TRANSFER OF STIMULUS CONTROL FROM MOTOR TO VERBAL STIMULI¹

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A transfer of stimulus control procedure was used to teach three profoundly retarded adolescents a series of specific responses to specific verbal instructions. After imitative control of a behavior was established, a verbal instruction was presented immediately before the behavior was modelled. Each correct response was followed on the next trial by inserting a delay between the verbal instruction and the modelling of the behavior. The delays increased from trial to trial. Transfer of stimulus control was indicated when a subject responded correctly on five consecutive trials before the behavior was modelled. All three subjects responded correctly to each verbal instruction after that item was trained in a multiple-baseline order. Generalization did not occur to items that had not been trained. Probe data revealed that some variations of the verbal instructions controlled responses after training was completed.

The prevalence of speech and language disorders among retarded populations has frequently been documented (Schlanger and Gottsleben, 1957; Spradlin, 1963). Thus, it is not unusual that many attempts to modify the speech and language-related skills of such populations have occurred (Baer, Peterson, and Sherman, 1967; Bricker and Bricker, 1970; Johnson, Capobianco, and McLean, 1970; Miller, 1960). Many of these initial attempts have focused on motor imitation or the correct production of speech with institutionalized subjects. Yet, for the institutionalized retardate, environmental contingencies are organized so that reinforcement is more likely to occur for behaviors such as being able to follow instructions. Verbal behavior is not typically required

of residents in institutions for the retarded, but the ability to follow instructions is (Spradlin, 1963).

In the establishment of instruction-following behavior, the motor behavior of the child must come under the control of verbal or gestural stimuli. In essence, the verbal behavior or gesture must become a discriminative stimulus for a specific response. Whitman, Zakaros, and Chardos (1971) indicated a scarcity of studies that have attempted to establish direction-following behavior. Whitman *et al.* (1971) were able to increase the frequency of correct motor responses to a variety of verbal instructions using a combination of positive reinforcement, physical guidance, and fading procedures with two retarded children. In so doing, they taught the children to make specific responses to specific verbal stimuli. They indicated that physical guidance was initially used to ensure a target response because the correct response or approximations of it might never occur on its own. Striefel and Wetherby (1973) obtained similar results using a similar procedure.

Another possibility for establishing instruction-following behavior consists of the transfer

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of stimulus control. The term transfer, as used here, refers to the acquisition of stimulus control by a set of stimuli that has been paired with an unrelated set of stimuli that already controls the response (Terrace, 1963*b*; Touchette, 1971). The literature contains numerous studies reporting errorless or nearly errorless transfer of stimulus control (Moore and Goldiamond, 1964; Terrace, 1963*a*, 1963*b*, 1966; Touchette, 1968, 1971). Such a procedure requires that the behavior already exists under the control of some stimulus. The task then is to transfer stimulus control to a set of stimuli that initially does not control the behavior. Transfer occurs by pairing these stimuli that already control the behavior with stimuli that do not control the behavior. By gradual stimulus change, responding to the initial stimuli is eliminated and responding is transferred to new stimuli. Previous applications of "errorless" fading procedures involving human subjects have been limited to the transfer of stimulus control between visual dimensions, for example, circle-ellipse (Sidman and Stoddard, 1967) and pictures-words (Corey and Shamow, 1972).

Touchette (1971) used a time delay procedure to shift stimulus control from a red key to responding to a specific black figure (inverted E). His procedure might be considered an "errorless" fading procedure if sequential time delays are considered fading steps. Touchette's procedure involved not only establishing a transfer in stimulus control but also determining the point in time at which stimulus control occurred. He trained subjects to respond to a red key but not to a white key and then superimposed black figures on the lighted keys. On the next trial, there was a 0.5-sec delay between the presentation of the black figure and the appearance of the red light. Gradually, the time between presentation of black figures and presentation of the red key increased. Eventually the subject responded to the black figure before the key turned red. This was defined as the moment of stimulus control transfer.

Lovaas, Schreibman, Koegel, and Rehm

(1971) trained autistic, retarded, and normal children to respond to a complex stimulus containing three components. After training, the autistic children responded primarily to only one of the components, the normals responded uniformly to all three components, and the retardates functioned at a level between these two extremes. Lovaas *et al.* (1971) speculated that the lack of control by all three stimulus components was due to an attentional deficit that might retard the acquisition of many behaviors in autistic children. Lovaas and Schreibman (1971), in a replication, trained normal and autistic children to respond to a complex stimulus with two components. After training, control over the response was exerted by only one stimulus component for the autistic children, but both stimulus components exerted control over the response in normal children. Striefel and Wetherby (1973) found that after being trained on verbal instructions, not all components of the instruction controlled a response in an 11-yr-old retarded boy. The lack of stimulus control exhibited by some components of the verbal instructions might well interfere with the acquisition of instruction-following skills.

The present study sought: (1) to establish instructional control of motor behavior using a transfer of stimulus control procedure; (2) systematically to replicate the procedure used by Touchette (1971) by applying the transfer procedure to instruction-following behaviors; and (3) to determine which elements of the verbal instruction control a specific response. These goals required that the subjects first be trained to imitate each behavior that was to be trained as an instruction-following item.

METHOD

Subjects

Three mentally retarded adolescents served (two boys and one girl, ages 11, 15, and 12 yr). The verbal repertoire of Subjects 2 and 3 consisted of a few phonemes and that of Subject 1

consisted of two words, "candy" and "pop", which were distorted when spoken by the subject. All three subjects had been trained to imitate motor behaviors during a previous study, to sit with their hands in their lap, to look at the trainer when their name was called, and to follow some instructions. Their IQs on a Peabody Picture Vocabulary Test were 20, 13, and 18 for Subjects 1, 2, and 3, respectively.

Setting and Design

The experimental space consisted of two adjacent rooms interconnected by a one-way mirror and intercom system. Each subject was brought to the training area individually and was seated face-to-face with a trainer alongside the table. One female and one male adult served as trainers but only one trainer worked with any child. Sessions were generally conducted twice daily, Monday through Friday, and lasted 20 to 30 min each. The design consisted of a multiple baseline of probe data across behaviors for the same subject, with replication across subjects.

Reinforcement

Each subject had been trained, in a previous study, to imitate all behaviors included as training items in the present study. The items used as reinforcers during imitation training were used as reinforcers during the present study. These included soft drinks for Subject 1, music for Subject 2, and M&Ms for Subject 3. Each correct response during baseline, probe sequences, training trials, trials of the transfer of stimulus control procedure, and random sequences was followed by contingent delivery of praise and the item designated above. Correct responses to daily probes were not followed by reinforcement.

Trials

Each trial during the baseline, probe sequences, daily probes, training trials, and random sequences started when the subject was seated with his hands in his lap. The trainer

said the child's name and when the child made eye contact, the trainer gave a verbal instruction; the subject was then allowed about 5 sec to respond. Before each trial throughout the study, the trainer placed four objects on the table in roughly a straight line with about 4 in. (10 cm) between objects. The use of four objects was to ensure that the subject must make a choice between objects when a verbal instruction was given.

Baseline

Each subject's ability to follow instructions was assessed during an initial baseline. The initial baseline included a total of 35 behaviors, of which 25 were designated as training items, and 10 items were included to assess generalization (see Table 1). During baseline, each item was presented 4, 4, and 3 times for Subjects 1, 2, and 3, respectively. Those training behaviors performed correctly during all trials of the initial baseline were considered learned for that subject and were placed on the subject's List of Learned Behaviors; the other items were randomly placed on a list called the subject's List of Behaviors to be Trained. The behaviors on each subject's List of Behaviors to be Trained were trained in a sequential order, starting with the first item on the list. The sequence in which behaviors were trained varied from subject to subject.

Probe Data

A *probe sequence* occurred immediately before the training of each behavior and consisted of three trials on each of the three behaviors at the top of the subject's List of Behaviors to be Trained. The nine randomly presented trials of a probe sequence served as last-minute multiple baseline data.

A second type of probes (daily probes) was conducted in an effort to determine whether any generalization occurred to untrained items as a function of training on other behaviors. Daily probes consisted of one trial on each of three training behaviors not yet trained and one

trial on each of two generalization items. Each day, different behaviors were probed so that all behaviors were probed at least once every few sessions (multiple baseline probe data).

Transfer of Stimulus Control Procedure

The function of this procedure was to shift control of the subject's motor behavior from motor stimuli (modelling by trainer) to verbal instructions. Trials during this procedure also started when the subject was seated with his hands in his lap (starting position) and with four stimulus objects on the table. The three types of trials during this procedure were imitation trials, simultaneous trials, and delay trials. During *imitation trials* the trainer said the child's name; when the child made eye contact the trainer proceeded by saying, "Do this", and modelling the behavior to be trained. The subject was allowed 5 sec to respond, and if he responded correctly, a reinforcer was delivered immediately. If he made no response or an incorrect response, a correction procedure was used. The trainer said "No", took the subject back to the starting position and again said, "Do this", modelled the behavior, and immediately provided a total physical prompt (physically guided the subject through the complete behavior), and then said, "Good boy/girl". At this point, the next trial was initiated.

A *simultaneous trial* consisted of the trainer giving the verbal instruction for the behavior being worked with in place of the "Do this". The trainer gave the verbal instruction, followed immediately by the modelled behavior. A correct response was followed by reinforcement; an error or no response was followed by a correction procedure identical to that previously described, except that "Do this" was replaced by a verbal instruction that specified the modelled response.

The *delay trials* consisted of inserting a delay between the verbal instruction and the modelling of the behavior for each trial. Each correct response resulted in an increase in the delay on the next trial. The delays increased from

approximately 0.5 sec to 1.0 sec, and by 1-sec increments thereafter. To determine the length of the delay, the trainer would count quietly to him (her) self, "one thousand (0.5-sec delay), one thousand one (1-sec delay), one thousand one-one thousand two (2-sec delay)", etc. Each incorrect response resulted in the use of the correction procedure and a return to the next-lower time delay on the next trial. If the subject responded after the instruction, but before the behavior was modelled, the trainer did not model the behavior.

Random Sequence

The purpose of the *random sequence* was to ensure that the subject was discriminatively making a specific response on the basis of a specific verbal instruction. A random sequence consisted of 10 trials presented in a random order. On five of these trials, the trainer presented the verbal instruction for the behavior on which the subject was just trained. On the other five trials, the trainer presented the verbal instructions for behaviors that the subject had previously learned.

Training

The training sequence (see Figure 1) consisted of conducting a probe sequence on the first three behaviors on a subject's List of Behaviors to be Trained. From there, the subject went to: (1) the next probe sequence if the behavior at the top of the list was performed correctly on all three probes, (2) training trials if the first behavior was performed correctly on one or two trials of the probe sequence, or (3) the transfer of stimulus control procedure if the subject made no correct responses on the behavior at the top of his List of Behaviors to be Trained during the probe sequence.

If training trials were conducted, they continued until: (1) the subject made three consecutive errors, at which time he would go into the transfer of stimulus control procedure, or (2) the subject made five consecutive correct

Fig. 1. Condensed flow chart of training sequence starting at a probe sequence and ending with a random sequence.

responses, at which time he would go to a random sequence.

Within the transfer of stimulus control procedure, imitative trials continued until the sub-

ject made three consecutive correct responses with no prompts. A simultaneous trial was then given. After one correct response on a simultaneous trial, the delay procedure was

initiated. Delay trials continued until the subject made five consecutive correct responses before the behavior being trained was modelled, after which a random sequence was presented. The subject was required to make 14 of 15 correct responses on the target behavior during three random sequences spread over three sessions for that behavior to be considered learned. The next probe sequence would then be given. If the subject did not meet criteria on the random sequence, he would be taken back through the transfer of stimulus control procedure.

Reviews

On a daily basis, one *review trial* was conducted on each of five Learned Behaviors. These review trials were conducted before the session and were included to ensure that behaviors the subject had previously learned were maintained while new behaviors were being trained. The behaviors reviewed rotated from session to session so that all learned behaviors were reviewed every few sessions.

Final Probes

After all 25 training items had been trained, final probes were given to determine which verbal instructions now controlled specific responses on the part of the subject and what part of each verbal instruction controlled the subject's behavior. This was accomplished by conducting two randomly presented trials on different variations of complete instructions (noun plus verb) and different variations of components of each instruction. The variations of complete instructions included: (1) the complete verbal instruction in the order presented during training, *e.g.*, touch your knee; (2) the complete verbal instruction with the verb moved from the initial to terminal position, *e.g.*, your knee touch; (3) the same verbal instruction with a different verb substituted (always either a generalization item or a different verb that had been trained with a different noun item), *e.g.*, rub your knee; and (4) the same verbal instruction with a different

noun substituted (always either a generalization item or a different noun that had been trained with a different verb), *e.g.*, touch your cheek. The variations of components included: (1) the verb only, *e.g.*, touch; (2) the noun only, *e.g.*, knee; (3) the verb plus the preposition or pronoun, if there was one; *e.g.*, touch your; (4) the preposition or pronoun plus the noun, *e.g.*, your knee; and (5) the preposition or pronoun only, *e.g.*, your. On the average, every fourth trial consisted of a complete verbal instruction, variations of which were not being probed during that session. Correct responses to these complete verbal instructions were reinforced. Some of the variations were not feasible with some items and were not included. A response was considered correct if: (1) the subject made the response specified when a complete verbal instruction was given, and (2) the subject performed any response that had been trained to a specific verbal instruction of which the component presented was an integral part during training.

RESULTS

Reliability data were periodically collected by an observer in the observation room. The observer scored the subject's response for each trial. A trial-by-trial comparison was then made with the trainer's scoring of the subject's response. Reliability was computed by dividing the total number of agreements by the total number of trials presented. At least one reliability was obtained on each subject during the initial probes, several during training, and at least one during the final probes. Reliability ranged from 97 to 100% (mean 99%) for Subject 1, 94 to 100% (mean 98%) for Subject 2, and 96 to 100% (mean 99%) for Subject 3.

Table 1 provides a summary of the percentage of correct responses to verbal instructions on the initial baseline and on the complete verbal instructions of the final probes for each behavior for each subject. Table 1 also indicates which behaviors were trained for each subject.

The subjects were trained on all training items on which they made errors during the initial baseline; thus, Subject 1 was trained on 12 behaviors, Subject 2 on 16 behaviors, and Subject 3 on 13 behaviors. Gains can be seen on 12 of 12 training items for Subject 1, 15 of 16 for Subject 2, and on 12 of 13 for Subject 3 between the initial baseline and final probes. No gains were obtained on any generalization item by any subject.

Figures 2, 3, and 4 show the percentage of

correct responses to verbal instructions during probes before training and to the random sequences at the termination of training for the first three behaviors trained for Subjects 1, 2, and 3, respectively. Figures 5, 6, and 7 show similar data for the last three behaviors trained for each subject. These data are representative of the data for the other behaviors on which each subject was trained. With few exceptions, correct responses did not occur until after training. The exceptions are explained below.

Table 1

Percentage Correct Responses on Initial Baseline and Final Probes for Each Behavior for Each Subject

<i>Training Items</i>	<i>Subject 1</i>		<i>Subject 2</i>		<i>Subject 3</i>	
	<i>Initial</i>	<i>Final</i>	<i>Initial</i>	<i>Final</i>	<i>Initial</i>	<i>Final</i>
1. Rub cheek/washcloth	75*	100	100	100	100	100
2. Raise your hand	25*	100	0*	100	0*	0
3. Wave your hand	0*	0	0*	0	33*	100
4. Fold your arms	0*	100	0*	100	0*	100
5. Touch your knee	0*	100	0*	100	0*	100
6. Push car	0*	100	0*	100	0*	100
7. Point to ear	50*	100	0*	100	33*	100
8. Hold out scissors	0*	100	0*	100	0*	100
9. Point to shoe	0*	100	0*	100	100	100
10. Nod your head "yes"	0*	100	0*	100	0*	100
11. Stick out tongue	0*	100	100	100	0*	100
12. Shake your head "no"	0*	50	0*	50	0*	100
13. Stand up	100	100	0*	100	100	100
14. Point to nose	100	100	100	100	100	50
15. Drink from glass	100	100	100	100	100	100
16. Open your mouth	100	100	0*	100	100	100
17. Blow on feather	100	100	0*	100	0*	100
18. Lift block	100	100	100	100	33*	100
19. Eat with spoon	100	100	100	100	100	100
20. Fold hands	100	100	100	50	100	100
21. Clap your hands	100	100	0*	100	100	100
22. Sit down	100	100	100	100	100	100
23. Brush hair	100	100	0*	100	100	50
24. Drop ball	100	100	100	100	67*	100
25. Put on glove	100	100	0*	100	100	100
<i>Generalization Items</i>						
Point to hair	0	0	0	0	0	0
Brush shoe	100	100	0	0	0	0
Lift car	100	0	100	0	0	0
Push block	25	0	0	0	0	0
Blow on ball	100	50	0	0	0	0
Drop feather	0	0	0	0	0	0
Wave scissors	0	0	0	0	0	0
Hold out hand	0	0	0	0	0	0
Touch cheek	0	0	0	0	0	0
Rub knee with washcloth	0	0	0	0	0	0

*Behaviors trained

Fig. 2. Percentage of correct responses to probes and random sequences for the verbal instructions for the first three behaviors on which Subject 1 was trained. Dotted line indicates point at which training began.

Fig. 3. Percentage of correct responses to probes and random sequences for the verbal instructions for the first three behaviors on which Subject 2 was trained. Dotted line indicates point at which training began.

Fig. 4. Percentage of correct responses to probes and random sequences for the verbal instructions for the first three behaviors on which Subject 3 was trained. Dotted line indicates point at which training began.

One behavior by each subject was performed correctly on all three trials of a probe sequence. Two other cases in which correct responses were made during probe sequences occurred. Subjects 1 and 2 responded correctly on two of nine trials on the behaviors Point to Ear and Brush Hair, respectively.

A few correct responses also occurred on the daily probes on training items. Subject 1 made four of 11 correct responses on the behavior Point to Ear; Subject 2 made no correct responses on daily probes of training items; Subject 3 made eight of 39 correct responses on the behavior Drop Ball. The correct responses that occurred during daily probes or on probe sequences usually occurred on items to which the subject had responded correctly on some trials of the initial baseline (see Table 1).

Correct responses to daily probes on the generalization items seldom occurred, unless the subject had responded correctly on that verbal instruction during the initial baseline.

Fig. 5. Percentage of correct responses to probes and random sequences for the verbal instructions for the last three behaviors on which Subject 1 was trained. Dotted line indicates point at which training began.

Subject 1 responded correctly on 90% of the daily probes on Brush Shoe, 43% of the probes on Lift Car, and 50% of the probes for Blow on Ball. Subject 1 had performed correctly on all trials on these behaviors during the initial baseline. Subject 2 responded correctly on 33% of the daily probes on the behavior Lift Car, even though he had responded correctly on all trials on that behavior during the initial baseline. Subject 3 did not respond correctly on any of the daily probes on generalization items.

Transfer of stimulus control generally occurred for all three subjects on the first trial where a time delay (roughly 0.5 sec) occurred between the verbal instruction and the modelling of the behavior. In essence, the subjects performed the behavior immediately after the verbal instruction was given, but before the trainer modelled the expected response. The

"moment of stimulus control transfer" (Touche, 1971) ranged from approximately 0 to 2 sec (median < 0.5) for Subjects 1 and 2, and from 0 to 3 sec (median < 0.5) for Subject 3. The per cent of errors made during training ranged from 0 to 18% (median 6%) for Subject 1, 0 to 15% (median 6%) for Subject 2, and 0 to 28% (median 12%) for Subject 3.

Figure 8 provides the mean per cent of appropriate responses for a summary of the final probe data for all subjects for all variations in which complete verbal instructions were given. Figure 9 provides similar data for variations in which components of verbal instructions were given. Comparison data indicate that in almost all cases, more control was exerted by variations of instructions on which the subject had performed correctly during the initial baseline *versus* variations of instructions on which the

Fig. 6. Percentage of correct responses to probes and random sequences for the verbal instructions for the first three behaviors on which Subject 2 was trained. Dotted line indicates point at which training began.

Fig. 7. Percentage of correct responses to probes and random sequences for the verbal instructions for the last three behaviors on which Subject 3 was trained. Dotted line indicates point at which training began.

subject had been trained. The degree of control exerted by the variations of the verbal instructions differed for the different variations and for the different subjects. For all three subjects, complete instructions, and complete instructions with the verb last, controlled a considerable amount of appropriate behavior. The amount of control exerted by complete instructions in which different nouns or verbs were substituted within trained instruction was minimal for all three subjects.

For all three subjects, the verb only, noun only, verb plus preposition (pronoun), and noun plus preposition (pronoun) all controlled a considerable amount of appropriate behavior. For Subject 3, the preposition (pronoun) only also controlled a considerable amount of appropriate behavior. The amount of control exerted by the preposition (pronoun) only was minimal for Subjects 1 and 2. In addition, the degree of control exerted by the components of instructions was generally lowest for Subject 1, slightly higher for Subject 2, and highest for Subject 3.

DISCUSSION

The present stimulus control transfer procedure was developed to establish instructional

Fig. 8. Mean percentage of appropriate responses for summary of each variation of verbal instructions having a complete instruction (noun plus verb) for each subject.

Fig. 9. Mean percentage of appropriate responses for summary of each variation of verbal instructions having only components of instructions for each subject.

control of motor behavior and to replicate Touchette's (1971) procedure with instruction-following behavior. The performance of the three subjects shows that transfer of stimulus control did occur for all three subjects. Functional relationships were established between the verbal instructions and the corresponding motor behaviors. Other than those motor behaviors that were already under the control of verbal instructions, the majority of specific motor responses did not come under the control of specific verbal instructions until they were trained in a multiple baseline order. This was true for all three subjects and all training was accomplished using the transfer of stimulus control procedure. In addition, correct responses to the verbal instructions of the generalization items never occurred. Thus, the acquisition of the majority of these functional relationships must be attributed to some aspect of the transfer of stimulus control procedure. The exceptions would be the one behavior for each subject that was performed correctly on all three trials of a probe sequence. The present results do not seem to be due to motivational factors, because (1) correct responses during the initial baseline were followed by reinforcement, and (2) correct responses to items that were not performed

correctly during the initial baseline did not occur until after the specific behaviors had been trained in a specific order. Striefel and Wetherby (1973) and Whitman *et al.* (1971) also established functional relationships between specific motor responses and specific verbal instructions; however, they used a combination of positive reinforcement, physical guidance, and fading procedures. Thus, the present findings provide a second method for establishing instruction-following skills. In addition, the data obtained in this study allow for the extension of Touchette's (1971) procedure to the area of instruction-following behaviors. The "errorless" fading procedures used to transfer stimulus control between visual dimensions (Corey and Shamow, 1972; Sidman and Stoddard, 1967; Terrace, 1963*a*, 1963*b*, 1966) have now been demonstrated to extend across sense modalities (visual-auditory).

Appropriate generalization to behaviors that were not trained did not occur in the present study. When a generalization item (consisting of a combination of a verb from one training item and a noun from a different training item) was presented, the present subjects performed a motor response that had been trained to one of its components during training. Striefel and Wetherby (1973) reported similar results.

The percentage of correct responding to variations of verbal instructions can be attributed to stimulus control by those variations. The fact that not all components of each verbal instruction controlled trained responses may indicate that the subjects were attending only to portions of the verbal instructions during training and that the portions of the instruction attended to varied from item to item. Such findings replicate those of Striefel and Wetherby (1973) and are congruent with those of Lovaas *et al.* (1971). Lovaas *et al.* (1971) found that after being trained on a response in the presence of a complex stimulus containing three components, not all components controlled the response. The present findings might be interpreted to indicate that selective attention

interfered with the learning of the retarded children in this study.

Stimulus control by the complete verbal instructions as trained was expected. The high percentage of appropriate responding to complete verbal instructions with the verb last indicates that word order did not interfere with appropriate responding. In addition, it is unlikely that generalization could occur on complete instructions in which the noun or verb of one training item was combined with the noun or verb of another training item, unless both the specific verbs and nouns controlled specific responses. In the present study, the subject's responses were not under the stimulus control of all nouns and verbs of training items. Thus, the failure of the subjects to emit the specified response on either generalization items or on variations of the verbal instructions where a verb or noun was substituted for the one used during training is not unexpected. The subjects seemed to "lock in" on one portion (noun or verb) of the new instruction and performed the response that had been associated with that part of the instruction during training, *e.g.*, when trained on Blow on Feather and Drop Ball, and then requested to Blow on Ball, the subject might "lock in" on the word Ball and would drop the ball. Striefel and Wetherby (1973) obtained similar results in that their subject did not respond to all variations of the verbal instruction, nor did he respond appropriately to generalization items.

All three present subjects generally performed more appropriate behaviors on variations of behaviors performed correctly during the baseline than on behaviors that were trained. These differences in performance may indicate that comprehension of the components of a verbal instruction is not complete until the subject is able to perform an appropriate response to all variations of a verbal instruction that includes information that specifies either the object or action expected.

In summary, all three subjects learned to make specific responses in the presence of spe-

cific verbal stimuli; however, none of the subjects learned a generative instruction-following skill, in that each instruction needed to be trained, and generalization to untrained items did not occur. As concluded by Striefel and Wetherby (1973), it seems likely that specific noun or verb concepts will need to be trained to the point where a generative instruction-following skill is developed. In view of the present findings it seems likely that the Touchette (1971) ("errorless" fading) delay procedure can be extended across other sense modalities and to other training areas.

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