INCREASING MENTALLY RETARDED ADOLESCENTS' VERBALIZATIONS ABOUT CURRENT EVENTS[1]

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The effects of antecedent and consequent events on the verbal behavior of three institutionalized mentally retarded adolescents were examined. Verbal statements, related to current national and international events, were recorded after exposures to television news programs. The study examined the accuracy of verbalizations as a function of: (1) exposures to television news presentations in massed (*i.e.*, viewing the entire news program before an opportunity to describe it) *versus* distributed form (*i.e.*, viewing each news item separately with each followed by an opportunity to describe it), and (2) contingent tokens and social praise for correct verbal responses (*i.e.*, statements corresponding to news items presented). Both the temporal distribution of news presentations and the reinforcement procedures improved the accuracy of verbal statements emitted by the subjects.

Most institutionalized mentally retarded individuals have little knowledge of events occurring outside the institution. Few of them read newspapers or view television news programs. Fewer still verbalize what they read, hear, or see. Although the functional analysis of the language of the mentally retarded has been extended to various speech problems such as plural usage (Guess, Sailor, Rutherford, and Baer, 1968; Guess, 1969), verb usage (Schumaker and Sherman, 1970), adjectival inflection (Baer and Guess, 1971), and inappropriateness (Barton, 1970), the functional analysis of semantic content of language has received little attention. The present study attempted to extend techniques of behavior analysis to the problem of inadequate language content of mentally retarded adolescents—specifically, verbalizations related to current national and international events.

Research has amply demonstrated the effectiveness of reinforcement, especially in combination with imitative stimulus control, to establish, maintain, and modify verbal behavior of retarded individuals (Lovaas, Berberich, Perloff, and Schaeffer, 1966; Baer, Peterson, and Sherman, 1967; McReynolds, 1969). In the present study, commercial television news telecasts served as models and discriminative stimuli for the verbalization of three institutionalized retarded adolescents. In separate conditions of the study, both antecedent stimulus events (news telecast presentation) and consequent stimulus events (social and token reinforcement) of the subjects' verbal behavior were manipulated. Since institutionalized individuals lack knowledge of the outside world, an increase in the accuracy of verbal behavior concerned with current events appeared to be a desirable training goal.

There is a glaring lack of data that reliably demonstrate the use of television as a training medium with retarded individuals (Commission

on Instructional Technology, 1970; Striefel, 1972). Television was used as an instructional aid in a study by Phillips, Phillips, Fixsen, and Wolf (1971) in which they increased news watching and comprehension by predelinquent boys in a token economy system by making points contingent on correct answers on a "news quiz" following news broadcasts. Their study demonstrated effective use of television as an instructional aid with predelinquent boys and suggested the applicability of television as a language-training medium with retarded individuals.

METHOD

Subjects

Three male adolescents, Ted, Greg, and Danny, from the same living unit at Parsons (Kansas) State Hospital and Training Center, were selected to serve as subjects on the basis of available free time in their daily schedule. All three were 15 yr of age and had been residents of the institution approximately 1 yr. Ted was described in hospital records as borderline retarded with a primary diagnosis of psychogenic mental retardation associated with emotional disturbance. Greg was described as moderately retarded with a primary diagnosis of mental retardation due to unknown prenatal influence. Danny's records described him as moderately retarded with a diagnosis of cultural familial retardation. Casual observation revealed Danny and Ted to be talkative and willing to engage others in conversation; Greg was less responsive to others and rarely offered spontaneous verbalizations.

Apparatus and Experimental Setting

Sessions were conducted in an 8.5 by 18 ft (2.5 by 5.4 m) room containing a small table holding a Sony television monitor (Model 110) and a Sony videocorder (Model 3400). An experimenter, acting as primary observer, and a secondary observer were present in the experimental room during all sessions. The second

author served as experimenter and primary observer, and the first or third author served as secondary observer. The subject's chair faced the television monitor. Two desk-chairs, one at each side of the subject's chair, held clipboards and pencils used by the two observers. The experimenter's chair also held a plastic container of poker chips used as token reinforcement. The observer was seated close to the videocorder, operating it during sessions.

Definition and Recording of News Items

A major requirement for the functional analysis of behavioral events is the establishment of criteria that enable different observers to agree on the occurrence of these events. To meet this requirement, a "specific observational code" (Bijou, Peterson, and Ault, 1968) was developed for each news telecast and subsequent verbal behavior.

Before each experimental session, the news segment of the NBC *Today Show* was videotaped. The NBC *Today Show* news telecast was chosen for its short duration (the mean and range of actual news reporting time per telecast was 7 min, 43 sec and 7 min, 18 sec to 8 min, 13 sec, respectively) of relatively complete news coverage and a minimum of news analyses and editorials in its format. Two or three observers watched the live telecast, and each independently wrote the specific observational code for that day. Each telecast was divided into separate news items, and each item into four categories: subject, action, object, and additional information. The content of each category consisted of a partial transcription of the actual telecast which was written on the observation code. The observational codes served as data sheets. A segment of a data sheet and observational code is presented in Figure 1. The number of news items comprising the daily observational code ranged from 6 to 14, with a mean of 9.0.

News items were defined by the content of the news telecast, with a single item usually representing a single event in the news. Whenever several separate news items dealt with a

SUBJECT	ACTION	OBJECT	ADDITIONAL INFORMATION
floods	destroyed	homes	Indian state of Assam; many dead and missing
men	killed	in helicopter crash	Harrisburg, Pa. CBS correspondent
Indiana farmer (Lowell Elliott)	found	ransom money	soy bean field; no trace of hijacker; American Airlines

Fig. 1. A segment of the observational code and data sheet from the news telecast of June 27, 1972.

single topic (*e.g.,* presidential primaries, the Indochina War), each was considered a separate news item. Separate news items were identified by content, as well as cues presented by the news commentator's behavior (*e.g.,* pausing, turning of script pages, *etc.*), and visual changes in telecast.

Disagreements between observers writing the observational codes were resolved by observers reviewing the videotape of the news up to three times, and after each review independently rewriting the categories in the code where disagreements occurred. Disagreements between observers on the content of one or more categories after three reviews of the videotaped newscast resulted in a random selection of one observer's coding. Interobserver agreement in selection of words and phrases for inclusion into the observational codes was not systematically tabulated, and interobserver reliabilities are, unfortunately, not available.

Measurement and Reliability

Data were recorded directly on the data sheets, which were located in front of the experimenter and observer. Verbal behavior of the subjects was scored in terms of its similarity to the observational code for that session. Four correct verbal responses, one per category, were possible for each separate news item on the observational code. Responses were scored as correct or incorrect. A correct verbal response was defined as one that was either a direct quote of the telecast dialogue transcribed on the code

(*i.e.,* verbal imitation of the telecast dialogue) or a close approximation or synonym for the category content (*e.g.,* "burned" for "burst into flames"; "plane" for "airliner"; "gonna keep fighting" for "continue siege").

If a subject included accurate news-item information along with non-related information in the same statement, the news categories of an item (*i.e.,* subject, action, object, and additional information) verbalized accurately were scored as correct, and nonrelated verbalizations were ignored. Also, verbal responses including accurate information from two different news items viewed during the same session were scored as correct. For example, the underlined words in the verbal response, "I saw *President Nixon* and some *astronauts*", were scored as two correctly verbalized categories even though they belonged to different news items.

Reliability of observation was evaluated by having the experimenter and the observer simultaneously but independently score the verbal behavior of the subjects. Interobserver reliability was measured by a comparison, category by category, of the observer's data sheet with that of the experimenter. Reliability was calculated by scoring each category as an agreement or disagreement and dividing the total number of agreements between the experimenter and observer by the number of total categories (or four times the total number of items) comprising the specific observational code for that day.

Reliability checks were conducted during all but eight sessions for Danny, all but nine for

Ted, and 16 for Greg. The mean percentage interobserver reliability for the four experimental conditions—Baseline$_{1,2,3}$; Massed News, Tokens plus Praise; Distributed News; and, Distributed News, Tokens plus Praise was, respectively, 96.1, 92.6, 92.9, and 93.6% for Ted; 99.7, 97.0, 98.4, and 97.5% for Greg; and 93.4, 92.4, 90.4, and 94.3% for Danny.

Procedures

The procedures followed a mixed single-subject design involving a reversal technique and a multiple baseline technique across subjects (*cf.* Baer, Wolf, and Risley, 1968; Hall, Cristler, Cranston, and Tucker, 1970). The design included sequentially introduced conditions of Baseline$_1$, Massed News, Tokens plus Praise, Baseline$_2$, Distributed News, Baseline$_3$, and Distributed News, Tokens plus Praise (*i.e.*, an ABACAD design). Baseline$_1$ was in effect for the first six sessions for all three subjects. Delivery of tokens and praise during massed news presentation began in Session 7 and was discontinued in Session 18 for all subjects. Beginning Session 19, Baseline$_2$ was in effect for four sessions for Ted, seven sessions for Greg, and 10 sessions for Danny. The Distributed News condition was successively applied for Ted, Greg, and Danny, and discontinued for all three in Session 39. A return to Baseline$_3$ for four sessions was followed by application of the Distributed News, Tokens plus Praise condition for nine sessions for all three subjects.

Subjects were brought into the experimental room individually to view the videotaped news segment of the NBC *Today Show*. Each subject was instructed to seat himself in front of the blank television screen. When seated, each subject was instructed as follows: "We're going to watch the news on television. When it is over, I would like you to tell me about the things you saw and heard. OK?".

These instructions were repeated at the beginning of the first three sessions and discontinued thereafter. After the instructions were given by the experimenter, the observer turned on the television monitor. The subject, experimenter, and observer remained in the experimental room during the showing of the taped news telecast. No data were recorded while the telecast was in progress. No attempts were made by the experimenter or the observer to direct the subjects' attention to the television screen.

Baseline$_{1,2,3}$. During baseline, subjects were exposed to the entire news telecast before recording of verbal behavior. No scheduled consequences followed the subjects' verbal behavior. At the conclusion of the taped telecast, the observer halted the tape. The experimenter then told the subject: "Tell me what you saw on the news". Verbal behavior following this statement was scored and recorded on data sheets containing the specific observational code for that day. Each subject was then asked: "What else did you see on the news today?", and replies to this question were scored.

Verbal prompts, provided to render verbalization of specific news items more probable, were given by the experimenter for those news items remaining unscored after the recording of verbal behavior in response to the question: "What else did you see on the news?". Unscored news items were defined as those news items on the observational code for which no verbal behavior was recorded in the subject, action, *and* object category. An item for which verbal behavior was recorded in any of these categories was considered scored, and no prompts were provided. Items for which *only* the additional information category was scored were prompted.

Verbal prompts consisted of the following sentence, completed by insertion of the *subject* of the unscored item as transcribed in the observation code: "Can you tell me anything about _____?" (*e.g.,* President Nixon, American bombers, space scientists). Verbal behavior following prompts was scored in the same fashion as unprompted verbal behavior, with the exception of verbalizations related to the subject. When the subject of the item was used in the prompt, the subject category was scored as an incorrect response. Verbal prompts continued

until all news items on the observational code for that session were scored as correct or incorrect. After all items were scored, the session was terminated.

Massed News, Tokens plus Praise. During this condition, procedures remained unchanged from those in Baseline₁ except that tokens and praise (*i.e.*, "Very good") were delivered by the experimenter contingent upon appropriate verbal behavior. At the beginning of the first session of this condition, a noncontingent token was delivered to each subject and exchanged for one penny to demonstrate the availability of tokens and a one-to-one exchange ratio. A single token was awarded for every category (*i.e.*, subject, action, object, and additional information) correctly verbalized. However, reinforcement was not delivered until the subject completed a sentence or phrase (*i.e.*, a subject was not interrupted in the middle of a sentence or phrase). As in the Baseline₁ condition, all unscored items were verbally prompted until the list of news items on the observational code was exhausted.

Distributed News. During this condition, the taped telecast was shown in its entirety but halted after every specific news item as defined in the observational code. At the beginning of the first session of this condition, subjects were told that they would not be shown the entire news telecast at one time, but would be given opportunities to tell the experimenter what they saw after viewing smaller segments of the news. After each news item was televised and the tape halted, the experimenter told the subject: "Tell me what you saw on the news". Responses were recorded, and the next news item was televised. This procedure was repeated until all news items on the observational code were televised.

No scheduled consequences were provided following verbalizations. Verbal prompts were not provided during this condition since each news item was separately televised.

Distributed News, Tokens plus Praise. The two experimental variables applied separately earlier in the study, experimenter reinforcement and distributed telecast presentation, were combined in this phase. News items were presented separately, and tokens plus praise were awarded contingent upon correct verbal behavior. There were no verbal prompts provided during this condition. All news items were presented until the list of news items on the observational code for that day was exhausted.

RESULTS

The ratio of total prompted to total unprompted correct verbal responses for the combined baselines was 0.12 for Ted, 0.39 for Greg, and 0.07 for Danny. For the Massed News, Tokens plus Praise condition, this ratio was 0.20, 0.23, and 0.07 for Ted, Greg, and Danny, respectively. No systematic changes of this ratio over sessions were apparent in the Baseline and the Massed News condition data.

The per cent of correct verbal behavior demonstrated by each of the three subjects is presented in Figure 2. The baseline data and the Massed News, Tokens plus Praise data represent both prompted and unprompted correct responses. Percentages were calculated by dividing the number of correctly verbalized news categories by the total number of news categories comprising the observational code each session. For example, in a session consisting of 10 televised news items (*i.e.*, 40 categories), 10% would have been tabulated if four categories were correctly verbalized.

During Baseline₁, the three subjects exhibited little correct verbal behavior. Only Ted exceeded 15% correct responses during Sessions 1 and 5. When tokens and adult social praise were provided contingent on correct verbal behavior during the Massed News condition, Ted and Danny's performance increased considerably over that of Baseline₁. By Session 18, Ted's verbal behavior had reached 46%, whereas the average during Baseline₁ was 12.2%. Similarly, Danny reached 36% in Session 18, while his average during Baseline₁ was 10.3%. The effects of tokens and praise on Greg's verbal behavior
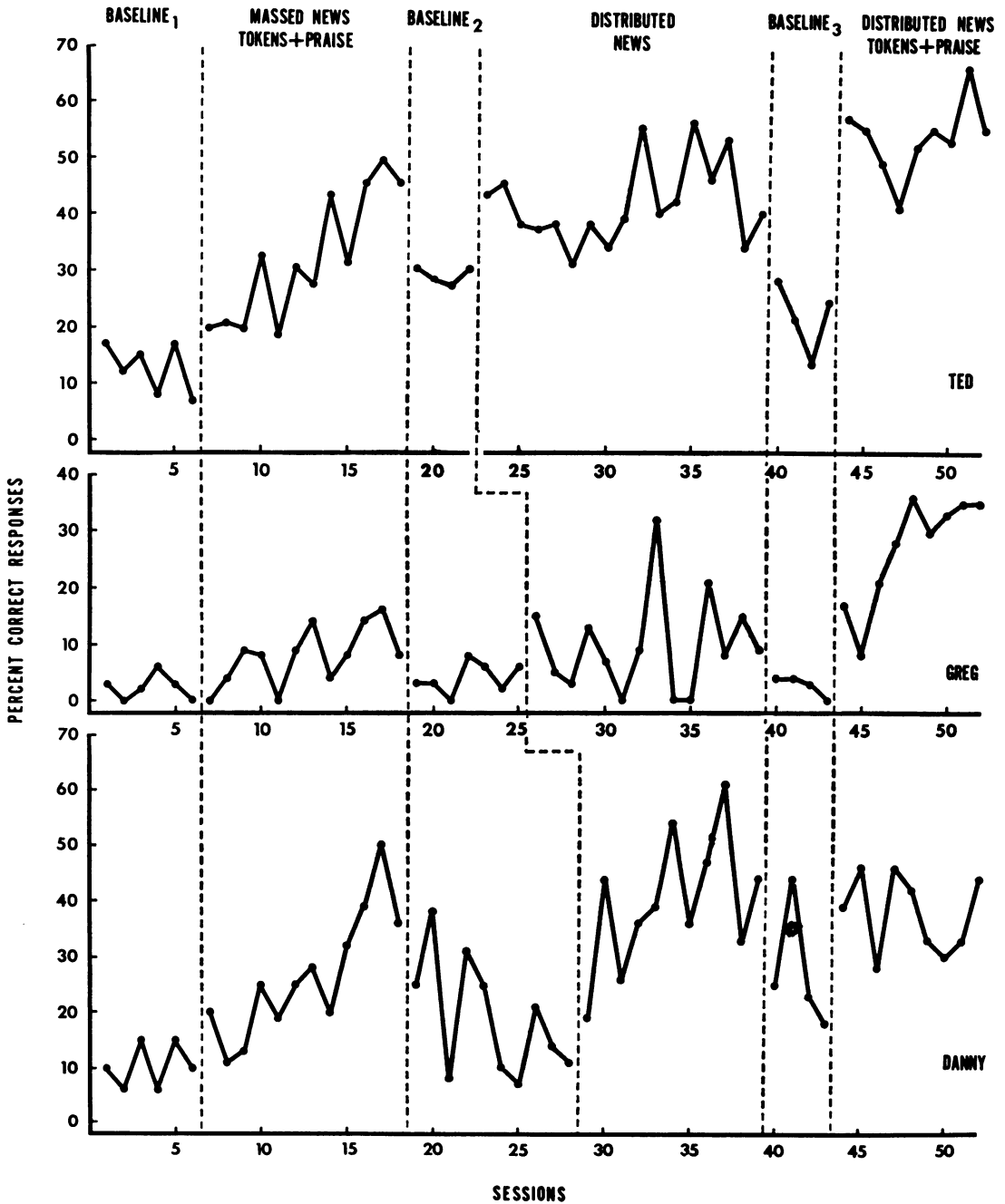
Fig. 2. Percentage of Ted, Greg, and Danny's verbal behavior related to current events over 52 sessions. *Baseline₁*—massed news, no scheduled consequences. *Massed News, Tokens plus Praise*—reinforcement was delivered contingent on correct verbalizations following uninterrupted presentation of entire news telecast. *Baseline₂*—reinstatement of Baseline₁. *Distributed News*—news presentation was temporally spaced with interspersed opportunities for verbal behavior between news items. *Baseline₃*—reinstatement of Baseline₁. *Distributed News, Tokens plus Praise*—news presentation was temporally spaced and reinforcement was delivered contingent on correct verbal behavior.

were less dramatic, although he did improve his performance over that demonstrated during Baseline₁.

After Baseline₂ was introduced in Session 18, the correct verbal behavior of all three subjects diminished. By Sessions 25 and 28, Greg and Danny's performance had deteriorated to levels demonstrated during Baseline₁. Ted, however, exhibited approximately twice the verbal behavior during the reinstatement of baseline conditions as he did during Baseline₁.

The introduction of distributed news items after varying lengths of Baseline₂ for the three subjects caused an increase in the correct verbal behavior of all three subjects. The multiple baseline technique successfully demonstrated that the change in correct verbal behavior was due to alteration of the news telecast presentation and not due to practice or coincidence. All three subjects recovered and surpassed the performance levels previously demonstrated when news presentations were massed and tokens plus praise were provided for correct verbal behavior. Baseline₃, introduced at Session 40, produced a marked deterioration in the performance of all three subjects.

At Session 44, the news telecasts were distributed over time, and tokens plus adult social praise were provided for correct verbalizations. The introduction of these variables produced its most dramatic effect on Greg, whose correct verbalizations increased from 0% in Session 43 (the last session of Baseline₃) to 35% in Session 52.

DISCUSSION

The present study demonstrated that a class of complex verbal operants, verbalizations related to current events, can be affected by their consequences as well as by antecedent stimulus conditions. Operant research has amply demonstrated that verbal behavior can be affected by its consequences. So far, much less attention has been given to the antecedent conditions that affect verbal behavior (Mann and Baer, 1971;

Lahey, 1971). The role of antecedent events in the control of the accuracy of verbal behavior has not been extensively examined. The present results suggest that the accuracy of relatively complex verbal behavior can be improved by exposure to the proper type of antecedent stimulus conditions. Specifically, exposure to televised news, temporally distributed to provide the optimal climate for receptive language, can increase accurate verbalization by mentally retarded adolescents in relation to the televised news.

It is possible that some of the improvements under the remedial conditions in this study could be accounted for by the systematic selection of "easier" (*i.e.*, more discriminable) items comprising the observational codes during different parts of the study. In part, the problem of differential item difficulty was countered by the use of transcriptions of the actual words and phrases used in the news telecast for the daily observational codes and the use of the multiple baseline across subjects after the first two conditions. The possibility of differential item difficulty was further evaluated *post hoc* by: (1) randomly selecting three complete observational codes from Baseline₁,₂,₃ and three codes from each of the remedial conditions (see below), for a total of 12 observational codes and 96 separate news items, (2) and by the selection of items from the codes judged to be more discriminable by six observers (Parsons Research Center staff) naive to the experimental manipulations. Each of the 96 news items, as they appeared on the observational codes, was typed on 3 by 5 in. (7.5 by 12.5 cm) cards identified by experimental condition on its reverse side (unseen by the observers). The cards were presented in random order to each of the six observers. Simple instructions to "pick out the easier news item transcriptions" were given to the six observers.

Out of 576 total possible item selections (96 items × 6 observers), 219 items were picked as "easier" items. Of those 219 items selected as easier, 66, 65, 42, and 46 (or 30.1%, 29.7%, 19.2%, and 21.0%) came from observational

codes used in Baseline₁,₂,₃; Massed News, Tokens plus Praise; Distributed News; and Distributed News, Tokens plus Praise, respectively. According to this estimate, there was a bias toward the selection of easier news items for Baseline₁,₂,₃ and the Massed News, Tokens plus Praise relative to the last two experimental conditions. However, news items used in Baseline₁,₂,₃ were judged as "easier" more frequently than items from any one of the other experimental conditions. It seems, therefore, that the increase in accuracy of verbalizations under the experimental conditions occurred despite a greater number of easy items during Baseline₁,₂,₃. That is, the differential item difficulty suggested by the estimate counteracted the results obtained.

The argument that differential item difficulty accounted for the results of the present study seems to have been countered effectively here. However, the study is nonetheless weak in this respect. Future studies involving the selection of words and phrases in a fashion similar to that of the present study should have a stronger basis from which to draw conclusions concerning the effects of differential item difficulty and the reliability of the coding procedure. Although it somewhat adds to the complexity of coding, the collection of interobserver agreement data in the selection of words and phrases in the coding procedure seems to be a desirable procedural detail, which was unfortunately omitted from the present study. An alternative to the tabulation of interobserver agreement in the selection of news items is to have someone naive to experimental changes perform the coding operation (cf. Phillips et al., 1971, Experiment IV).

It is interesting to note the relatively small effect of verbal prompts on the verbalization of the subjects during Baselines and the Massed News condition. Apparently such "hints" or thematic prompts (cf., Skinner, 1957) as: "Can you tell me anything about such-and-such?" do not render verbal behavior more probable if the subject has already verbalized all he can without

such prompts. Greg did demonstrate a higher ratio of prompted to unprompted correct responses than either Ted or Danny. However, because of the low operant level of appropriate verbal behavior exhibited by Greg during the Baselines and the Massed News condition, it would be difficult to conclude that the prompts were a significant source of supplemental strength for verbalizations about current events. Perhaps a verbal prompt consisting of the subject of a news event is either too broad or too circumscribed to be an effective stimulus for additional verbal behavior. Whatever the reasons, the results of the present study indicate that such "hints" are not markedly functional when used with mentally retarded adolescents.

A rather surprising aspect of the results concerns the continued occurrence of correct verbalizations in the Distributed News condition. All three subjects continued to verbalize current events items accurately despite the absence of experimenter reinforcement. These results seem to provide some support for data suggesting that some imitative responses can be established through the use of modelling in the absence of reinforcement (e.g., Lahey, 1971). Television may also have functioned as both a discriminative stimulus or model and a reinforcing stimulus. A study by Baer and Sherman (1964) demonstrated the effectiveness of a talking puppet as both a model and a source of reinforcement for imitative behavior in young children. Since television viewing is generally a popular activity, it is possible that the verbal behavior of the subjects was maintained simply by the opportunities for continued television viewing and/or social interaction with the experimenter. Research with retarded and nonretarded individuals has demonstrated that television can be an effective reinforcer for a variety of behaviors (Baer, 1962; Lindsley, 1962; Greene and Hoats, 1969; see also Whaley and Malott, 1971).

The present research demonstrated the efficacy of television as an instructional aid with retarded individuals. Although proven effective

in the training of normal individuals (Ball and Bogatz, 1970), the uses of television to train language skills in mentally retarded individuals have received little attention. The obvious advantages of television used as an educational tool with the institutionalized mentally retarded are its accessibility and universality. There is hardly a school or institution that does not have one or more accessible television sets. Moreover, a retarded individual in an institution can view the identical program at the same time as his "normal" peer outside the institution, thereby closing the gap between institutionalized and community living. Providing the mentally retarded with a climate for language growth is difficult due to a lack of appropriate models (Spradlin, 1963). Commercial and educational television programming provides an economical and efficient means whereby individuals can be exposed to hours of appropriate language per day. The present data suggest that when such exposure is properly controlled and verbalizations following such exposure are reinforced, television can become a powerful tool for language development and modification.

Several further constraints as well as suggestions for further research can be mentioned. In the present study, news telecasts were presented to the subjects individually. The experimenter and an observer were present at all times during the viewing of the news telecast and the subsequent reporting of the news items by the subjects. Also, the live telecasts were videotaped using relatively expensive equipment. In an institutional setting where the requirements of minimum accommodation on the part of the ward staff and other personnel and minimum expense are tantamount, the application of the methods reported may be prohibitive. Ideally, the procedures described here should be applied in a natural setting with maximum accommodation to the daily routine of an entire group of individuals. For example, live television using a standard television monitor could be presented to available individuals at specific times. Data on attendance of viewing sessions, as well as

frequency and appropriateness of verbal behavior, could provide valuable information on the effectiveness of television as an instructional aid. Furthermore, the content of the television program viewed need not be current events. Educational programs as well as commercial entertainment programs could be presented as a source of language. Such exposure to language could be highly relevant to acquisition of productive speech in the mentally retarded.

The generality of the present results depends on further research under a number of differing conditions. The constraints and improvements suggested, however, do not detract from the empirical demonstration that specific semantic content, *i.e.*, relatively complex verbal behavior related to current events, can be increased in mentally retarded individuals by the proper exposure to antecedent stimulus conditions and the provision of positive reinforcement.

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