings - The teachers' ratings were based on their own impressions of the Ss' dependency behavior in both classroom and free-play situations. The teachers used five-point rating scales with each scale representing one of the five dependency categories used by the trained observers. When ratings for all five scales were combined, this total dependency score could range from five to 25 points. A Rank Order Correlation between Teacher Ratings and Behavior Unit Observations was computed: its failure to reach significance was to be expected in view of the highly homogeneous group and the restricted score range of seven points on the Teacher Ratings.

Measures of ability to learn from audio-visual presentations:

This measure was obtained by having each S watch colored slides with taped narration. Two series of slides were used: the first was presented under incidental learning conditions, the second under intentional learning conditions. After each series the S was questioned about the content. The total number of correct responses for both series is referred to as the First Film Learning Score.

One week before the First Film Learning Score was obtained, each S was shown colored slides with a taped narration in three separate sessions in order to familiarize him with this type of audio-visual presentation. For these preliminary sessions and for all subsequent audio-visual presentations, colored 35 mm slides were used accompanied by a taped narration. The slide projector and tape recorder were run by one adult; the S and a second adult (or another child or other children) sat together on small chairs five feet from the screen and the projector was eight feet from the screen. The adults and other children were well-known to the S.

Method of assigning Ss to Experimental and Control Groups:

Although clinically all 54 Ss in the experiment were diagnosed as verbal as opposed to non-verbal children, in daily interactions one small group of these Ss (n = 9) exhibited very little verbal behavior. These children were all assigned to one group (Group Six - Non-verbal). The remaining children (n = 45) were formed into quintets on the basis of similarities in CA, MA, and IQ. Members of each quintet were then randomly assigned to one of five groups; the procedure for these groups differed in three respects, (1) in the model whom the S learned to value, (2) in the kind of participation the S experienced (individual or group), and (3) in the taped instructions given to the S during the audio-visual presentations

(intentional or incidental learning). The following is a description of the six experimental conditions:

Group One - Intentional Individual: The Ss learned to value Model A and subsequently saw Model A in the audio-visual presentations that were used to measure learning. The taped instructions accompanying these audio-visual presentations encouraged intentional learning, e.g., "Watch me do it, I want you to do it this way, too." These Ss participated singly in all dependency learning and test sessions.

Group Two - Incidental Individual: Same as Group One except that the taped instructions were designed for incidental learning, e.g., "This is my new game, I'm going to play with it right now."

Group Three - Intentional Group: Same as Group One except that the Ss participated with either one or two other children in all sessions. In each test session only one child in the group was a S because it was necessary to test the S immediately following the audio-visual presentation.

Group Four - Incidental Group: Same as Group Two except that the Ss participated with either one or two other children in all sessions. In each test session only one child in the group was a S.

Group Five - Intentional Individual Control: The Ss learned to value Model B in the dependency sessions and subsequently saw Model A in the audio-visual presentations. The other procedures were the same as those for Group One.

Group Six - Intentional Individual Non-verbal: Same as Group One except that the Ss were measured in the test sessions only on non-verbal tasks.

Method of establishing the dependency relationship:

In order to teach the S to value the model figure, the conditions that lead to the development of dependency in the early mother-child relationship were simulated, i.e., the model figure was paired consistently

with a variety of rewarding stimuli (games, toys, edibles, etc.) and these rewarding interactions were intermittently available to the S. It was empirically established through pretesting that Ss who experienced a ratio of three rewarding interactions to one incident of non-availability of the model figure over a series of 20 sessions placed a high value on the model figure. The kinds of behavioral evidence that provided a basis for inferring the existence of a dependency relationship included touching the model figure, patting her, kissing her, wanting to be near and to play with her, frequently looking at her picture, addressing comments to her, bringing her presents, sending her messages, praise-seeking, attention-seeking, and making requests to go to her room, etc.

The specific procedure used to teach the S to value the model figure was as follows. The E, who was well known to the Ss, invited a S to come to the experimental room to play with some toys. The E emphasized that these were not her toys and assured the S that he would see who they belonged to when they reached the room. As soon as they entered the experimental room the S was introduced to the model figure. The model figure for Ss in Groups One, Two, Three, Four, and Six was Model A, who will be referred to as MA-Polly; the model figure for Ss in Group Five was Model B, who will be referred to as MB-Susan.

MA-Polly was a child of elementary school age with dark brown hair and a distinctive red dress, while MB-Susan was a child with blonde hair and a pale pink dress. If the S was fairly mature he was simply shown a colored slide of the model figure; if he was very young or immature he was shown a doll that closely resembled the colored slides that the older Ss saw. This procedure was used because it was felt that a tangible object would facilitate the forming of a dependency relationship for the young S. These Ss were later shown the same slides that were used for the older Ss.

In introducing the S to the model figure, E said, "This is Polly (Susan). All these games belong to her and you can play with them. She has lots of toys for you to play with on other days, too. You can play with these today. I'll help you if you need help." The E then sat down well to one side of the room leaving the model figure (the doll or a slide of the model flashed on the wall) where the S, in the center of the room, could see it. The E regularly made comments designed to focus the S's attention on the model figure, e.g., "Polly likes the way you play." "I bet Polly will think you're really good at that game when I tell her how many times you hit the target."

In order to get the S to leave the room at the end of the session, E told the young Ss that when it was time for them to leave the model figure would lie down. E was able to make the doll lie down while the child was picking up game parts from the floor. The older Ss were told that the model figure had said they could have a specified number of turns with the game and that E would tell them when they had had all their turns.

The E always acted as an agent of the model figure, a person with no authority and no possessions of her own. She made no attempt to regulate the S's play: she remained neutral when the S, angered at having to stop, threatened to strike the model figure (the doll or the picture). No S ever struck the model figure, although many Ss threatened to do so. Most Ss offered reassurance and apologies to the model figure after threatening her. After several sessions the Ss tended to direct most of their attention and comments to the model figure and the E was able to withdraw almost completely from the situation. This focus on the model figure was particularly noticeable with the Ss in Groups Two and Four who participated with either one or two other children in the dependency sessions.

Evidence of the relative unimportance of the E in the situation was shown by the fact that the Ss in all groups often reprimanded the E for

handling games carelessly and for other behaviors with, "Don't do that, Polly won't like you, its her game," or "You be careful or Polly won't ask you in here," and other similar comments.

At the end of the establishment of dependency period (five to six weeks) it was apparent that the above procedures were even more effective than the pretesting had indicated. All Ss viewed the model figure as a personal friend and maintained a high level of interest in her well beyond their period of contact in the experimental sessions.

The Ss were next exposed to a series of audio-visual presentations in which the model figure performed novel responses. Pretesting established that children similar in age, IQ, and MA did not exhibit any of the responses when provided with the materials used in these responses. The responses included form board tasks, paired associates learning, telephone skills, memory for stories, and memory for objects. For these presentations the model figure for <u>all</u> groups was MA-Polly. The dependency relationship for Group Five had been established with MB-Susan. The purpose of using MA-Polly to exhibit the novel responses was to allow a test of the main hypothesis that a dependency relationship established with a model would facilitate learning from that model and that significantly less learning would occur if no dependency relationship had been established with the model presenting the responses.

Measures of the extent to which the Ss learned the responses were made immediately following the audio-visual presentation; measures of retention were made one week later for all responses except telephone skills. It was found that the Ss practiced the telephone skills at home and, consequently, any measure of retention became invalid. The specific procedures for presenting and measuring the responses are described as follows:

First and Third Film Learning Scores

Two sets of stories of similar difficulty and interest value* were used to obtain a pre-experimental measure (First Film Learning Score) of each S's ability to learn from film presentations. Story Set A consisted of a short animal story and a longer story about an animal looking for a friend. Story Set B contained a short animal story and a longer story about a child who wanted a playmate. The narrator was unidentified to the Ss. Half the Ss had Story Set A as a pre-experimental measure, the other half had Story Set B. In both cases the short animal story was presented first under incidental individual learning conditions, followed by the longer story under intentional individual learning conditions. The total possible score was 30 points, the longer story having a possible score of 21 points.

The longer story in each set was used again at the end of the experiment. to obtain the post-experimental measure, the Third Film Learning Score. Ss who had had Story Set A as a pre-experimental measure now had the longer story from Story Set B and vice versa. The narrator for the post-experimental measure was MA-Polly; the conditions of learning were identical to the one that each group had experienced on the other tasks, i.e., intentional, incidental, individual, group. The possible score was 21 points; retention of this task was not measured.

Memory for Objects

The task required each S to recall the names of ten farm animals after being shown slides of the animals. MA-Polly described a farm she had visited and then showed the S pictures of ten different animals that she had seen on the farm. As each picture was shown, she made appropriate

* Pretesting of the stories on children similar to the Ss in the experiment showed that the stories were equal in difficulty and interest value and that the content could be readily learned by children of this intellectual level.

comments about the animals, allowing her to name them three times. When all ten pictures had been shown MA-Polly asked the S if he would like to see them again; all Ss wanted to see them again and this time MA-Polly made a different set of comments about each picture and named each animal twice.

The initial testing took place immediately following the audio-visual presentation. The E asked the S if he had liked the pictures and then said, "Let's see if you can remember some of the animals that Polly saw on the farm." The S then stated as many as he could remember, the total possible score being ten points.

In the retention trial one week later the E said, "Remember Polly told you about going to the farm. Look, here's the dog she saw on the farm (picture of dog shown on screen). What were some of the other animals she saw on the farm?" The total score possible was nine points. The Ss have access to books about farms and to farm toys and blocks in the regular school program. The single slide was shown in the retention test in order to identify which farm the E was talking about.

Memory for Stories

The task required each S to answer questions about stories presented audio-visually. MA-Polly told the S two stories about her brother, Tommy. The two stories were similar in difficulty and in interest value to the story "The Wet Fall", at Year VIII in the Stanford-Binet Form L-M Intelligence Test. One story concerned a runaway donkey, the other an injured bird.

At the end of the first story, the lights were turned on and E asked the S questions about the story. The E then asked the S if he would like to hear another story from MA-Polly. The procedure was repeated, the total possible score for the two stories being 12 points.

In the retention trial one week later, the E said, "Do you remember

Polly told you some stories? Did you like those stories?" Pause. "What were the stories about?" The E asked questions as necessary but avoided questions which aided the S's recall of the story. The total possible score for the retention test was 12 points.

Form Board

The task for each S was to fill two round colored plastic form boards with pieces of a specific color. Each form board had three differently shaped holes in it (circles, squares, stars, ovals, triangles, etc.) and a variety of pieces of different colors to fit the holes.

Each S first watched an audiovisual presentation in which MA-Polly played with a Fill-the-Hole Game. She filled a blue form board with yellow pieces, frequently holding up the form board during the demonstration and emphasizing the blue-yellow combination. When she had completed the form board she turned to the S and asked him if he would like to play the game. All Ss wanted to play the game. The E then switched on the lights and gave the S a blue form board with a variety of colored pieces. The time limit for this task was four minutes. During this period the S was scored on the time taken to complete the task if less than four minutes, and the number of correct colors in holes. At the end of the four minute period, the E removed the formboard and gave the S a second form board identical to the first one. The S's performance on this form board was scored as described above. E then said to the S, "Let's look at another movie." The same procedure was repeated, the only change being that a red-green form board combination was demonstrated. The total possible score was 12 points.

One week later, each S participated in a retention test. The order of presentation and the time limit were the same as in the first session. The E asked Ss in the four Intentional Learning Groups to show her how

MA-Polly told them to play the game. Ss in the two Incidental Learning Groups were told that they could have another turn playing with MA-Polly's game. The total possible score was 12 points.

Telephone Skills

The task for each S consisted of learning to make telephone calls, answering the telephone, lifting and replacing the receiver, giving his name, and saying Hello and Good-by, all at the appropriate time.

The skills were divided into two groups taught separately by audio-visual presentation:

(a) Telephone Answering - The Film Model demonstrated each of the skills by telephoning a friend, and then said to the S, "Would you like me to call you? Ask whoever is in the room to get you a telephone and I'll call you." The E then set a telephone on a table in fromt of the S; a second E in another room made three separate calls to the S and scored the S on his performance. The total possible score was 18 points.

(b) Telephone Calling - After demonstrating each of the skills, the Film Model invited the S to call her on the telephone. The same procedure was followed in testing the S. The S was required to make three separate calls. The total possible score was 21 points.

In order to reduce the effects of past telephone experience which the Ss may have had, the dial on the telephones was altered so that the S had to learn to dial from the blue section of the dial. This innovation was effective: all Ss had to be shown what to do.

Paired Associates

The task for each S consisted of learning to associate signs and objects (stimulus items) with gross motor responses. Two sets of paired-associate items were used: Set One consisted of the following pairs -

FLAG - stand up straight, salute; BALLOON - touch nose with balloon, touch head; ARROWS - look up, look down; TENT - make tent with hands, with fingers; X - cross arms, cross fingers. Set Two included five similar pairs: CHECKERS - pile red together, pile black together; BALLS - place one on one eye, place one on the other eye; CROSS - stand up straight, stretch both arms out; STAR - head on hands, close eyes; CIRCLES - point to one eye, point to the other eye.

The task was presented under two learning conditions:

(a) Teacher Presentation (Intentional Individual) - The S's own classroom teacher taught the S one set of the paired associates in a seven and one-half minute period. She used any teaching techniques (kind of reinforcement, amount of repetition, etc.) that she deemed appropriate to the S's learning ability. She could allocate the time to the items in any way that she wished.

(b) Audio-visual Presentation (Intentional or Incidental, Group or Individual) - The S (or Ss) watched the Film Model demonstrate one set of paired associates with appropriate comments and then repeat the demonstration so that the S saw each paired-associate item twice.

For each of the six main groups in the experiment half of the Ss in each group had Teacher Presentation of one set of paired-associates and, not less than 10 days later, Audio-visual Presentation of the other set of paired associates. Within this sub-group, half of the Ss learned Set One of the paired-associates from the teacher, and half learned Set Two from her. The other half of the Ss in each main group had the Audio-visual Presentation of one set of paired-associates, followed by Teacher Presentation; half of this sub-group learned Set One from the teacher, the other half learned Set Two.

The procedure for testing in the original learning situation and in the retention tests one week later was almost identical for both learning conditions. At the end of the learning period the teacher held up one stimulus item at a time and said, "Show me what you do when you see this." When she had held up all five stimulus items she said, "Let's do it again", and repeated the procedure. The E followed the same procedure except that she said, "Show me what P olly does when she sees this." Each S could obtain a total of 20 points in the original learning session and in the retention test he could earn another 20 points.

Observers: Trained observers, naive as to the purpose of the experiment recorded the responses made by the Ss in the learning and retention sessions. Because of space problems the observers were in the experimental room. The Ss in the two schools were all accustomed to having a number of adults around, the presence of the observers did not seem to interest them.

Percentage agreement was used as a measure of inter-observer agreement in the scoring of the sessions. The level of inter-observer agreement was 93 per cent.

Results

The six learning tasks fell into three groups: verbal memory tasks (Memory for Objects, Memory for Stories, Third Film Learning Task), association of symbols and non-verbal responses (Paired-Associates Task), and manipulation of concrete objects (Telephone Skills, Formboard Tasks).

Statistical comparisons were made of the learning and retention scores on the tasks when they were presented (1) by a valued model vs. an unfamiliar model, (2) in individual vs. group settings, (3) under intentional vs. incidental learning conditions, and (4) by the teacher vs. the valued model.

The four Experimental Groups all valued the model; the Control Group did not value this model but had had previous exposure to another model.

Subjects who valued the film model generally performed at a higher level on the three verbal memory tasks than did Ss who had had no previous experience with the model. Analysis of variance showed that while the learning scores for the five groups did not differ on Memory for Objects, the retention scores did differ ($F=2.65$, $<.05$). All four Experimental Groups scored higher on retention than did the Control Group and these comparisons are shown in Table 1.

Overall differences for the five groups on Memory for Stories learning scores did not reach the level of significance ($F=2.56$, $<.06$). The between-group comparisons on these learning scores showed that Groups One ($t=3.16$, $<.02$) and Two ($t=4.04$, $<.01$) differed from the Control Group. However, there were overall differences among the retention scores of the five groups ($F=4.58$, $<.01$), and all four Experimental Groups retained the story material better than did the Control Group. Table 2 contains the retention score comparisons.

The First Film Learning Score was one of the measures used in the initial assignment of Ss to groups. Two stories, A and B, narrated by an

Table 1

Retention Scores on Memory for Objects Task:

Comparison of Control Group and each Experimental Group

Group	Condition	N	Mean	S.D.	t	p*
Control (Gr. 5)	Int. Ind.	9	1.67	1.37		
vs. Experimental (Gr. 1)	Int. Ind.	9	3.78	1.48	4.39	.01
vs. Experimental (Gr. 2)	Inc. Ind.	9	3.11	1.20	3.22	.05
vs. Experimental (Gr. 3)	Int. Group	9	4.11	2.28	3.55	.01
vs. Experimental (Gr. 4)	Inc. Group	9	3.44	3.82	4.11	.01

* One-tail tests were used for all comparisons related to the explicitly stated prediction that heightening the dependency relationship between Ss and model would facilitate learning from the model. One-tail tests were also used for the comparisons concerning types of learning situation (intentional vs. incidental, individual vs. group, teacher vs. audio-visual) for which no explicit predictions were stated, there being little doubt that the first mentioned of each pair should produce the higher learning score.

Table 2

Retention Scores on Memory for Stories Task:

Comparison of Control Group and each Experimental Group

Group	Condition	N	Mean	S.D.	t	p*
Control (Gr. 5)	Int. Ind.	9	3.66	2.18		
vs. Experimental (Gr. 1)	Int. Ind.	9	8.11	3.71	4.93	.01
vs. Experimental (Gr. 2)	Inc. Ind.	9	7.11	2.47	3.16	.02
vs. Experimental (Gr. 3)	Int. Group	9	6.11	2.02	2.16	n.s.
vs. Experimental (Gr. 4)	Inc. Group	9	6.33	1.91	5.02	.01

* One-tail test

unidentified person were used to obtain this measure. Half of the Ss heard Story A, the other half heard Story B. The two stories were designed to be equal in content and in difficulty. A comparison of the scores on the two stories showed no differences. The two stories were used again for the Third Film Learning Score with the valued model as narrator. A comparison of each of the five groups' First and Third Film Learning Scores showed that the latter scores of the four Experimental Groups had increased significantly but that no such increase occurred in the Third Film Learning Score for the Control Group. Table 3 shows these comparisons.

Subjects who valued the model performed at a higher level on the Paired-Associates Task which was presented audio-visually, than did the Ss who had had no previous experience with the model. Analysis of variance showed differences among the groups on both learning ($F=2.91, <.05$) and retention scores ($F=4.58, <.01$). All four Experimental Groups learned and retained the Paired-Associates better than did the Control Group. The t-tests for these comparisons are shown in Tables 4 and 5.

There were no differences among the groups on the two Telephone Skills learning scores. Retention tests were not conducted on the telephone tasks because following the first measure most Ss practiced the routines at home, thus invalidating further measures.

On the Formboard Task, analysis of variance showed no differences among the groups on correct color scores or on time taken to complete the task for either the learning session or the retention test.

The second overall comparison made was of performance under individual viewing (Groups One and Two) vs. group viewing (Groups Three and Four). Analysis of variance showed that there were no overall group differences on any of the tasks on either learning or retention scores.

Table 3

Comparison of the First and Third Film Learning Score (FLS) of each Group

Group	Condition	FLS	N	Mean	S.D.	t	p*
Experimental:							
One	Int. Ind.	1st	9	7.22	3.58	3.06	.02
		3rd	9	11.11	5.20		
Two	Inc. Ind.	1st	9	6.77	2.20	2.77	.05
		3rd	9	9.33	3.34		
Three	Int. Group	1st	9	7.33	4.22	2.38	.05
		3rd	9	11.00	5.88		
Four	Inc. Group	1st	9	7.11	3.57	2.89	.03
		3rd	9	10.00	2.82		
Control:							
Five	Int. Ind.	1st	9	6.66	7.77	1.14	n.s.
		3rd	9	4.40	4.31		

* One-tail test

Table 4

Scores on Paired Associates Task (Audio-Visual):

Comparison of Control Group and each Experimental Group

Group	Condition	N	Mean	S.D.	t	p*
Control (Gr. 5)	Int. Ind.	9	7.55	4.54		
vs. Experimental (Gr. 1)	Int. Ind.	9	15.00	3.91	3.88	.01
vs. Experimental (Gr. 2)	Inc. Ind.	9	11.22	5.18	2.52	.05
vs. Experimental (Gr. 3)	Int. Group	9	12.44	6.25	2.91	.02
vs. Experimental (Gr. 4)	Inc. Group	9	10.99	3.12	2.18	n.s.

* One-tail test

Table 5

Retention Scores on Paired Associates Task (Audio-Visual):

Comparison of Control Group and each Experimental Group

Group	Condition	N	Mean	S.D.	t	p*
Control (Gr. 5)	Int. Ind.	9	5.33	3.54		
vs. Experimental (Gr. 1)	Int. Ind.	9	13.11	4.74	3.85	.01
vs. Experimental (Gr. 2)	Inc. Ind.	9	8.37	3.81	2.18	n.s.
vs. Experimental (Gr. 3)	Int. Group	9	11.78	5.69	3.81	.01
vs. Experimental (Gr. 4)	Inc. Group	9	8.11	2.02	2.33	.05

* One-tail test

The third general comparison made concerned the effect of differences in verbal instructions on learning and retention. Groups One and Three were instructed by the model to watch her and to do what she did; Groups Two and Four watched the model perform without specific instructions to watch. Analysis of variance showed that there were no overall group differences on any of the tasks on either the learning or retention scores, although the direction of scores favored intentional learning instructions on all tasks.

To compare the effectiveness of the audio-visual technique with teacher presentation of the same material, each S learned one set of Paired Associates from his teacher under Intentional Individual learning conditions. Each of the four audio-visual conditions, Intentional Individual (Groups One and Five) and Intentional Group (Group Three), Incidental Individual (Group Two) and Incidental Group (Group Four), were then compared with the Teacher learning scores. The Teacher learning scores were higher than the Audio-visual scores for all five groups, the differences being greatest in Group Five. These results are shown in Table 6. However, the Teacher retention scores of the Ss in the Intentional Groups (One and Three) did not differ from the Audio-visual retention scores. The Teacher retention scores of the other three groups were higher than the Audio-visual retention scores. These results are shown in Table 7.

It will be recalled that one group of Ss ($n=9$) who exhibited very little verbal behavior were assigned to Group Six. These Ss learned to value MA-Polly and were subsequently tested on the Form Board and Paired Associates tasks under Intentional Individual learning conditions. The Ss in Group Six did not differ from the Ss in Group Five (Control) in chronological age; however, they were lower in IQ ($t=2.46, <.05$) and in mental age ($t=2.57, <.05$).

When Group Six was compared with Group Five on the Form Board task neither their learning nor their retention scores differed. However, Group Six' Paired Associate scores did differ from those of Group Five: Group Six scored lower on Audio-visual learning ($t= 2.11, <.06$), on Audio-visual

Table 6

Scores on Paired Associates Task:

Comparison of Audio-visual Learning and Teacher Learning

Group	Presentation	N	Mean	S.D.	t	p*
One (Int. Ind.)	A-V	9	15.00	3.91	2.66	.05
	Tchr.	9	18.44	2.41		
Two (Inc. Ind.)	A-V	9	11.22	5.18	2.30	.06
	Tchr.	9	15.33	3.94		
Three (Int. Gr.)	A-V	9	12.44	6.25	2.65	.05
	Tchr.	9	15.78	5.14		
Four (Inc. Gr.)	A-V	9	10.99	3.12	3.80	.01
	Tchr.	9	15.22	4.52		
Five (Int. Ind.)	A-V	9	7.55	4.54	7.40	.001
	Tchr.	9	18.00	2.11		

* One-tail test

Table 7

Retention Scores on Paired Associates Task:

Comparison of Audio-visual and Teacher Presentation

Group	Presentation	N	Mean	S.D.	t	p*
One (Int. Ind.)	A-V	9	13.11	4.74	1.08	n.s.
	Tchr.	9	15.55	2.31		
Two (Inc. Ind)	A-V	9	8.37	3.81	3.46	.01
	Tchr.	9	14.33	2.37		
Three (Int. Gr.)	A-V	9	11.78	5.69	2.04	n.s.
	Tchr.	9	14.89	4.51		
Four (Inc. Gr.)	A-V	9	8.11	2.02	3.70	.01
	Tchr.	9	12.99	4.61		
Five (Int. Ind.)	A-V	9	5.33	3.54	5.17	.001
	Tchr.	9	14.56	3.40		

*One-tail test

retention ($t=2.60, <.02$), on Teacher learning ($t=3.10, <.01$), and on Teacher retention ($t=2.64, <.02$).

The comparisons reported of Groups One to Five are meaningful only if the results on which they are based can be attributed to differences in the effects of the experimental manipulations rather than to differences existing in the five groups prior to the onset of the experiment. A statistical check was made to determine whether the five groups initially differed on the variables likely to distort the results should inter-group differences exist. These variables were chronological age, mental age, IQ, Dependent Behavior Scores, and First Film Learning Scores. The Kruskal-Wallis One-Way Analysis of Variance by Rank technique was used because parametric analysis was inapplicable to the data. There were no differences among the five groups on the five variables. A further check was available on the equality of the groups: a comparison of the scores obtained when the teachers taught all Ss the Paired Associate task showed that there were no overall groupdifferences on either their learning or retention scores.

Discussion

The Behavior Unit Observations showed that most of the subjects had inadequate dependency relationships with both the adults and children in the school environment. This study would indicate that the deficiency is due to a lack of specific training rather than to a more basic inability to establish satisfactory dependency relationships. The procedures for establishing a dependency relationship between the film model and each subject were highly successful: in no instance did any subject fail to greatly value the film model. These procedures could be adapted for use in training situations for mental retardates quite apart from the use of audio-visual materials. The establishment of strong dependency relationships with the teacher should

be a prerequisite to the introduction of any instructional programs designed for the mental retardate.

We attribute the finding that the subjects performed as well under incidental learning conditions as under intentional learning conditions to the strong dependency relationship established between the film model and the subjects. The high value placed on the film model by the subjects obscured the relatively minor differences in verbal accompaniment which distinguished the intentional from the incidental conditions. An alternate possibility, that the subjects in the incidental learning conditions had developed an expectancy that they would be questioned after each audio-visual presentation and that this expectancy caused them to attend closely to the material, has been discounted. The subjects were questioned in a very informal manner and, if the expectancy of being questioned could produce these learning results, the Control Group should have performed at a much higher level since the intentional learning instructions clearly stated that the subject would be questioned.

It is impressive that the experimental condition most resembling that of the teacher-child situation, i.e., Intentional Experimental 1 Groups, resulted in a retention score on the Paired Associates task equal to that of the teacher-taught retention scores. There were obvious advantages to the teacher-child situation: the teacher could quickly identify which pairs were most difficult for the child, could allocate more time to them, could have the child practice the correct responses, and could use teaching techniques most appropriate to the child's capacity. In contrast, the audio-visual presentations exposed the child to the material twice, provided no opportunities for overt practice, made no attempt to reprimand the child should his attention wander from the screen, and made no allowances for individual differences in

ability to master the material.

Audio-visual materials have not been extensively used with young retarded children primarily because it is the opinion of most educators that the best learning situation for this group is the small special class. Consequently, little attention has been given to the production of suitable audio-visual materials and those that are available are often too complex for the young retardate.

The results of the present study provide strong support for the use of audio-visual materials designed specifically for the young retardate. The performance of the subjects in the Control Group indicates that these children are <u>able to learn</u> from audio-visual presentations; the higher performance of the subjects in the Experimental Groups indicates that learning is facilitated if a dependency relationship is established prior to the course of instruction. The potential value of this audio-visual technique is further heightened by the finding that group viewing was as effective a learning situation as individual viewing. In the experimental situation, group viewing both facilitated and inhibited the subjects' learning of the material. For example, if one subject overtly reproduced the film model's responses during the presentation, the other subjects usually copied him; subjects frequently commented on the model's actions and thus emphasized behaviors that constituted the learning in the situation. However, if one subject exhibited silly behaviors such as making shadows on the screen the other subjects often stopped attending to the presentation. In the actual classroom situation the benefits of group viewing would be strengthened by instruction on correct viewing behavior: the experimental procedures did not permit reprimands for poor viewing behaviors, but in a classroom situation such training would be an automatic accompaniment of the learning situation.

The audio-visual technique proposed here has a number of advantages: it provides considerable variety and is a medium which is clearly enjoyed by the children; it could be used by any competent adult as a supplementary device to relieve the teacher of direct teaching; it would be particularly useful in teaching tasks where repeated demonstrations of the same material are needed; and the preparation of the materials is simple and economical - many picture slides are available on the market and it is a simple task to prepare a taped narration interpreting the slides to fit the teacher's specific requirements.

The tasks commonly used in studies of the learning patterns and characteristics of retarded children tend to be limited to those fitting the requirements of operational conditioning experiments, for example, pressing one or more of a series of buttons or putting tokens in slots. In the present experiment, one criterion for task selection was that the tasks have high interest and appeal for the child. The Telephone Skills task was by far the most exciting one for the children (in fact, we were not able to conduct retention tests on this task because the children practiced at home). We hypothesize that this high interest was a possible reason for the finding that there were no differences between the Control and the Experimental Groups on this task: the subjects in the Control Group were so interested in making a telephone call that they attended to the audio-visual presentation as closely as the other subjects.

The failure to obtain differences between the Control and Experimental Groups on the Form Board task is more difficult to explain. Although the film model clearly presented the task as an activity that required specific colors as well as correct shapes it was apparent from the subjects' comments that their perception of the task was to fill the holes, disregarding color.

Subjects frequently commented correctly on what the film model had done, and then proceeded to use colors other than the ones required. Pretesting had established that the subjects did know the colors and could accurately identify different colors in audio-visual presentations. The general inability to follow instructions of the type used in the Form Board task may indicate that considerable repetition of instructions is needed when a variety of distracting-preferences is available in the situation.

The subjects in this experiment had almost no knowledge of rudimentary telephone skills (picking up the receiver before speaking or dialing, which end of the receiver to speak into, etc.) and their parents were surprised that the children were capable of learning these skills. The parents' reaction tc this learning and the fact that the teachers were skeptical that the children could learn five paired associates in seven and one-half minutes would support Kirk's belief (1958, 1962) that we demand too little of the young educable mental retardate.

The non-verbal subjects, Group Six, had been taught to value the model. They were given only the tasks requiring no verbalizations, i.e., the Form Board and the Paired Associates tasks. They did not differ from the Control Group on the Form Board and they obtained lower scores on both the audio-visual and teacher presentations of the Paired Associates task. These children were lower in intelligence than the subjects in the Control Group: it appears that valuing the model did not compensate for the lower level of intellectual functioning indicated by the lower IQ scores.

Summary

This study was designed to test the hypothesis that the dependency relationship could be used to increase the effectiveness of audio-visual teaching techniques with young, educable mental retardates.

One group of experimental subjects learned to value a same-age model, Model A. The conditions of learning simulated those accompanying dependency learning in the early mother-child relationship: the model was paired consistently with rewarding stimuli in situations in which the retardate was the sole participant and these rewarding interactions were intermittently available to him. A control group of subjects learned to value a different model, Model B. All subjects then watched a series of audio-visual presentations in which Model A presented three types of learning tasks: verbal memory, paired-associates, and manipulation tasks. Subjects viewed these presentations either individually or in small groups, and under either incidental learning or intentional learning conditions. Teacher presentations of the paired associates were made.

The overall results provide support for the hypothesis: subjects who valued the film model performed better than did subjects who had had no exposure to the model prior to the audio-visual presentation. All subjects were able to learn from the audio-visual presentations. The experimental subjects performed as well under group viewing as under individual viewing conditions; they also performed as well under incidental learning as under intentional learning conditions. All subjects obtained higher learning scores under teacher presentation of the paired associates as compared to audio-visual presentation, but the retention scores on audio-visual presentation under the intentional learning conditions were equal to those obtained following the teacher presentation.

Appendix A

DEPENDENCY RATING SCALES

DEPENDENCY RATING SCALES

Scale 1: Instrumental Dependency - Extent to which the child asks adults or children for help with his clothes and dressing, with projects he is working on, with finding his belongings, with getting supplies, and with outdoor physical activities such as climbing, jumping, swinging, etc.

1. Practically never asks for these kinds of help.
2. Occasionally asks for them.
3. Sometimes asks for them.
4. Often asks for them.
5. Very often asks for them.

Scale 2: Physical Proximity - Extent to which the child wants to sit on teacher's knee, to touch or lean against her, or to be near her. Also includes physical affection and seeking and following teacher and other children from one activity to another.

1. Practically never seeks physical proximity.
2. Occasionally seeks it.
3. Sometimes seeks it.
4. Often seeks it.
5. Very often seeks it.

Scale 3: Reassurance - Extent to which the child seeks comfort, consolation or sympathy, protection, and verbal affection from adults or children.

1. Practically never seeks these kinds of reassurance.
2. Occasionally seeks them.
3. Sometimes seeks them.
4. Often seeks them.
5. Very often seeks them.

Scale 4: Negative Attention-getting - Extent to which the child criticizes or commands other children or adults. Includes shouting, silliness, clowning, giggling, baby talk that seems to be directed towards attracting attention. Also, aggression (physical or verbal) that is attention-getting, and withdrawal (sulking, crying, pouting, etc.).

1. Practically never exhibits these kinds of behavior.
2. Occasionally exhibits them.
3. Sometimes exhibits them.
4. Often exhibits them.
5. Very often exhibits them.

Scale 5: Positive Attention-getting: - Extent to which the child asks adults or children for praise, recognition of accomplishments, approval, information. Also includes giving information voluntarily, bringing teacher presents, and inviting teacher to participate in activity (not asking for help from her). Smiling at teacher and verbal affection-giving.

1. Practically never seeks positive attention.
2. Occasionally seeks it.
3. Sometimes seeks it.
4. Often seeks it.
5. Very often seeks it.

Bibliography

Bandura, A., Ross, Dorothea, and Ross, Sheila A. Imitation of film mediated aggressive models. J. abnorm. soc. Psychol., 1963, 66, 3-11.

Bandura, A., and Walters, R. H. Social learning and personality development. New York: Holt, Rinehart, & Winston, 1963.

Beller, E. K. Dependency and independence in young children. J. genet. Psychol., 1955, 87, 25-35.

Cruickshank, W. M. Research in the education of children with retarded mental development. Amer. J. ment. Defic., 1951, 56, 308-312.

Denny, M. R. Learning. In R. Heber & H. Stevens (Eds.) Mental retardation. Chicago: Univer. of Chicago Press, 1963.

Dunn, L. M. Mentally retarded children. In Encyclopedia of educational research, 3rd ed. New York: Macmillan, 1960. Pp. 835-848.

Dunn, L. M. Exceptional children in the schools. New York: Holt, Rinehart, & Winston, 1963.

Heber, R. The educable mentally retarded. In S. Kirk & Bluma Weiner (Eds.) Behavioral research on exceptional children. Washington: Council for Exceptional Children, 1963.

Hetherington, E. M. and Banta, T. J. Incidental and intentional learning in normal and mentally retarded children. J. comp. physiol. Psychol., 1962, 55, 402-404.

Hutt, M. L. and Gibby, R. G. The mentally retarded child. Boston: Allyn, 1961.

Kirk, S. A. Early education of the mentally retarded. Urbana: Univer. Illinois Press, 1958.

Kirk, S. A. Educating exceptional children. Boston: Houghton Mifflin, 1962.

Kirk, S. A. Research in education. In R. Heber and H. Stevens (Eds.) Review of research in mental retardation. Chicago: Univer. of Chicago Press, 1963.

McCandless, B. R. Children and adolescents. New York: Holt, Rinehart & Winston, 1961.

Ross, Dorothea M. The relationship between dependency, intentional learning and incidental learning in preschool children. In press, 1965.

Ross, Dorothea M. The dependency behavior of young, educable mental retardates. In preparation, Stanford University School of Medicine, 1965a.

Zigler, E. An overview of research in learning, motivation, and perception. Except. Child., 1962, 28, 455-458.