An Analysis of the Generalization of Multiple-Word Response Forms across Stimulus Conditions

James E. Nofziger

Western Michigan University

Follow this and additional works at: https://scholarworks.wmich.edu/masters_theses

Part of the Psychology Commons

Recommended Citation
https://scholarworks.wmich.edu/masters_theses/2125

This Masters Thesis—Open Access is brought to you for free and open access by the Graduate College at ScholarWorks at WMU. It has been accepted for inclusion in Master’s Theses by an authorized administrator of ScholarWorks at WMU. For more information, please contact maira.bundza@wmich.edu.
AN ANALYSIS OF THE GENERALIZATION OF
MULTIPLE-WORD RESPONSE FORMS
ACROSS STIMULUS CONDITIONS

by

James E. Nofziger

A Thesis
Submitted to the
Faculty of The Graduate College
in partial fulfillment
of the
Degree of Master of Arts

Western Michigan University
Kalamazoo, Michigan
August 1978
ACKNOWLEDGEMENTS

In writing this thesis, I have benefited from the encouragement and constructive criticism of Professors Paul T. Mountjoy, Brian A. Iwata, and Richard W. Malott. I extend my appreciation to them for the help that they gave me and to my other colleagues at Western Michigan University for their support and counsel. This thesis also was supported by the Staff of the Croyden Avenue School, and special thanks go to the students at the school for teaching me how to teach them. Finally, I thank my wife who sustained me while I focused on the contingencies of the thesis.

James E. Nofziger
INFORMATION TO USERS

This material was produced from a microfilm copy of the original document. While the most advanced technological means to photograph and reproduce this document have been used, the quality is heavily dependent upon the quality of the original submitted.

The following explanation of techniques is provided to help you understand markings or patterns which may appear on this reproduction.

1. The sign or “target” for pages apparently lacking from the document photographed is “Missing Page(s)”. If it was possible to obtain the missing page(s) or section, they are spliced into the film along with adjacent pages. This may have necessitated cutting thru an image and duplicating adjacent pages to insure you complete continuity.

2. When an image on the film is obliterated with a large round black mark, it is an indication that the photographer suspected that the copy may have moved during exposure and thus cause a blurred image. You will find a good image of the page in the adjacent frame.

3. When a map, drawing or chart, etc., was part of the material being photographed the photographer followed a definite method in “sectioning” the material. It is customary to begin photoing at the upper left hand corner of a large sheet and to continue photoing from left to right in equal sections with a small overlap. If necessary, sectioning is continued again — beginning below the first row and continuing on until complete.

4. The majority of users indicate that the textual content is of greatest value, however, a somewhat higher quality reproduction could be made from “photographs” if essential to the understanding of the dissertation. Silver prints of “photographs” may be ordered at additional charge by writing the Order Department, giving the catalog number, title, author and specific pages you wish reproduced.

5. PLEASE NOTE: Some pages may have indistinct print. Filmed as received.

University Microfilms International
300 North Zeeb Road
Ann Arbor, Michigan 48106 USA
St. John’s Road, Tyler’s Green
High Wycombe, Bucks, England HP10 6HR

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
Masters Thesis 13-11,876

Noziger, James Ellis

An Analysis of the Generalization of Multiple-Word Response Forms Across Stimulus Conditions.

Western Michigan University, M.A., 1978

University Microfilms International, Ann Arbor, Michigan 48106
<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>1</td>
</tr>
<tr>
<td>II</td>
<td>9</td>
</tr>
<tr>
<td>III</td>
<td>24</td>
</tr>
<tr>
<td>IV</td>
<td>43</td>
</tr>
<tr>
<td>V</td>
<td>54</td>
</tr>
<tr>
<td>VI</td>
<td>59</td>
</tr>
</tbody>
</table>
INTRODUCTION

Until recent years, applied behavior research has focused little attention on the variables that control the generalization of results of behavior change procedures to environments and behaviors outside the behavior change program (Koegel and Rincover, 1977). Stokes and Baer (1977) reviewed the applied behavior research literature and found 63% of the studies relevant to generalization (270 total) did not actively program generalization or directly contribute to a technology of generalization. Almost half of the studies reviewed simply documented the occurrence or nonoccurrence of generalization.

Since a technology of generalization has not been actively pursued, it is no surprise that the occurrence of generalization has been the exception rather than the rule (Kazdin and Bootzin, 1971). The magnitude of the problem of generalization is reflected in the variety of conditions where generalization does not occur. A number of studies report the failure of behavior changes to generalize to extra-treatment settings (Birnbrauer, Wolf, Kidder, and Tague, 1965; Bucher and Lovaas, 1966; Johnston and Johnston, 1972; Koegel and Rincover, 1974; Kuypers, Becker, and O'Leary, 1968; Lovaas and Simmons, 1969; Meichenbaum, Bauers, and Russ, 1969; O'Leary and Becker, 1967; Pomerantz and Redd, 1977; Redd, 1970; Wahler, 1969; Walker, Mattson, and Buckley, 1969), to individuals not associated with the treatment procedures (Bucher and Lovaas, 1966; Johnston and Johnston, 1972; Kale, Kaye, Whelan, and Hopkins, 1968; Lovaas and Simmons, 1969; Redd, 1970; Redd and Birnbrauer, 1969; Wahler, 1969), to changes in the quantity and
schedule of reinforcement (Meichenbaum et al., 1969; Walker and Buckley, 1968; Baer, Peterson and Sherman, 1967), to other members of a response class (Striefel, Bryan and Aikens, 1974; Striefel and Wetherby, 1973), and to stimulus items not associated with reinforcement (Redd, 1972).

After observing the failure of their treatment effects to generalize, several of the studies cited above successfully implemented generalization programming procedures (Bucher and Lovaas, 1966; Kale et al., 1968; Koegel and RIncover, 1974; Pomerantz and Redd, 1977; Redd and Birnbrauer, 1969; Walker and Buckley, 1968). Like any other behavior change, generalization is a function of environmental events and must be programmed (Baer, Wolf, and Risley, 1968). Stokes and Baer (1977) compiled a list of generalization programming methods that can be directly applied to a range of generalization problems. This list included:

1.) implementing behavior change procedures in extra-treatment settings where generalization did not occur, 2.) selecting target behaviors with a high probability of reinforacement in extra-treatment settings, 3.) training sufficient exemplars of generalization stimuli, such as experimenters, physical locations, stimulus items, and times, 4.) training sufficient exemplars of members of a response class, 5.) programming indiscriminative contingencies, and 6.) programming stimuli common to both treatment and extra-treatment settings. The experimental analysis of generalization will benefit from a thorough examination of the effects of these generalization
programming procedures.

In addition the experimental analysis of generalization will benefit from a systematic investigation of the interaction between these procedures and all of the features of generalization. Generalization may occur across responses, physical locations, times, stimulus items, schedules of reinforcement, and experimenters (behavior change agents). By no means is this a complete list of the features of generalization, but the nature of the concept of generalization makes the list very long, and it is useful to think about the features of generalization in terms of a tangible list of categories of environmental events, objects and properties.

Rincover and Koegel (1975) analyzed the role of incidental stimulus items in the occurrence of generalization across physical locations and experimenters. They programmed the occurrence of the generalization of imitation by introducing to the extra-treatment setting furniture and experimenter gestures originally seen only in the treatment setting. Other investigators have demonstrated the role of incidental features of the treatment setting in the occurrence of generalization. These features included a cup that held reinforcers (Redd, 1970) and the facial orientation of the experimenter (Garcia and Trujillo, 1977).

If treatment procedures fail to vary the incidental features of a discriminative stimulus, then the discrimination may be made in terms of features other than those intended (Engelmann, 1969). If incidental features of a treatment setting are held constant,
the more the extra-treatment setting differs in terms of the incidental features, the more likely the discrimination will break down in the extra-treatment setting, and the less likely that generalization will occur.

In addition to the intended discriminative stimulus, many features of a highly structured treatment setting are held constant; for example, the behavior change agent, the physical location, the stimulus items, the tone and content of the agent's instructions, and the schedule of the reinforcement. A subject may learn a discrimination in terms of any of these constant, incidental features. If this happens and if the intended discriminative stimulus is presented in a novel setting where the incidental features are absent, the response may not generalize.

A hypothetical example of this problem is the failure of a student to perform a newly acquired instruction-following response when persons other than the student's teacher present the instruction. It may be hypothesized that the teacher in combination with the instructions acquired discriminative control of the instruction-following response, i.e., both were necessary for the response, but neither was sufficient.

Pomerantz and Redd (1977) also argued that "gains achieved through behavioral intervention are often limited to the materials, settings, and personnel associated with training." In their study of generalization from a tutorial, treatment setting to a classroom, extra-treatment setting, these investigators take a comprehensive approach to programming generalization by successively
changing a number of treatment setting features; the delay of reinforcement, density of prompts, and number of other students present.

Koegel and Rincover's (1977) analysis of generalization and their experimental paradigm make an important distinction between two other features of generalization; the initial occurrence of generalization and its subsequent maintenance. These investigators demonstrated the emergence and extinction of responding in an extra-treatment setting by measuring the occurrence of responding in the generalization setting during and after acquisition in the treatment setting. They programmed maintenance of extra-treatment responding by thinning the schedule of reinforcement in the treatment setting or by introducing noncontingent reinforcers to the extra-treatment setting.

It would be useful now to recapitulate and clarify the preceding points. The applied behavior research relating to generalization is deficient in demonstrations of and technologies of generalization. The experimental analysis of behavior is not deficient in explanations of generalization (c.f. Skinner, 1953; Ferster, Culbertson and Parrott-Boren, 1975); and there are a number of generalization methods and concepts ready for application and analysis (Stokes and Baer, 1977). Generalization refers to a range of behavioral and environmental features, and the occurrence of a desired level of generalization may require programming generalization across all of the features of interest to the goal of a generalized, behavior change. Now it is time to turn to the experimental analysis
of the generalization of verbal behavior, the topic of the present investigation.

In a review of the applied behavior research relevant to the generalization of verbal behavior, it is useful to distinguish between two features of the generalization of verbal behavior; the development of generative verbal behavior and the generalization of verbal responses across stimulus variables. The experimental analysis of verbal behavior has focused attention on the issue of generative verbal behavior. Critics (Lenneburg, 1967; Miller, 1962) of the learning theory approach to verbal behavior may have prompted this emphasis on generative verbal behavior by challenging behaviorists to provide an operant explanation of productive language (García, Guess, and Brynes, 1973).

The reply to this challenge has been based on the concept of the response class (Skinner, 1938; Salzinger, 1957). The response class is a set of topographically different responses so organized that their probabilities of occurrence vary together, even though only a relatively small subset of their members are directly controlled by an effective stimulus (García et al., 1973). Thus, according to an experimental analysis of verbal behavior, productive language is a response class controlled by stimulus combinations which have not been learned directly but exemplify the same dimensions and rules that characterize original learning experiences (Baer and Guess, 1971).

Several studies have investigated the acquisition of generative morphological rules through the application of imitation, shaping,
and differential reinforcement procedures to a relatively small set of morphological examples (Baer and Guess, 1971; Guess, 1969; Guess and Baer, 1973; Guess, Sailor, Rutherford, and Baer, 1968; Sailor, 1971; Schumaker and Sherman, 1970). Several studies have investigated the acquisition of generative syntactic rules (Bennett and Ling, 1972; Garcia et al., 1973; Lutzker and Sherman, 1974; Sailor and Taiman, 1972; Wheeler and Sulzer, 1970).

The preceding investigators have focused on the development of verbal response classes or generative verbal behavior, but reports on verbal behavior programs frequently mention the need for the generalization of newly acquired verbal skills to other verbal agents and settings (Risley and Wolf, 1967; Wing and Heimgartner, 1973). The present review of the relevant literature found only three studies that experimentally analyzed the generalization of a verbal response across stimulus variables (Kale et al., 1968; Murdock, Garcia, and Hardman, 1977; Stokes, Baer, and Jackson, 1974).

The last three studies examined simple verbal responses, greeting and labeling. On the other hand, all five of the studies of generative syntax were conducted in controlled environments (booths and therapy rooms) and did not examine the generalization of newly acquired syntactic verbal behavior across stimulus variables. The present experiment investigates the experimental question of whether the generalization of syntactic verbal behavior (multiple-word response forms) across stimulus variables is a
function of training successive sets of examples of the multiple-word response form.

If the technology of the generalization of verbal behavior is to have a significant impact on educational outcomes, it must also produce generalization across stimulus conditions as well as generative responding. Thus the present study employs imitation, shaping, and differential reinforcement to teach successive subsets of multiple-word response forms in a tutoring setting and concurrently measures the occurrence of the tutoring and generalization response items in an extra-tutorial setting.
METHOD

Subjects

Two students from a public school for the severely mentally impaired participated in the study. Student 1 was a 25 year old female. Student 2 was an 18 year old male. Both students lived in foster care homes.

These two students were selected on the basis of their current level of verbal behavior as determined from their classroom records, preliminary classroom observations, and evaluations provided by their teachers and the school speech therapist. These indicators showed that the students had good receptive and imitative verbal skills, could at least approximate the correct pronunciation of common words, used a large number of one word tacts and mands (Skinner, 1957), and gave fragmentary answers to questions.

The students had received some prior instruction in the use of phrases and sentences to label and request objects and activities; however, both students usually required extensive prompting to use these multiple-word, expressive skills throughout their school day. Before this study they had not received instruction in the multiple-word responses taught during this study, nor had the students been observed to produce these responses elsewhere during the school day.
Settings

School Setting. Both students attended the same class five days a week from 9 AM to 3 PM. During this time they participated in approximately nine, half-hour, group or individual, instructional sessions. The class was supervised by two teachers who also conducted some of the instructional sessions; however, most of the sessions were conducted by undergraduate and graduate students from a nearby university. Twelve students (including the present subjects) attended this class. The class was located in two large rooms, a classroom and a workshop, connected by a door and a long observation window. The classroom contained the teachers' desks, and several tables, chairs and cabinets. Many of the class' preacademic skills sessions occurred in this room. The workshop contained several benches, stools, tables, cabinets, and pieces of machinery. Most of the class' pre-vocational skills sessions occurred in the workshop, but it was not used during every period of the day.

Tutoring Settings. Settings varied for each student; however, the experimenter did not control the occurrence of the setting changes. Student 1 was taught initially in a corner of the classroom. After session 43 Student 1 was taught in a corner of the workshop. Her sessions remained there until the end of the study. In both settings the student sat facing the Experimenter and the corner. A table was located between them. On the table were the stimulus objects for the session and a tape recorder. A
microphone was attached to the student.

Student 2 was taught initially in a large observation room located in another part of the school building. After session 49 the student was taught in a corner of the workshop. His sessions remained there until the end of the study. In both settings the student, Experimenter, furniture, and experimental materials were arranged as they were for Student 1. Tutoring sessions occurred in the afternoon for both students.

**Generalization Setting.** The students' teacher conducted generalization sessions at a table in the classroom with the stimulus objects for the session located in a box and placed on the table as needed. Intermittently, a reliability observer was present during these sessions. Generalization sessions occurred in the morning for both students.

**Procedures**

**Multiple-Word Response Forms.** Two classes of multiple-word response forms were taught to each student. For Student 1 they were a preposition response, "In Front Of (Obj.)", and a descriptive, asking response, "Give Me (Color) (Obj.)". The object and color characteristic varied across response examples. For Student 2 they were a preposition response, "In (Obj.)", and an asking response, "Give Me (Obj.)". The object varied across response examples. These forms were selected because of their novelty relative to the previous grammatical skills of the students and because they constituted a large and practical verbal response...
The students had received some prior verbal instruction relevant to these multiple-word response forms from their regular education programs. They had prior instruction in the receptive task of placing two objects in the positional relationships appropriate for the instructions for several prepositions, including *In* and *In Front Of*.

The students had received prior instruction in the expressive tasks of labeling some prepositional relationships. Student 1 was taught to use a prepositional phrase (including the noun modified by the phrase) to answer the question, "Where is the *(Obj.)*?" when shown two objects demonstrating the following prepositional relationships; *In, On, Over* and *Under*. Student 2 was taught to use a prepositional phrase (without the noun modified) to answer prepositional questions about *In* and *On* relationships.

The students had received prior instruction in the expressive task of asking for objects and activities. Both were taught to use the sentence, "I Want *(Obj.)*". Student 1 was taught to use the sentence, "Give me *(Obj.)*". As indicated in the *Subjects* section, both students did not generalize these previously learned, expressive verbal responses to situations throughout the school day.

**Multiple-Word Response Examples.** Twenty examples of each multiple-word response form were selected on the basis of the objects and colors of objects found in the students' school environment and on the basis of the students' ability, as evaluated by a
speech therapist, to pronounce the common names of the objects and colors. Each group of 20 response examples was randomly ordered into four subsets of five. A fifth subset of five examples was composed of examples randomly selected from the initial four subsets. This latter subset was labeled Subset 1 and the remaining were labeled Subsets 2-5. Tables I and II (pages 14 and 15) respectively list subsets for each student for the (descriptive) asking response form and the preposition response form.

**Baseline Sessions.** The students' pre-tutoring level of response was assessed during four baseline sessions. During baseline sessions one and three the Experimenter presented the stimulus object pairs (in the appropriate positional relationship) from the complete list of preposition response examples and cued the student with "Where is the (Obj.)?" During sessions two and four the Experimenter presented the stimulus objects from the complete list of asking response examples and cued Student 1 with "Ask me for the (Color) (Obj.)" and cued Student 2 with "Ask me for the (Obj.)". No prompts were given after the Experimenter's vocal cue, and no reinforcers were delivered for verbal responses to the cue; however, social reinforcers were provided for other, appropriate responses, for example, posture, eye contact, sitting quietly, and looking at the Experimenter and the stimulus objects.

**Tutoring Sessions.** The tutoring sessions ran for approxi-
<table>
<thead>
<tr>
<th>Item Subset</th>
<th>Student 1</th>
<th>Student 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Give me white paper</td>
<td>Give me paper</td>
</tr>
<tr>
<td></td>
<td>Give me red toothpaste</td>
<td>Give me toothpaste</td>
</tr>
<tr>
<td></td>
<td>Give me black pencil</td>
<td>Give me pencil</td>
</tr>
<tr>
<td></td>
<td>Give me grey fork</td>
<td>Give me fork</td>
</tr>
<tr>
<td></td>
<td>Give me grey washer</td>
<td>Give me washer</td>
</tr>
<tr>
<td>1</td>
<td>Give me paper</td>
<td>Give me ball</td>
</tr>
<tr>
<td></td>
<td>Give me green ball</td>
<td>Give me spoon</td>
</tr>
<tr>
<td></td>
<td>Give me green spoon</td>
<td>Give me nail</td>
</tr>
<tr>
<td></td>
<td>Give me blue nail</td>
<td>Give me napkin</td>
</tr>
<tr>
<td>2</td>
<td>Give me red toothpaste</td>
<td>Give me toothpaste</td>
</tr>
<tr>
<td></td>
<td>Give me white soap</td>
<td>Give me soap</td>
</tr>
<tr>
<td></td>
<td>Give me red toothbrush</td>
<td>Give me toothbrush</td>
</tr>
<tr>
<td></td>
<td>Give me blue cup</td>
<td>Give me cup</td>
</tr>
<tr>
<td></td>
<td>Give me white sock</td>
<td>Give me sock</td>
</tr>
<tr>
<td>3</td>
<td>Give me grey washer</td>
<td>Give me washer</td>
</tr>
<tr>
<td></td>
<td>Give me black comb</td>
<td>Give me comb</td>
</tr>
<tr>
<td></td>
<td>Give me red sponge</td>
<td>Give me sponge</td>
</tr>
<tr>
<td></td>
<td>Give me grey nut</td>
<td>Give me nut</td>
</tr>
<tr>
<td></td>
<td>Give me grey bolt</td>
<td>Give me bolt</td>
</tr>
<tr>
<td>4</td>
<td>Give me black pencil</td>
<td>Give me pencil</td>
</tr>
<tr>
<td></td>
<td>Give me grey knife</td>
<td>Give me knife</td>
</tr>
<tr>
<td></td>
<td>Give me green fork</td>
<td>Give me fork</td>
</tr>
<tr>
<td></td>
<td>Give me grey screw</td>
<td>Give me screw</td>
</tr>
<tr>
<td></td>
<td>Give me blue cap</td>
<td>Give me cap</td>
</tr>
</tbody>
</table>
TABLE II
Preposition Response Examples

<table>
<thead>
<tr>
<th>Item Subset</th>
<th>Student 1</th>
<th>Student 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ball in front of box</td>
<td>Knife in bowl</td>
</tr>
<tr>
<td></td>
<td>Comb in front of bowl</td>
<td>Soap in box</td>
</tr>
<tr>
<td></td>
<td>Nut in front of towel</td>
<td>Knife in box</td>
</tr>
<tr>
<td></td>
<td>Soap in front of towel</td>
<td>Toothbrush in box</td>
</tr>
<tr>
<td></td>
<td>Cup in front of bowl</td>
<td>Comb in bowl</td>
</tr>
<tr>
<td>2</td>
<td>Ball in front of box</td>
<td>Knife in bowl</td>
</tr>
<tr>
<td></td>
<td>Pencil in front of shoe</td>
<td>Spoon in cup</td>
</tr>
<tr>
<td></td>
<td>Sock in front of shoe</td>
<td>Nail in shoe</td>
</tr>
<tr>
<td></td>
<td>Nail in front of book</td>
<td>Napkin in cup</td>
</tr>
<tr>
<td></td>
<td>Brush in front of cup</td>
<td>Toothbrush in shoe</td>
</tr>
<tr>
<td>3</td>
<td>Comb in front of bowl</td>
<td>Knife in box</td>
</tr>
<tr>
<td></td>
<td>Washer in front of cup</td>
<td>Pencil in bottle</td>
</tr>
<tr>
<td></td>
<td>Bolt in front of shoe</td>
<td>Cap in shoe</td>
</tr>
<tr>
<td></td>
<td>Spoon in front of book</td>
<td>Sock in cup</td>
</tr>
<tr>
<td></td>
<td>Toothpaste in front of plate</td>
<td>Fork in cup</td>
</tr>
<tr>
<td>4</td>
<td>Nut in front of towel</td>
<td>Soap in box</td>
</tr>
<tr>
<td></td>
<td>Sock in front of bottle</td>
<td>Toothpaste in shoe</td>
</tr>
<tr>
<td></td>
<td>Cap in front of plate</td>
<td>Bolt in cup</td>
</tr>
<tr>
<td></td>
<td>Nail in front of bottle</td>
<td>Fork in shoe</td>
</tr>
<tr>
<td></td>
<td>Cap in front of bottle</td>
<td>Bolt in bottle</td>
</tr>
<tr>
<td>5</td>
<td>Soap in front of towel</td>
<td>Toothbrush in box</td>
</tr>
<tr>
<td></td>
<td>Cup in front of bowl</td>
<td>Comb in bowl</td>
</tr>
<tr>
<td></td>
<td>Spoon in front of plate</td>
<td>Washer in cup</td>
</tr>
<tr>
<td></td>
<td>Fork in front of cup</td>
<td>Nail in box</td>
</tr>
<tr>
<td></td>
<td>Cup in front of plate</td>
<td>Pencil in shoe</td>
</tr>
</tbody>
</table>

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
mately 20 minutes. They were scheduled for five days per week; however, unavoidable Experimenter and student absences, holidays, and behavioral disruptions resulted in an average of three sessions per week.

Five examples of both of the multiple-word response forms were taught during each tutoring session. Each response example was repeated three times during a session, resulting in 15 trials of one response form followed by 15 trials of the other response form. The five examples were randomly ordered within each block of 15 trials. The order of the two blocks of 15 trials alternated from session to session. A two minute session intermission separated the two blocks of trials.

A tutoring trial began when the Experimenter exhibited the stimulus object for an asking response trial or place two objects in the appropriate positional relationship for a preposition response trial. Then the Experimenter asked the student to look at the object(s) and then to look at the Experimenter. When the student was looking at the Experimenter, the Experimenter vocally cued the (descriptive) asking response or the preposition response. For Student 1, these vocal cues were "Ask me for the (Color) (Obj.)" or "Where is the (Obj.)?" For Student 2, these cues were "Ask me for the (Obj.)" or "Where is the (Obj.)?" The Experimenter waited ten seconds for a response. If the student did not respond or responded incorrectly, the Experimenter presented a correction which involved saying, "Wrong", modeling the correct response, and presenting the vocal cue a second time. If an error occurred
after this correction, the Experimenter presented the next response trial. If the student correctly responded to the vocal cue, the Experimenter said, "Good talking," shook the student's hand, and presented the stimulus object (for asking response trials only) to the student.

At the start of tutoring the students did not imitate the entire, multiple-word response; consequently, the Experimenter initially required the student to present a partial, multiple-word response. Following acquisition of this partial response (two successive sessions with better than 90% of the trials correct), the Experimenter required successively longer word chains until the student was responding with the complete multiple-word response form. For Student 1, the preposition response was taught first as "In Front" and then as "In Front Of (Obj.)". The descriptive, asking response was taught first as "Give Me (Obj.)" and then as "Give Me (Color) (Obj.)". For Student 2, the preposition response was taught first as "In (Obj.)" and then as "(Obj.) In (Obj.)". The asking response was taught first as "(Obj.)", and then as "Me (Obj.)", and finally as "Give Me (Obj.)".

Initially, the Experimenter vocally prompted every word, word-by-word. Gradually these prompts were withdrawn. When the student sometimes omitted or changed the position of a word that no longer received regular prompts, the Experimenter would reinstate the prompt for the appropriate word for the next five trials or until the end of the session for that response form. After the 47th tutoring session for Student 1, the American Sign Language, manual
sign for In Front (Hoemann and Hoemann, 1975) was paired with the vocal prompt, "In". The vocal prompt later was withdrawn, but the manual sign never was withdrawn entirely because the student frequently omitted the initial word of that response form throughout the study. A similar process was followed with the descriptive, asking response form. After the 51st session the manual sign for Give was introduced. Although the vocal prompt for Give was withdrawn successfully, the manual sign remained until the end of the study.

Tutoring sessions ended after 30 trials (15 trials of each response form). At the end of the session the Experimenter escorted the student back to the classroom. The specific response examples presented during each session were the same as those described in Tables I and II.

Generalization Sessions. The student's teacher conducted the generalization sessions. At the start of the study the generalization procedures and multiple-word responses were explained to the teachers, and they were asked to run generalization sessions two to three times per week. The Experimenter gave the teachers feedback on the frequency of their generalization sessions and discussed any problems that might have occurred. A reliability observer attended these sessions when reliability checks were scheduled.

The generalization sessions involved the presentation of five examples of both multiple-word response forms. Each response example was presented once, resulting in ten trials per generalization session. Response example Subsets 2-5 provided the sets
of five examples used during these sessions. These subsets were used in rotation. The teacher presented all of the examples of one of the response forms before presenting the examples of the other response form, and the order of presentation of the two response forms was alternated from session to session. A brief intermission separated the sets of trials for both response forms. Each session took approximately five minutes to run.

The generalization session began when the teacher brought the student to the table where the generalization sessions regularly occurred. Generalization trials were presented in the same manner as tutoring trials except the teacher provided no consequences or prompts for verbal responses to the teacher's vocal cues; other appropriate behaviors were praised the same as they were during baseline conditions. After the student's response was recorded the teacher presented the next trial. When all ten trials were completed, the student returned to his/her regular school activity.

**Design.** A multiple-baseline design (Baer et al., 1968) across response forms was employed to evaluate the effects of teaching successive subsets of the multiple-word responses on the generalization of the response forms across stimulus conditions. After baseline sessions, tutoring procedures were begun for response example Subset 1 for both of the response forms. When the student's percent of correct trials (with minimal prompting) was above 90 for two successive sessions, tutoring procedures were begun for Subset 2 of the preposition response for Student 1 and for Subset 2 of the asking response for Student 2. Subsets 3 and 4 were successively
taught following criteria on Subset 2. For reasons explained in the discussion, the multiple-baseline design was not fully implemented; only Subset 1 of the descriptive, asking response for Student 1 and Subset 1 of the preposition response for Student 2 were taught during all of the tutoring sessions throughout the study. Generalization assessment procedures were initiated in the generalization setting shortly after tutoring sessions began. Generalization sessions subsequently were run until the end of the study.

**Response Definition.** There were three components to the definition of a correct response; content and order, latency, and pronunciation. The student's response had to contain all of the words that were part of the response example for the current trial. The occurrence of wrong words, an incomplete response, or words in the wrong order made the response incorrect. The student's response had to begin by at most ten seconds after the vocal cue and end by at most 15 seconds after the response started. The student's response could contain approximate pronunciations of the words in the response example for the current trial. Approximate pronunciations were acceptable if they were used to consistently designate the same word. In addition, the occurrence of a prompt during a tutoring trial response did not make the student's response incorrect.

**Response Recording and Scoring.** The Experimenter or teacher recorded verbatim of the students' responses to the vocal cues on a data sheet that contained a list of the response examples for the day's session and a space for the verbatim record. In addition, they scored each response as correct or incorrect on the basis of the
response definition. The Experimenter allowed partial responses during the initial shaping period of the tutoring sessions. In addition, the students' responses were tape recorded during the tutoring sessions. They were not tape recorded during generalization sessions in order to make the two settings more discriminative across stimulus conditions and in order to facilitate the teachers' implementation of the generalization session procedures.

Reliability Observation and Calculation. Undergraduate and graduate students served as reliability observers for the Experimenter and teachers' scoring of the students' multiple-word responses. The reliability observers recorded the generalization session responses in the classroom and recorded the tutoring session responses from tape recordings of the tutoring sessions.

The reliability observers were given the response definitions described above and a set of instructions for response recording (Appendices A and B, pages 59-61). Training consisted of reading these materials and attending three, one-hour tape sessions where the Experimenter and reliability observers listened to tapes of the students' initial tutoring sessions. The reliability observers recorded and scored the students' responses, and the Experimenter provided feedback after each response trial. The Experimenter and reliability observers discussed their disagreements, and in particular the Experimenter noted standards for acceptable, approximate pronunciations and for the application of the response definitions and recording instructions to the recording and scoring of the responses on the tapes. The overall percentage of agreement was
calculated by dividing the total number of agreements by the total number of agreements plus disagreements and multiplying by 100, resulting in better than 90% agreement on the training tape responses during the final training session. Whenever a change was made in the response requirement during shaping procedures, the Experimenter and reliability observers reviewed a tape recording from one of the initial sessions of this change and discussed the recording of the new, additional responses.

During the study tapes were given to the reliability observers who recorded and scored the responses on data sheets containing a list of the response examples for the current session. In addition, the reliability observers attended the generalization sessions and recorded and scored the responses occurring during the generalization trials using blank copies of the teachers' data sheets. The Experimenter collected these data sheets and calculated the overall percentage of agreement by dividing the total number of agreements by the total number of agreements plus disagreements and multiplying by 100. Percentage of agreement on trials scored as correct was calculated by dividing the total number of agreements on the correct trials by the total number of agreements on the correct trials plus the total number of disagreements. Percentage of agreement on trials scored as incorrect was calculated by dividing the total number of agreements on incorrect trials by the total number of agreements on incorrect trials plus the total number of disagreements.

The Experimenter also recorded and scored tape recorded responses from five randomly selected tutoring sessions for each
student. The Experimenter compared his scores obtained from the tapes with his scores obtained while conducting the sessions. The percentage agreements were calculated using the above formulas.
RESULTS

Reliability

The reliability of the Experimenter's scoring of the student's responses during tutoring sessions was checked for 40 of 66 sessions for Student 1 and 29 of 56 sessions for Student 2. Table III (page 25) presents the values for overall, scored-correct, and scored-incorrect percentage agreements for both students.

The reliability of the teachers' scoring of the students' responses during the generalization sessions was checked for 18 of 38 sessions for Student 1 and 4 of 17 sessions for Student 2. No scoring disagreements occurred during any of these checks.

Overall and scored-correct percentages of agreement averaged over 90 for the Experimenter's scoring of tutoring session responses during the sessions and from the tapes for both students. Scored-incorrect percentages averaged 77 and 70 respectively for Student 1 and Student 2 for the preposition response and 49 and 80 for the asking response.

Tutoring and Generalization Sessions

Student 1. Figure 1 (page 27) presents percentages of correct responses for Student 1 during tutoring of the preposition response. Shaping procedures involved first teaching "In Front" and then teaching "In Front of (Obj.)". With vocal prompts for each
### TABLE III
Percent Observer Agreement-Tutoring Sessions

<table>
<thead>
<tr>
<th>Reliability Type</th>
<th>Preposition Response</th>
<th>Descriptive Asking Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Range</td>
</tr>
<tr>
<td>Overall</td>
<td>94</td>
<td>80-100</td>
</tr>
<tr>
<td>Scored-Correct</td>
<td>96</td>
<td>70-100</td>
</tr>
<tr>
<td>Scored-Incorrect</td>
<td>82</td>
<td>0-100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Student 2</th>
<th>Preposition Response</th>
<th>Asking Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Range</td>
</tr>
<tr>
<td>Overall</td>
<td>92</td>
<td>80-100</td>
</tr>
<tr>
<td>Scored-Correct</td>
<td>95</td>
<td>86-100</td>
</tr>
<tr>
<td>Scored-Incorrect</td>
<td>85</td>
<td>0-100</td>
</tr>
</tbody>
</table>

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
Figure 1. Percent of correct responses for Student 1 during tutoring of the preposition response. The numbers 1-5 on the graph indicate changes in the prompts given.
word, the student reached criteria (90% correct for two successive sessions) for the complete response form on the 27th session.

The subsequent withdrawal of the vocal prompts required 28 additional sessions. The numbers 1-5 on the graph indicate the changes in the prompts given Student 1; 1.) In, Front, and Of were vocally prompted, 2.) In and Front were vocally prompted, 3.) In was vocally prompted, 4.) the vocal prompt for In was paired with the manual sign for In Front, and 5.) In was manually prompted (no vocal prompts).

Because of the length of time required to withdraw each prompt (an average of 5.6 sessions per prompt), the manual prompt was continued with new response examples in the next phase. This prompt was withdrawn on occasional trials, but the student's persistent omission of the word, In, on some of these trials resulted in its reinstatement and continued application.

The next phase involved teaching response example Subset 2, a combination of one previously learned response example and four new response examples. The student acquired Subset 2 in eight sessions. Next, Subset 3 was taught in two sessions. Subset 4 was not finished by the end of the study; however, the single session with subset 4 resulted in 93% correct trials.

Figure 2 (page 30) presents percentages of correct responses for Student 1 during tutoring of the descriptive, asking response. Shaping procedures involved first teaching "Give Me (Obj.)" and then teaching "Give Me (Color) (Obj.)". With vocal prompts for each word, the student reached criteria for the complete response
Figure 2. Percent of correct responses for Student 1 during tutoring of the descriptive, asking response. The numbers 1-5 on the graph indicate changes in the prompts given.
form on the 29th session.

The subsequent withdrawal of the vocal prompts required 28 additional sessions. The numbers 1-5 on the graph indicate the changes in the prompts given Student 1; 1.) Give and Me were verbally prompted, 2.) Give was verbally prompted, 3.) no vocal prompts, 4.) the vocal prompt for Give was paired with the manual sign for Give, 5.) Give was manually prompted (no vocal prompts).

The manual prompt was continued until the end of the study. During the final nine sessions of tutoring Subset 1, the student displayed variability in accuracy, and an occasional withdrawal of the manual sign usually resulted in omission of the word, Give.

Figure 3 (page 33) presents percentages of partial or complete, multiple-word responses for Student 1 during generalization sessions. Data are displayed on separate abscissas for the preposition and the descriptive, asking responses. Blocked bars indicate the relative frequency of occurrence of complete, multiple-word responses; "In Front Of (Obj.)" (top abscissa) and "Give Me (Color) (Obj.)" (bottom abscissa). Striped bars indicate the relative frequency of occurrence of partial responses; "(Obj.)-(Obj.)" (top abscissa) and "Give Me (Obj.)" (bottom abscissa). The abscissas are labeled with the numbers of the tutoring sessions that preceded each generalization session.

After the tenth generalization session (26th tutoring session) the student began to name both of the objects presented during the preposition response trials. The student never included the words In, Front, or Of in her responses.
Figure 3. Percent of partial or complete, multiple-word responses for Student 1 during generalization sessions. Data are displayed on separate abscissas for the preposition and descriptive, asking response.
On the second generalization session (ninth tutoring session) the student said "Give Me (Obj.)" on three of five asking response trials. The student gave this response on all of the trials for the tenth generalization session (26th tutoring session), but thereafter the percentage of these partial responses decreased to zero. The student never gave the complete descriptive, asking response during the generalization session.

Student 2. Figure 4 (page 36) presents percentages of correct responses for Student 2 during tutoring of the asking response. Shaping procedures involved first teaching "(Obj.)", then teaching "Me (Obj.)", and finally teaching "Give Me (Obj.)". With vocal prompts for each word, the student reached criteria for the complete response form on the 24th session.

The subsequent withdrawal of vocal and manual prompts required 12 additional sessions. The numbers 1-3 on the graph indicate a change in the prompts given Student 2; 1.) Give and Me were vocally prompted, 2.) Give was vocally prompted, 3.) no vocal prompts.

At this point the frequency of the social reinforcer was gradually reduced, requiring eight additional sessions to reach FR 2 without the percent correct falling under 90 for two successive sessions. The numbers 4-5 indicate the changes in the schedule of social reinforcement; 4.) two out of every three responses were reinforced, and 5.) one out of every 2 responses were reinforced.

This rate of reinforcement was continued into the next phase which involved teaching response example Subset 2. The student acquired the response in this subset in four sessions. Next Subset 3
Figure 4. Percent of correct responses for Student 2 during tutoring of the asking response. The numbers 1-5 on the graph indicate changes in the prompts and consequences given.
was taught in four sessions, and Subset 4 in two sessions. The study was not continued beyond this point.

Figure 5 (page 39) presents percentages of correct responses for Student 2 during tutoring of the preposition response. Shaping procedures involved first teaching "In (Obj.)" and then teaching "(Obj.) In (Obj.)". With vocal and manual prompts for each word, the student reached criteria for the complete response form on the 24th session.

The subsequent withdrawal of the vocal and manual prompts required eleven additional sessions. The numbers 1-4 on the graph indicate the changes in the prompts given Student 2; 1.) the object of the preposition was vocally and manually (the Experimenter pointed to the object) prompted and In was vocally prompted, 2.) the object of the preposition was vocally and manually prompted, 3.) the object of the preposition was manually prompted (no vocal prompts), and 4.) no manual prompts. The object modified did not require prompting.

At this point a reduction in the rate of reinforcement also was begun for the preposition response. The numbers 5-6 indicate the changes in the schedule of social reinforcement; 5.) two out of every three responses were reinforced, and 6.) one out of every two responses were reinforced. Twelve sessions were required to reach FR 2 without falling below criteria. This rate of reinforcement also was continued until the end of the study.

Figure 6 (page 42) presents percentages of partial or complete, multiple-word responses for Student 2 during generalization.
Figure 5. Percent of correct responses for Student 2 during tutoring of the preposition response. The numbers 1-6 on the graph indicate changes in the prompts and consequences given.
sessions. Data are displayed on separate abscissas for the preposition and the asking responses. Blocked bars indicate the relative frequency of occurrence of complete, multiple-word responses; "Give Me (Obj.)" (top abscissa) and "(Obj.) In (Obj.)" (bottom abscissa). Striped bars indicate the relative frequency of Student 2's repetition of the object named in the vocal cue provided by the teacher. The student consistently named the object used in the teacher's vocal cue during the preposition and asking trials. He never said the words, Give and Me, and only used the complete, preposition response during one trial of the third generalization session. The abscissas are labeled with the numbers of the tutoring sessions that preceded each generalization session.
Figure 6. Percent of partial or complete, multiple-word responses for Student 2 during generalization sessions. Data are displayed on separate abscissas for the preposition and asking responses.
DISCUSSION

The shaping, differential social reinforcement, and fading procedures used during tutoring sessions were effective in producing acquisition of five examples of two multiple-word response classes under constant stimulus conditions involving the same Experimenter, stimulus objects, time, and schedule of reinforcement. An additional limitation on the stimulus conditions discriminative for Student 1's responding was the presence of the manual prompting stimuli.

These procedures also were effective in producing acquisition of additional examples of one response class, i.e., the preposition response for Student 1 and the asking response for Student 2. Furthermore, the number of sessions for acquisition of successive, response example subsets progressively decreased, indicating generalization to new groups of response examples, or the acquisition of a generative multiple-word response. Neither generalization of novel response examples nor generalization of directly taught response examples occurred across a concurrent change in the verbal agent, physical location, stimulus objects, time, and schedule of reinforcement.

Thus, the results of the present investigation of the relationship between teaching successive verbal response examples and the generalization of these responses across stimulus conditions replicate the results of earlier studies by producing generative
Verbal behavior under limited stimulus conditions. On the other hand, the present results indicate that this procedure is not effective for programming generalization across stimulus conditions.

The next step in the acquisition of the generalization of the response class across stimulus conditions would be to apply generalization programming procedures appropriate to the stimulus conditions occurring in the generalization setting. The present study was not designed to investigate this important issue adequately and ended before new independent variables could be implemented.

Several generalization settings are required to investigate this issue, each varied from the tutoring setting for only one stimulus feature; however, even this design will not answer questions about the interaction of combinations of stimulus features. Moreover, the number of possible combinations further complicates the investigation of the issue of the generalization of response classes across stimulus conditions. The complexity of the question requires a set of experiments that investigate specific features of the issue while holding other features constant and that complement the work of other investigators of this question.

The present study was designed to replicate (across response classes) the effects of teaching successive groups of response class examples; however, this was not done because of the time it took to teach the initial subset and to withdraw prompts and continuous reinforcement. The additional, descriptive, asking response subsets for Student 1 and the preposition subsets for
Student 2 should be taught in order to provide a within-subjects replication of the acquisition of a generative multiple-word response form, similar to the acquisition of a generative preposition response demonstrated by Student 1 and a generative asking response demonstrated by Student 2.

The present study assessed the occurrence of generalization under conditions not uncommon in special education settings. The multiple-word responses were taught under consistent and limited stimulus conditions and observed for generalization in settings where a number of the potentially salient stimulus features were altered. The failure of generalization, although discouraging to educators, parents, and students, was not surprising. Even after the students acquired a generative verbal response, generalization of the response class to other stimulus conditions should not be expected unless appropriate generalization programming procedures are applied to each incidental stimulus feature relevant to the tutoring and generalization settings (O'Leary and Drabman, 1971).

A question pertinent to the preceding suggestion is, "how might these 'relevant' stimulus features be identified?" Since there are many potentially relevant stimulus features, economy of programming becomes crucial. Rincover and Koegel (1975) systematically assess the relevancy of various stimulus features of their treatment setting to the occurrence of generalization to an extra-treatment environment by introducing suspected features to the extra-treatment environment one at a time. The economy of this
procedure depends on the programmer's skill in selecting suspected stimulus features. Becker, Engelmann, and Thomas (1975) provide useful suggestions for presenting examples of a discriminative stimulus that systematically vary in terms of incidental features. Their procedures could prove useful in programming the acquisition and generalization of behavior change.

A number of procedural issues require analysis and discussion. The first issue is about reliability. The reliability procedure employed in the present study allowed the reliability observer to observe the differential consequences given to the student during tutoring sessions. Guess et al. (1968) employed similar methods and obtained a 100 percent overall agreement. The overall percentage agreements obtained in this study were not nearly as high, but were exceptionally good for judgements of verbal responses (McDonald, 1964); the percentage agreements for the scoring of the students' use of the two response forms during tutoring sessions were all either 95 or 96.

Since interobserver agreement would be biased by the reliability observer's observation of the consequences provided by the Experimenter, it is necessary to develop methods for deleting this confound. At the start of the study, erasing consequences from the session tapes was judged too time consuming, and having the Experimenter operate a manual switch during tutoring sessions proved too cumbersome. Consequently, reliability observers were instructed to record the student's responses as they occurred and

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
to stop the tape player when the student finished responding (see Appendix A, instruction 1); however, the observers' performance of these instructions was not always guaranteed.

A foot operated switch might reduce the difficulty of controlling this confound during taping sessions. Otherwise, erasing the consequences might be the best alternative for controlling this variable.

A second procedural issue concerns staff management. The generalization sessions did not occur as frequently or consistently as planned. On the average generalization sessions occurred twice a week for Student 1 and once a week for Student 2. No consequences were arranged for the teachers' running of the sessions, but the Experimenter frequently prompted teachers to conduct generalization sessions.

The frequency of generalization sessions for Student 1 improved during the final 16 tutoring sessions when the reliability observer began to arrange a schedule of generalization sessions with the teacher at the beginning of each week. In addition, the observer began to enter the classroom at an earlier time, in order to set up the stimulus objects for the teacher. After this point generalization sessions occurred three times a week without fail. The generalization sessions for Student 2 remained intermittent throughout the study. Often this was due to unavoidable absences involving dental appointments and trial visits to a potential, new home setting.

This issue suggests the need to provide acquisition and
maintenance procedures for the additional, classroom activity and organization required to program generalization goals for special education students. Investigators of the control of the behavior of behavior-change program staff have researched the effect of public posting, monetary incentives, lotteries, and the Premack Principle (Pommer and Steedbeck, 1974; Iwata, Bailey, Brown, Foshee, and Alpern, 1976). In order to develop and maintain generalization programming activities it would be useful for special education teachers to arrange with their supervisors for the application of one or more of these procedures.

A third procedural issue is the use of social rather than tangible consequences which was a procedure prescribed by classroom policy. Uncontrolled changes in the value of the social consequences may have contributed to the instability observed during tutoring trials in the students' attention and response latencies, resulting in variable session performances and delays in the acquisition of the response criteria for the initial tutoring phases; the students did not reach the complete form of the multiple-word responses and the final schedule of reinforcers and density of prompts until after the 45th session.

Synder, Lovitt, and Smith (1975) reviewed the experimental literature on the teaching of language skills to the severely retarded and noted that every study they reviewed used some form of tangible reinforcer. Murdock et al. (1977) is the only study in this area reviewed by the present author that only used social reinforcers during their training procedures; however, they did
provide candy and points at the end of their sessions.

The use of only social consequences raises several research issues. Social consequences are not as readily defined in operational terms as tangible consequences, and the effects of their subtle variations are difficult to analyze or control (Murdock et al., 1977). On the other hand, the repeated use of standardized, verbal, social reinforcers may result in the weakening of their secondary reinforcing properties, reducing their effectiveness and limiting the power of the Experimenter's procedures.

The value of social consequences can be controlled. This would involve regularly associating the social reinforcers (and reinforcing agents) with tangible rewards, or regularly changing the topography of the social reinforcers to other forms that have demonstrated reinforcing properties. To some extent the latter procedure was followed in this study, but concern for controlling variables across sessions limited the amount of alternatives tried; however, judging from the delay in the students' acquisition of the verbal responses, it may not have been tried enough.

A generalization issue also is raised whenever tangible reinforcers are employed in an instructional program. Responding under these conditions may not generalize to settings where the tangible reinforcer is altered or absent (Baer et al., 1967; Meichenbaum et al., 1968; Walker and Buckley, 1972). The consensus of Murdock et al. (1977) and Pomerantz and Redd (1972) is to employ the procedures necessary to produce acquisition and then program generalization to different conditions by fading the extra-ordinary
training stimuli.

The amount of time necessary to fade the extensive prompts used in the present study suggests the costliness of following their recommendations. Fading reinforcers would have involved even more instructional time, but if the educational outcome is increased adaptive behavior for students, then the costs can be evaluated on the basis of benefits to students and their community.

A final procedural issue is the role of the reinforcement procedures used during generalization sessions on the student's performance during generalization trials. Several of the studies of the generalization of verbal behavior employed a mixture of reinforced and unreinforced trials during generalization probes (Bucher and Mueller, 1977; Garcia et al., 1973; Guess, 1969; Guess and Baer, 1973; Metz, 1965; Schroeder and Baer, 1972; Schumaker and Sherman, 1970; Twardosz and Baer, 1973), i.e. trials of previously learned responses were reinforced while trials of generalization responses were not reinforced.

The level of performance of novel imitation responses during generalization probes decreased when Baer et al. (1967) withdrew reinforcement for intermixed trials of previously learned responses. Their results suggest that intermixed, reinforced trials for previously learned response items enhance subjects' responding during generalization item trials.

The present experiment did not employ the intermix method during generalization sessions. The effect of this variable was not experimentally manipulated; however, it is possible that a
context of reinforcement for similar responses could have enhanced the occurrence of generalization. On the other hand, the intermix condition poses problems for the practicality of generalization procedures that have demonstrated an effect only under conditions of intermixed trials. To have wide applicability the generalization procedure must have an effect on the performance of newly acquired skills in settings where reinforcement for the skills is less structured or less frequent than reinforcement during typical intermix conditions.

To program for generalization to nonreinforced settings the present study only reinforced other (appropriate) behaviors during generalization sessions. The teachers' implementation of this procedure was not measured, and it is possible that the partial, verbal responses consistently produced by the students' during generalization trials (see Figures 3 and 6, striped bars) were maintained by uncontrolled reinforcements. Future research needs to attend to the issue of the effect of the reinforcement conditions that occur during generalization sessions.

The occurrence of reinforcing events relative to the dependent variable should be measured, but social reinforcers may be subtle and difficult to detect. Consequently, if social reinforcers are employed during generalization sessions, the experimenters should be trained in the delivery of controlled social reinforcers.

Finally, the possible role of undetermined contingencies in the control of the partial responses that occurred in the generalization sessions presented a serious problem for programming the performance
of the complete, multiple-word responses in the generalization setting. By the time the responses were taught in the tutoring setting the partial responses had been maintained in the generalization setting for a long time. Subsequent efforts to program generalization by manipulating tutoring or generalization session stimulus variables probably would have had to contend with the strength of the existing, partial responses and with their possible controlling variables.

In summary, the present study reviewed the literature on the generalization of verbal responses and found few investigations of the generalization of specific verbal responses or verbal response classes across stimulus conditions. This review discriminated generative verbal behavior from the generalization of verbal behavior across stimulus conditions. This is a useful discrimination for evaluating the outcomes of generalization studies and for planning generalization promotion programs, because it focuses the Experimenter's attention on the stimulus features that control the occurrence of verbal behavior across stimulus conditions. In addition, this review noted that generalization programming may need to attend to a large number of stimulus features in order to produce desired stimulus generalizations. The present study also assessed the occurrence of multiple-word responses under novel stimulus conditions during the tutoring of successive examples of the multiple-word responses and found that although students showed some acquisition of generative responding, they did not generalize this performance to a novel setting. Finally and in conclusion the present study
discussed four procedural issues concerning reliability, staff management, social reinforcement, and intermixed trials, and suggestions were made for controlling these problematic variables during future research.
REFERENCES


INSTRUCTIONS FOR RECORDING THE VERBATIM OF VERBAL RESPONSES

(Appendix A)

1. Record the sentence response in pen. Write each word or utterance before the consequence occurs. When recording off the cassettes, turn off the tape player before it plays the consequence. Do not alter your record of the sentence response after hearing the consequence.

2. With capital letters initialize each word of the sentence response if it is part of the criterion sentence for the current trial (See verbatim recording example 1).

3. Record each word or utterance as it occurs. Maintain uniform spacing between your record of each word or utterance.

4. Record a dash (-) for utterances that are too inarticulate or inaudible to be understood (example 2).

5. If the subject produces the same approximate pronunciation of a word across several trials, initialize the approximation with a capital letter or write out the phonic spelling of the approximation (example 3).

6. Write out those intelligible words that are not part of the criterion response for the current trial (example 4).

7. If the first letter of two or more words occurring in the same session is the same, distinguish the words by adding a second, lower case letter (example 5).

8. If a word has two syllables and is sometimes approximated with a one syllable word, distinguish between the two pronunciations by using one capital letter for the one syllable approximation and a capital plus lower case letter combination for the two syllable pronunciation (example 6).

9. If the S repeats a word or utterance, repeat your record of the word or utterance (example 7).

10. If the S omits a word that is part of the criterion response do not record it with a blank space. Consecutively record each word or utterance (example 8).
11. If the S produces additional responses (correct or incorrect) later than five seconds after the error, do not record any of the responses following the error (example 9).

12. The student's approximate pronunciations need to be consistent, and the record of those approximations needs to be consistent. Always use the same symbol for the same approximation. Furthermore, acceptable approximations and their symbols must be the same across recorders.

13. Once a S has produced a correct response according to the response definition, the trial is over. Subsequent responses are not scored and need not to be recorded.

14. When a S makes an error and the E then prompts the correction, the trial stops once the prompt is given. Record S's responses only up to the error.

15. Enclose in parentheses those words that occur during the E's vocal cue (example 10).

16. If the S produces an unintelligible utterance or produces a word out of order or a word that is not part of the criterion sentence for the current trial but then produces the criterion word without a vocal prompt from the E, record the first and second responses with an ellipses between them (example 11). If a vocal prompt occurs between the responses, do not record any subsequent subject responses (example 12).


**VERBATIM RECORDING EXAMPLES**

(Appendix B)

<table>
<thead>
<tr>
<th>CRITERION SENTENCE</th>
<th>SENTENCE RESPONSE</th>
<th>RECORD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Give Me Black Pen</td>
<td>&quot;Give me black pen.&quot;</td>
<td>GMBP</td>
</tr>
<tr>
<td>2. Pencil In Box</td>
<td>&quot;Pencil in ***&quot;</td>
<td>PI---</td>
</tr>
<tr>
<td>3. Give Me Grey Washer</td>
<td>&quot;Give me gay washer.&quot;</td>
<td>GMGW or GMGayW</td>
</tr>
<tr>
<td>4. Comb In Bowl</td>
<td>&quot;Comb on table.&quot;</td>
<td>ConTable</td>
</tr>
<tr>
<td>5. Ball In Front Of Box</td>
<td>&quot;Ball in front of box.&quot;</td>
<td>BLIFOBx</td>
</tr>
<tr>
<td>6. Give Me Toothpaste</td>
<td>&quot;Give me paste&quot; or &quot;Give me toothpaste.&quot;</td>
<td>GMP or GMTp</td>
</tr>
<tr>
<td>7. Give Me Shoe</td>
<td>&quot;Give...Give me shoe.&quot;</td>
<td>GGMS</td>
</tr>
<tr>
<td>8. Nail In Bottle</td>
<td>&quot;In bottle.&quot;</td>
<td>IB</td>
</tr>
<tr>
<td>9. Give Me Spoon</td>
<td>&quot;Ask...(delay greater than 5 sec.s)...Give me spoon.&quot;</td>
<td>Ask</td>
</tr>
<tr>
<td>10. E's vocal cue:</td>
<td>&quot;Ask me for the towel.&quot;</td>
<td>(GM)T</td>
</tr>
<tr>
<td>S's sentence response:</td>
<td>&quot;Give me towel.&quot;</td>
<td></td>
</tr>
<tr>
<td>11. E's vocal prompt:</td>
<td>&quot;In&quot;</td>
<td>KOn</td>
</tr>
<tr>
<td>S's sentence response:</td>
<td>&quot;Knife on...in bowl.&quot;</td>
<td></td>
</tr>
<tr>
<td>12. S's sentence response:</td>
<td>&quot;Comb on...in box.&quot;</td>
<td>Con...IBx</td>
</tr>
</tbody>
</table>

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.