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An analysis of generalization in a parent training program from a laboratory to home setting

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AN ANALYSIS OF GENERALIZATION IN A PARENT TRAINING PROGRAM FROM A LABORATORY TO HOME SETTING[1]

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THESIS ACCEPTANCE

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ABSTRACT

A mother was trained in a structured laboratory setting, through written and verbal instructions and daily verbal feedback, to modify specific components of her attention to her 4-yr-old daughter's behavior during an instruction-following task. Examinations were made of the effectiveness of parent training in changing the mother's behavior in the structured laboratory setting, as well as the extent of generalized change in mother's responses in three other settings in which no training was conducted: 1) a similar structured period in the home, 2) a dissimilar unstructured period in the laboratory, and 3) a dissimlar unstructured period in the home. The parent-training package, introduced sequentially across components of the mother's attention in a multiple baseline design, led to desired changes in the mother's behavior in the structured laboratory setting, and to generalized changes in these same parent behaviors in the structured home setting; however, little generalization occurred to either of the dissimilar unstructured settings. Examination of the child's behavior showed a progressive decrease in the rate of inappropriate behavior in both structured settings correlated with successive changes in the mother's behavior.

INTRODUCTION

In recent years, a growing body of research in applied behavior analysis has demonstrated that parents can be trained as change agents for a wide variety of child behaviors, including compliance (Budd, Green, & Baer, in press; Forehand, Cheney, & Yoder, 1974; Nordquist, 1971; Nordquist & Wahler, 1973; Wahler, 1969a, 1969b; Zeilberger, Sampen, & Sloane, 1968), self-help skills (Fowler, Johnson, & Whitman, Note 1), aggression (Bernal, Duryee, Pruett, & Burns, 1968; Hawkins, Peterson, Schweid, & Bijou, 1966), bizarre verbalizations (Pinkston & Herbert, Note 2), and self-injurious behavior (Allen & Harris, 1966). The range of child management techniques taught to parents has included employing differential social attention and timeout (e.g., Lavigueur, Peterson, Sheese, & Peterson, 1973; Wahler, Winkel, Peterson, & Morrison, 1965; Budd, Pinkston, & Green, Note 3), implementing token reinforcement systems (e.g., Christopherson, Arnold, Hill, & Quilitch, 1972; Hall, Axelrod, Tyler, Grief, Jones, & Robertson, 1972; Rekers & Lovaas, 1974), providing tangible rewards for appropriate child behavior (e.g., Zeilberger et al., 1968), and applying shock contingent on inappropriate child behavior (e.g., Merbaum, 1973; Risley, 1968).

While there is considerable evidence that parents can be trained as effective behavior modifiers, there is very little evidence of the extent to which parents generalize their newly learned skills outside the training sessions. Few studies have formally assessed generalization, and most of those have found that parents did not use the behavior management procedures consistently in non-training settings until specifically trained to do so. One case in point was provided by Budd, Pinkston, and Green (Note 3), who trained a mother in the laboratory in the use of

timeout and differential social attention to treat her son's aggression. Observations in the home revealed that the mother did not use these procedures in either a similar structured period in the home or a dissimilar, unstructured period in the home until training was introduced directly in each of these settings. Johnson and Green (Note 4) reported a similar lack of spontaneous generalization from a laboratory to home setting.

The lack of generalization reported in the literature raises a critical question regarding the feasibility of parent-training programs, especially those occurring outside the home setting, as viable means of treating child behavior problems. In order to have a therapeutic impact on parent-child relations, parent-training programs must lead to changes in everyday interactions between the parent and child in the home (Patterson, McNeal, Hawkins, & Phelps, 1967). The task for behavioral psychologists is to identify the factors affecting generalization of parents' skills in child management techniques and develop training programs that maximize the likelihood for generalization to occur (cf. Stokes & Baer, in press).

Some variables that might affect whether or not parents use newly trained skills outside the training sessions include the simplicity, convenience, and/or effectiveness of the procedures, and the degree of similarity between the training setting and the natural environment. In addition, it appears that information given to parents during training regarding their use of the procedures outside the training sessions could be relevant. For example, if parents are told simply to implement the child treatment procedures in the laboratory (as was done by Budd, Pinkston, & Green, Note 3), the parents might interpret these instructions to mean that the experimenter does not want them to use the procedures elsewhere. If the treatment procedures require special equipment or

facilities, the lack of any hints as to how the procedures might be adapted to another setting may inadvertently hinder generalization. One very recent study by Polk, Schilmoeller, Embry, Holman, & Baer (Note 5) specifically examined the role of experimenter comments in obtaining generalized use of a parent-training package. After training a parent to use child management procedures in a laboratory setting, the experimenters instructed the parent to implement the same procedures in the home, and found that such instructions were sufficient to promote generalized use of the management techniques.

These findings indicate that trainers can influence, at least to some extent, the probability that parents will apply newly trained skills outside the training setting by specifically requesting them to use the procedures in other environments. If such instructions to generalize are functional in obtaining generalization, it is possible that other trainer comments might also have an impact. For example, rather than specifically instructing parents to apply the treatment procedures outside the training setting, perhaps simply informing parents that the procedures would be useful in other settings might facilitate generalization of the parents' behavior. That is, it may be that suggestions to generalize could achieve the same results as the more direct procedure of instructions to generalize.

The primary purpose of the present study was to analyze the generalization of a mother's use of child management procedures from the training setting in the laboratory to a similar setting in the home, and to two dissimilar settings, one in the laboratory and one in the home. The mother was specifically told during training that, while training would occur first in the clinic, the child-managment procedures should work anywhere, and that training might occur later in the home. Thus, this study

investigated whether or not such suggestions on the generalizability of the treatment procedures, along with a parent-training program, would be sufficient to result in generalized use of behavior management techniques in other settings.

Another purpose of this study was to evaluate the effectiveness of a parent-training package, consisting of initial written and verbal instructions coupled with daily verbal feedback, in modifying different components of a mother's attention within the training setting. In this respect, the study provides a systematic replication of the training procedures used successfully by Budd et al. (in press). In both the Budd et al. study and the present study, the parent had no previous training in behavior modification; however, because of different characteristics between the parent-child pairs in these studies, the treatment procedures being trained differed in some respects to those employed by Budd and her colleagues.

In addition to evaluating the effectiveness of a parent-training package and the generalization of the parent skills trained, this study examined the changes in child behavior corresponding with changes in the mother's attention to child behavior, with the ultimate goal of remediating the child's inappropriate behavior.

METHOD

Subjects

A mother and her 4-yr-old daughter, Sarah, served as the subjects. Sarah obtained a mental age of 44 months (at the chronological age of 53 months) on the Merrill-Palmer Scale. She tested at age level on concrete visual-motor tasks, was mildly delayed in motor imitation skills, and failed expressive and receptive language items at the 18-month to 2-yr level. Sarah was enrolled in both a speech therapy program and a preschool program. Early in the study, it was determined that Sarah had a mild hearing loss due to fluid in her ears. This was treated surgically (during the Baseline phase of the experiment) by placing tubes in her ears; however, no subsequent evaluation of her hearing was conducted to verify whether or not Sarah had fully regained her hearing.

The mother and child were referred for treatment by school personnel because of reported behavior problems in the home. The mother described these problems as including noncompliance, failing to pick up things she used, putting things in her mouth, and unsystematic toileting. She expressed both frustration with attempts to handle these problems on her own and a desire to receive help in order that Sarah could become a more "normal" child.

Both parents were in their mid-thirties, and each had some business college education. The mother was a housewife and the father was a middle class, white collar worker. In addition to Sarah, they had a 6-yr-old son, whom the parents described as bright and well-behaved. Only the mother and Sarah participated in the study.

Experimental Settings and Activities

Experimental sessions were conducted two days per week in each of

two settings: a laboratory room at the Meyer Children's Rehabilitation Institute, and the family's home. The location of sessions alternated on a daily basis unless unforeseen circumstances resulted in deviations from this schedule. Each session lasted approximately 30 minutes and consisted of two parts: first, a structured, instruction-following period, in which the mother presented a total of 16 pre-specified instructions to Sarah; and second, an unstructured free-play period, when Sarah was free to play independently (except for occasional parent instructions) while the mother worked or read. These two periods are described in more detail below.

Structured Period

The format and activities for this period closely follow those reported by Budd et al. (in press). The laboratory room used in the structured period measured 3.7 m by 4.3 m and was furnished with a table and two chairs for the subjects, a plastic tub of stimulus objects, and four response locales that were involved in the mother's instructions to the child. The four locales were chosen at random for each session from a pool of six: table, chair, tub, bag, box, and rug. These locales were situated approximately four feet from the subjects' table and placed in a line on the floor about 12 inches apart.

In the home setting, the structured period took place in the combination kitchen-dining room, which measured 3.1 m by 6.0 m. In the room were the kitchen table and chairs where the subjects sat, and six response locales, four of which were chosen at random each session to be involved in the mother's instructions to the child. The six locales were a dishwasher, bowl, table, chair, sewing machine cabinet, and kitchen counter. Four of the locales in the home were immovable; however, the chair and the bowl were placed randomly so there was some variability in the arrangement

of the response locales.

At the beginning of each session, the experimenter gave the mother a list of 16 specific instructions to be presented to Sarah one at a time (see Appendix A). Each instruction requested Sarah to place a specific object in one of the four available locations -- for example, "Put the crayon in the tub," or "Put the airplane on the table." The mother handed the stimulus object to Sarah as she was giving the instruction. Both the laboratory and home stimulus objects were selected daily from different item pools consisting of approximately 40 items each.

The length of the structured period varied between 7 and 20 minutes, depending primarily on the latency of the child's responses to her mother's 16 instructions. It began when the first instruction was given, and ended when the child completed the final instruction.

Unstructured Period

During this period in both the laboratory and home settings, the mother told Sarah she had work to do and that Sarah should play on her own. In the laboratory setting, Sarah was invited to go into the playroom (measuring 2.3 by 5.1 meters) adjacent to the experimental room and use any of the toys she found there while the mother sewed, read, or wrote letters. In the home, the only restriction on Sarah's movements was that she remain in the house; the mother was asked to go about her routine activities. Observations during the unstructured period lasted 12 minutes in the laboratory and 18 minutes in the home.

Behavioral Definitions and Observation Procedures

During both the structured and unstructured periods, an observer, equipped with a stopwatch and clipboard, recorded the occurrence of parent and child behavior in continuous 10-sec intervals.[2]

Structured Period

Descriptions of the seven target parent behaviors recorded during the structured period are provided below.

Pointing during initial instruction: an occasion when the mother pointed to the appropriate location for a specific stimulus object while giving an initial instruction. (The first delivery of a specific instruction from the written instruction list was denoted as an initial instruction.)

Name and eye contact during initial instruction: an occasion when the mother called the child by name before giving an initial instruction, and oriented her eyes toward the child's face at least sometime during delivery of the initial instruction. The child's eyes also had to be oriented toward the mother's face during all or part of the initial instruction.

Praise: verbal or physical social behavior that indicated approval of the child's correct response to an initial instruction and that occurred directly following compliance in the same or immediately successive 10-sec interval.

Verbal prompt: any verbal statement during intervals of instructional trials, excluding initial instructions, repetitions of instructions, or praise. Verbal prompts included providing extra information regarding the task, requests for attending, praise before a response was completed, comments regarding inappropriate or mouthing behaviors, or irrelevant remarks.

Tangible reward: delivery of a bite of food, such as cheese crackers, chocolate, or M&Ms, to the child following a response to an initial instruction, as long as the edible was given in the same or immediately successive 10-sec interval following the child response.

Repetition of instruction: restatement of all or part of an initial instruction, using the same or synonymous words.

Physical prompt: any physical behavior directed toward the child during intervals of trials, excluding praise, tangible rewards, or pointing during an initial instruction. Physical prompts included touching the child, modeling all or part of the correct response, pointing toward the response locale after the initial instruction, or touching the correct response locale.

In addition to the above defined parent behaviors, the observer also recorded a category of general parent attention to Sarah between instructional trails; however, this behavior was not targeted for treatment.

The two categories of child behaviors recorded during the structured period are defined below.

Correct response: placement of the specified stimulus object for an instructional trial in the appropriate response locale and release of both hands from the object, excluding occasions when the mother provided assistance at the moment of compliance. (Physical assistance consisted of the mother touching the child, stimulus object, or response locale at the moment the child was completing the response.)

Inappropriate: physical behavior directed away from compliance, including sitting on the floor, touching the observer or the observer's materials, manipulating stimulus objects other than the one involved in the instruction, remaining seated at the table for more than 5 sec following the initial instruction, or sitting on or in one of the response locales.

Additional child behaviors recorded during the structured period included correct responses with parental assistance, incorrect responses, mouthing of objects, and inappropriate behavior between instructional trials.

From the data collected during each session, four additional measures were computed: 1) no repetitions, 2) no physical prompts, 3) length of instructional trials, and 4) child's perfect trials. These measures are

defined below.

No repetitions: the proportion of total instructional trials in which the mother provided no repetition of the initial instruction, at least until the third interval of the trial or until an incorrect child response had occurred, whichever came first.

No physical prompts: the proportion of total instructional trials in which the mother provided no physical prompt, at least until the third interval of the trial or until an incorrect child response had occurred, whichever came first.

Length of instructional trials: the mean number of continuous 10-sec intervals within an instructional trial. An instructional trial began when the mother completed her delivery of an initial instruction and was terminated when the child made a correct response.

Child's perfect trials: the proportion of total instructional trials in which all of the following events occurred: the child's first response was correct, this correct response occurred within the first two 10-sec intervals, and the child engaged in no inappropriate behavior during the trial.

Unstructured Period

Similar parent and child responses were recorded during the unstructured periods, with the exception that an additional child behavior category, appropriate, was denoted, and the definition of inappropriate behavior was modified as described below.

Appropriate: any time the child was actively manipulating materials (except those defined as off-limits) in a non-destructive manner, or was looking at a book or the television, and the behavior was not inappropriate as defined below.

Inappropriate: whenever the child engaged in any of the following behavior categories: physical aggression toward people or materials; physical contact with restricted objects, such as the observer or her materials, household appliances, or light switches; or behavior directed away from compliance with parental requests or ongoing rules, such as leaving the observation area or inappropriate toileting.

Reliability Procedures

Reliability observations were made at least once in each experimental condition in each of the four environments with one exception: In the first training condition, no reliability observations were made during the unstructured period in either the laboratory or home. Reliability observations were made by having two observers sit shoulder-to-shoulder and make simultaneous and independent recordings of defined parent and child behaviors. During the structured period, the observers were seated so that they were able to see the faces of both the mother and child as the initial instruction was given, and at a distance of approximately eight feet from the subjects. The same approximate distance was maintained during the unstructured periods, while the observers followed the child as unobtrusively as possible.

The percentage of interobserver agreement was calculated for the occurrence of each behavior within each 10-sec interval by dividing the total number of intervals in which both observers recorded the occurrence of a behavior by the total number of intervals in which either observer recorded the occurrence of a behavior, and then multiplying this quotient by 100.

Design

This experiment investigated changes in individual components of mother and child behavior in four environments: 1) a structured period in the laboratory, 2) a structured period in the home, 3) an unstructured

period in the laboratory, and 4) an unstructured period in the home. A parent-training package was applied successively to different components of the mother's behavior in one environment -- the structured laboratory period -- in a multiple baseline design. An analysis was conducted of the effects of direct training on the mother's behavior in this environment, as well as of any generalized effects of training in the three additional environments in which no direct training was introduced. In addition, an examination was made of the corresponding effects of changes in the mother's behavior on her child's behavior in each of the four environments.

The parent-training package consisted of initial written and verbal instructions to the mother on the use of specific child treatment procedures. The parent-training package was introduced successively in the structured laboratory period for the following aspects of parent behavior: 1) calling child's name, making eye contact with the child, and pointing to the correct response locale during the initial instruction; 2) providing praise for correct child responses to instructions; 3) the delivery of verbal prompts while an instruction was ongoing; and 4) providing tangible rewards for correct child responses, and delivering repetitions and physical prompts while an instruction was ongoing.

During direct training in the structured laboratory period, the mother was told that the treatment procedures should work in any environment. The experimenter explained that training would begin in the structured laboratory period, but, if needed, additional training would be provided later in the home.

Procedures

Structured Laboratory Period

Baseline: Sessions 1-7. At the beginning of this condition, the mother

was asked to deliver a set of instructions to Sarah and to use whatever means she would normally employ to get Sarah to comply with the instructions. No information was given to the mother regarding her behavior in dealing with Sarah.

Training on use of child's name, eye contact, and pointing during initial instructions: Sessions 8-14. At the beginning of this and all later training conditions, the mother was given a written explanation of the procedures she was to employ and a brief rationale for their use. (Copies of the written instructions to the mother for each condition are provided in Appendix B.) When the mother had read these instructions, the experimenter reviewed the procedures with her and answered any questions the mother had regarding the procedures. In the first training condition, the mother was asked to get Sarah's attention before giving an instruction by calling her name and establishing eye contact with her, and to point to the correct response locale as she gave each initial instruction. These procedures were introduced because it was unclear whether or not Sarah was attending when the initial instruction was given. Also, because of Sarah's history of mild hearing loss, it was uncertain whether she was fully hearing or understanding the instruction. Feedback was given the mother at the end of each session regarding her use of the child treatment procedures. For example, the mother was told, "Good, you pointed during every instruction, always called Sarah's name, and established eye contact on all but one instruction."

Training on praise for child responses to instructions: Sessions 15-22. Because the mother infrequently provided positive attention to Sarah for correct responses to instructions, she was asked to provide warm positive attention each time Sarah was correct in her first response to an initial

instruction. (She was also asked to withhold her praise when a correct response followed an incorrect response to the same instruction.) In this and later conditions, the mother was requested to continue using the child treatment procedures outlined in the previous condition(s). At the end of each session in this and all following training conditions, the mother was given feedback regarding her use of the procedures currently being taught, as well as all procedures previously outlined. For example, she was told, "That was nice -- you praised Sarah every time her first response was correct, and you called her name and had eye contact with her before giving each instruction; however, you forgot to point during one instruction."

Training on verbal prompts: Sessions 23-28. The mother was now asked to eliminate her verbal prompts while an instruction was ongoing. This category included additional information about the task, corrective feedback, and irrelevant comments. Although it was unclear whether or not Sarah fully understood each instruction and could comply without any help, it was felt that the elimination of verbal prompts might teach the child to attend more carefully to the mother's initial instructions. The mother was still free to provide repetitions or physical prompts to obtain Sarah's compliance.

Training on tangible rewards and initial help: Sessions 29-24. In this condition, the mother was asked to provide a tangible reward such as candy when Sarah responded correctly within the first 15 sec following the initial instruction, and to withhold all help -- that is, verbal prompts, repetitions of instructions, and physical prompts -- within the first 15 sec following the initial instruction. The mother was asked to time the 15-sec period by counting "1001," "1002," and on up to "1015" to herself. After that time, the mother was free to repeat the instruction or provide

a physical prompt to help Sarah respond correctly. She was asked to continue to provide praise for initial correct responses, even if they didn't occur within the 15-sec period, and to continue to follow all the procedures previously outline. These procedures were introduced to test whether or not Sarah could learn to respond quickly and independently to instructions.

Structured Home Period

During each session in this period, the mother delivered a set of 16 instructions to Sarah just as she did in the structured laboratory period. The procedures in the home setting were the same as those for Baseline in the laboratory. Even after parent training was initiated in the laboratory, no direct instructions or feedback were provided to the mother regarding her behavior in dealing with Sarah in the home structured period (and the mother never specifically asked how she should act in this setting).

Unstructured Laboratory and Home Periods

During these two periods, the mother was asked to have some materials available to work on or read while Sarah played independently; however, the mother and child were free to interact as they wished with no restrictions or specific requests by the experimenter regarding the nature of their interaction. Throughout the study, the mother was not given any instructions or feedback regarding her behavior in dealing with Sarah in the unstructured periods, nor did she receive any direct training on the treatment procedures outlined in the structured laboratory period.

RESULTS

Reliability

The ranges and means of the reliability percentages for the structured periods in the laboratory and home are presented in Table 1, and for the unstructured periods, in Table II. No range is provided for the behaviors for which the percentage of agreement was the same throughout the study. The average percentage of interobserver agreement in the structured period was 80% or above, and in the unstructured period, 75% or above for each behavior throughout the study. The lower percentages of agreement obtained for some behaviors in some conditions was due primarily to low rates of the behaviors, and thus few opportunities to record the behavior.

Insert Tables I and II about here

Structured Periods

Daily levels of the five parent behaviors targeted for treatment are presented in Figure 1 in the order in which the parent-training package was applied to them.

The top graph in Figure 1 presents the percentage of total instructional trials in which the mother pointed during the initial instruction, and the percentage in which she both called the child by name and established eye contact during the initial instruction. During Baseline, the mother pointed during the initial instruction an average of only 18% of the trials, and never called the child by name or established eye contact with the child. Following the application of the parent-training package to these behaviors, the mother's rate of pointing during the initial instruction increased dramatically to a mean of 99% for the remainder of the study, and her use of the child's name and eye contact also increased

Table I

Reliability Percentages - Structured Periods

Behavior	Range of Mean Reliabilities Within Conditions	Mean Reliability Across All Conditions
Laboratory Setting		
Initial Instruction	--	100
Pointing During Initial Instruction	80 to 100	99
Name & Eye contact During Initial Instruction	94 to 100	99
Praise	57 to 100	95
Verbal Prompts	65 to 100	85
Tangibles	--	100
Repetitions	81 to 100	89
Physical Prompts	67 to 95	85
Inappropriate Behavior	50 to 100	80
Correct Responses	93 to 100	97
Home Setting		
Initial Instruction	--	100
Pointing During Initial Instruction	71 to 100	98
Name & Eye Contact During Initial Instruction	88 to 100	99
Praise	86 to 100	97
Verbal Prompts	67 to 100	86
Tangibles	91 to 100	97
Repetitions	80 to 100	89
Physical Prompts	69 to 91	83
Inappropriate Behavior	67 to 92	80
Correct Responses	--	100

Table II

Reliability Percentages - Unstructured Periods

Behavior	Range of Mean Reliabilities Within Conditions	Mean Reliability Across All Conditions
Laboratory Setting		
Initial Instruction	0 to 100	84
Pointing During Initial Instruction	67 to 100	86
Praise	80 to 100	83
Verbal Prompts	50 to 100	81
Repetitions	71 to 100	90
Physical Prompts	0 to 100	86
Inappropriate Behavior	65 to 100	81
Correct Responses	67 to 100	83
Home Setting		
Initial Instruction	50 to 100	87
Pointing During Initial Instruction	0 to 100	88
Name & Eye Contact During Initial Instruction	--	100
Praise	--	100
Verbal Prompts	50 to 100	75
Repetitions	57 to 100	78
Physical Prompts	50 to 100	80
Inappropriate Behavior	67 to 100	87
Correct Responses	50 to 100	85

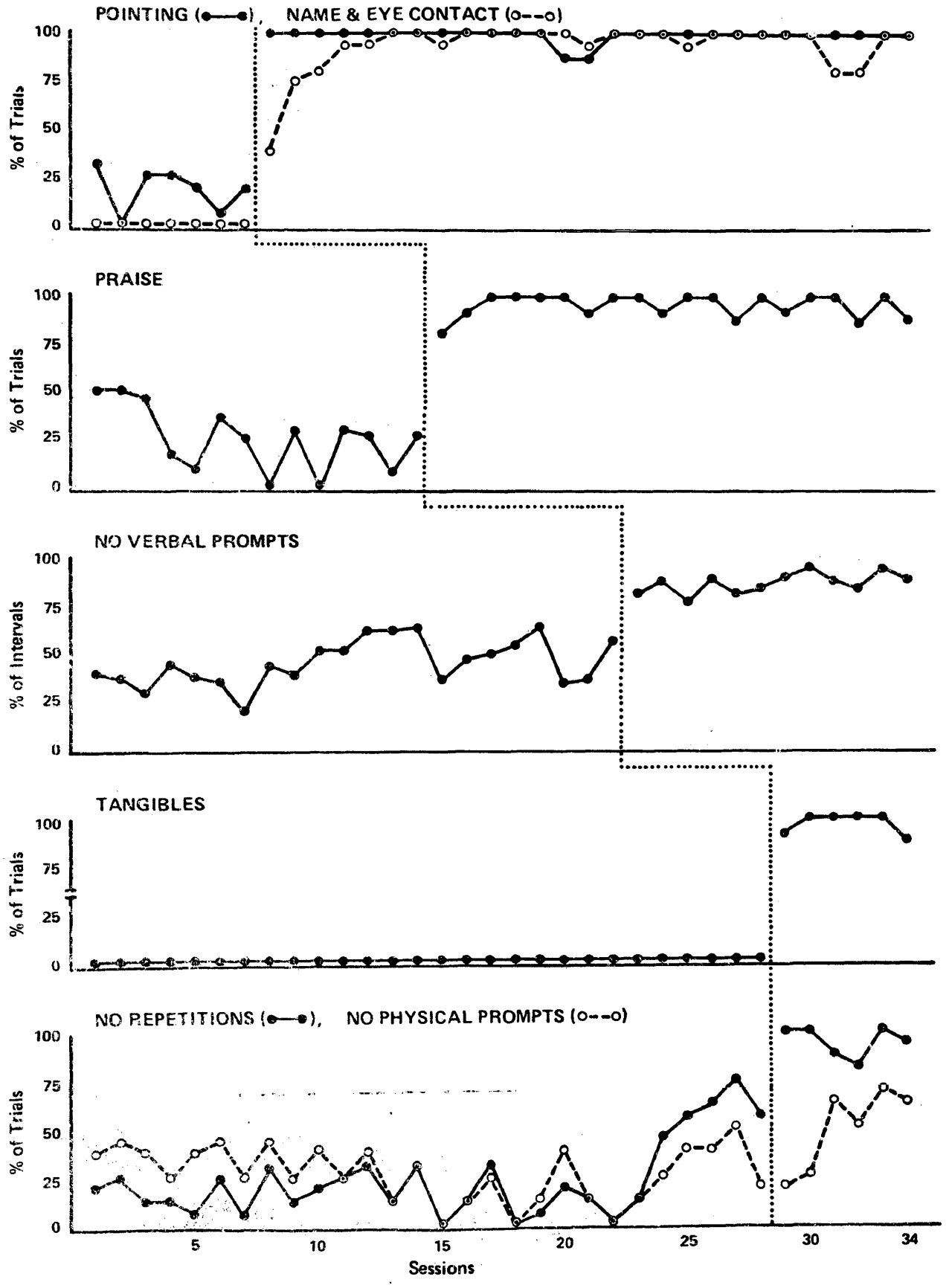
significantly to a mean of 94%.

Insert Figure 1 about here

The second graph displays the mother's rate of praise following correct child responses, calculated as the percentage of the total instructional trials in which the child's first response to an initial instruction was correct. During Baseline, the mother's rate of praise gradually declined, reaching an average of 19% of trials in which Sarah's first response was correct. Training on the use of praise quickly increased her rate to an average of 95% for the remainder of the study. Similarly, the middle graph shows that the mother's withholding of verbal prompts, calculated as the percentage of total 10-sec intervals in which no verbal prompts were provided, increased from a Baseline mean of 43% to an average of 86% of total intervals following the parent-training input on this behavior.

The fourth graph presents the mother's delivery of a tangible reward for correct responding, calculated as a percentage of total trials in which Sarah's first response was correct and occurred within two intervals of the instruction. Whereas the mother never provided a tangible reward during Baseline, her rate following training increased dramatically to a mean of 96% of the correct first responses that occurred in the first two intervals of a trial. The last graph presents the mother's withholding of repetitions and withholding of physical prompts, each calculated as a percentage of instructional trials in which no repetitions (or physical prompts) occurred before the third 10-sec interval or until after an incorrect response had occurred. During Baseline, the mother withheld repetitions at a mean of 23% of the instructional trials and withheld her physical prompts a mean of 27% of the trials; however, her rate of

Fig. 1 Daily levels of five target parent behaviors in the structured laboratory setting across successive treatment conditions. Dotted vertical lines indicate the introduction of the parent-training procedures on the target behaviors.


POINTING (●—●), NAME & EYE CONTACT (o--o)
% of Trials
100
75
50
25
0
PRAISE
% of Trials
NO VERBAL PROMPTS
% of Intervals
TANGIBLES
% of Trials
NO REPETITIONS (●—●), NO PHYSICAL PROMPTS (o--o)
% of Trials
5
10
15
20
25
30
34
Sessions

withholding repetitions increased somewhat in the final sessions of Baseline, following the introduction of training for the mother's use of verbal prompts. Application of the parent-training package to these behaviors resulted in a further increase in the mother's rate of withholding repetitions to a mean of 94%, with a corresponding increase in her rate of withholding physical prompts to a mean of 48%.

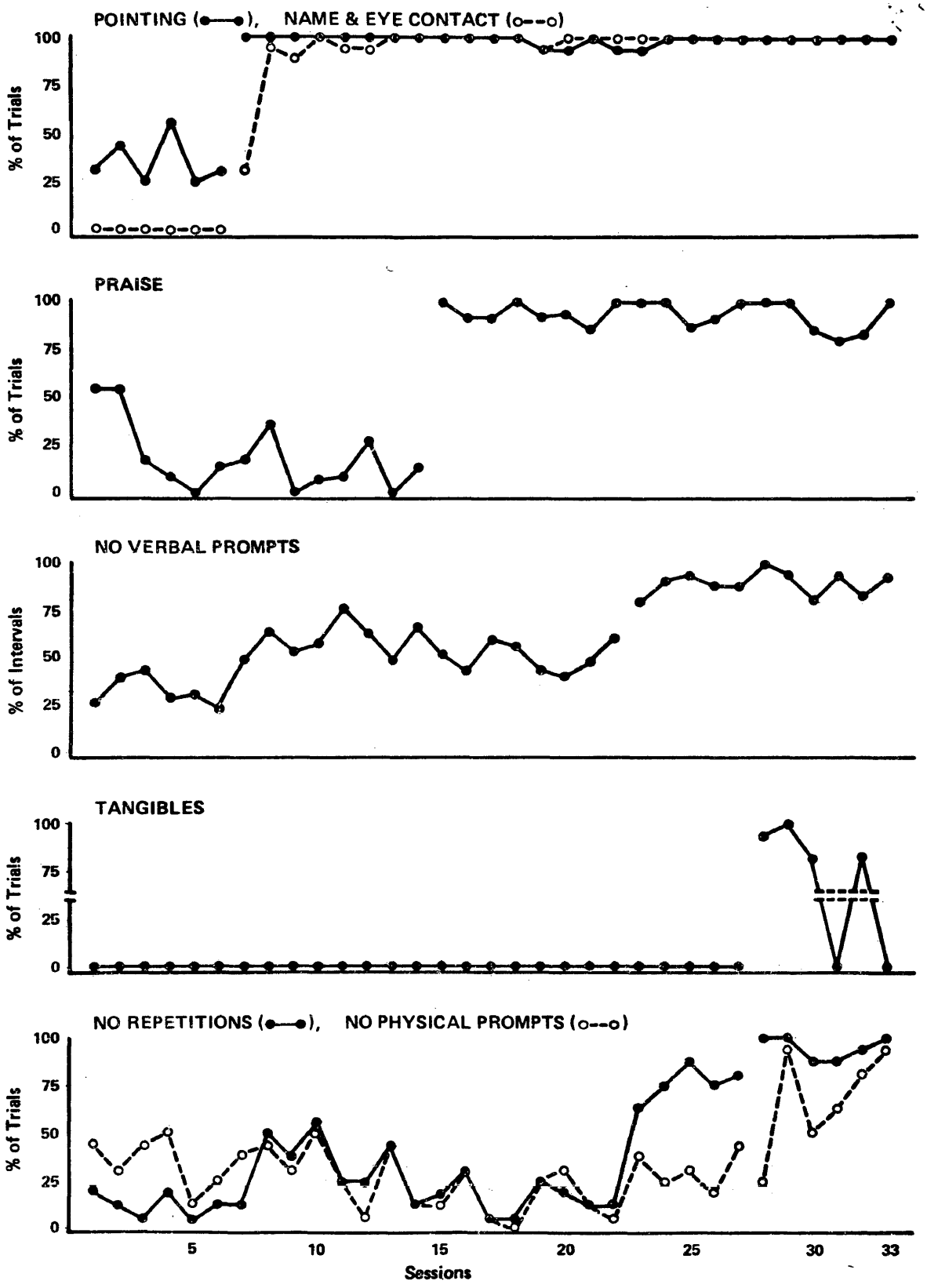
Thus, as Figure 1 shows, the rates of each of the mother's behaviors targeted for treatment increased systematically following the introduction of parent training in the structured laboratory setting. The extent to which these changes generalized to the mother's behavior in the structured home setting is shown in Figure 2.

Figure 2 displays the daily levels in the home of the five parent behaviors that received treatment in the structured laboratory setting. The pattern of each of the parent behaviors in Figure 2 is virtually identical to that displayed in Figure 1: initially low levels of the behaviors, followed by a systematic increase in the rate of each behavior correlated with the introduction of parent training in the laboratory. The only variation of note between the two figures concerns the rate of delivering tangible rewards, after training was introduced for this behavior--whereas the mother always provided tangible rewards (at a level of above 80% each day) in the laboratory, she provided tangibles in the home (again, at a level of 80% or above) on four of the six days, but delivered no tangible rewards in the fourth and sixth home sessions.

Insert Figure 2 about here

Thus, Figure 2 indicates that the mother generalized her use of the child-treatment procedures from the structured laboratory to the structured home setting. The correlated effects of these changes on her

Fig. 2 Daily levels of five parent behaviors in the structured home setting. Breaks in each of the graphs represent the point at which the parent-training package was applied in the laboratory structured setting to that particular parent behavior.


POINTING (●—●), NAME & EYE CONTACT (o--o)
% of Trials
100
75
50
25
0
PRAISE
% of Trials
NO VERBAL PROMPTS
% of Intervals
TANGIBLES
% of Trials
NO REPETITIONS (●—●), NO PHYSICAL PROMPTS (o--o)
% of Trials
5
10
15
20
25
30
33
Sessions

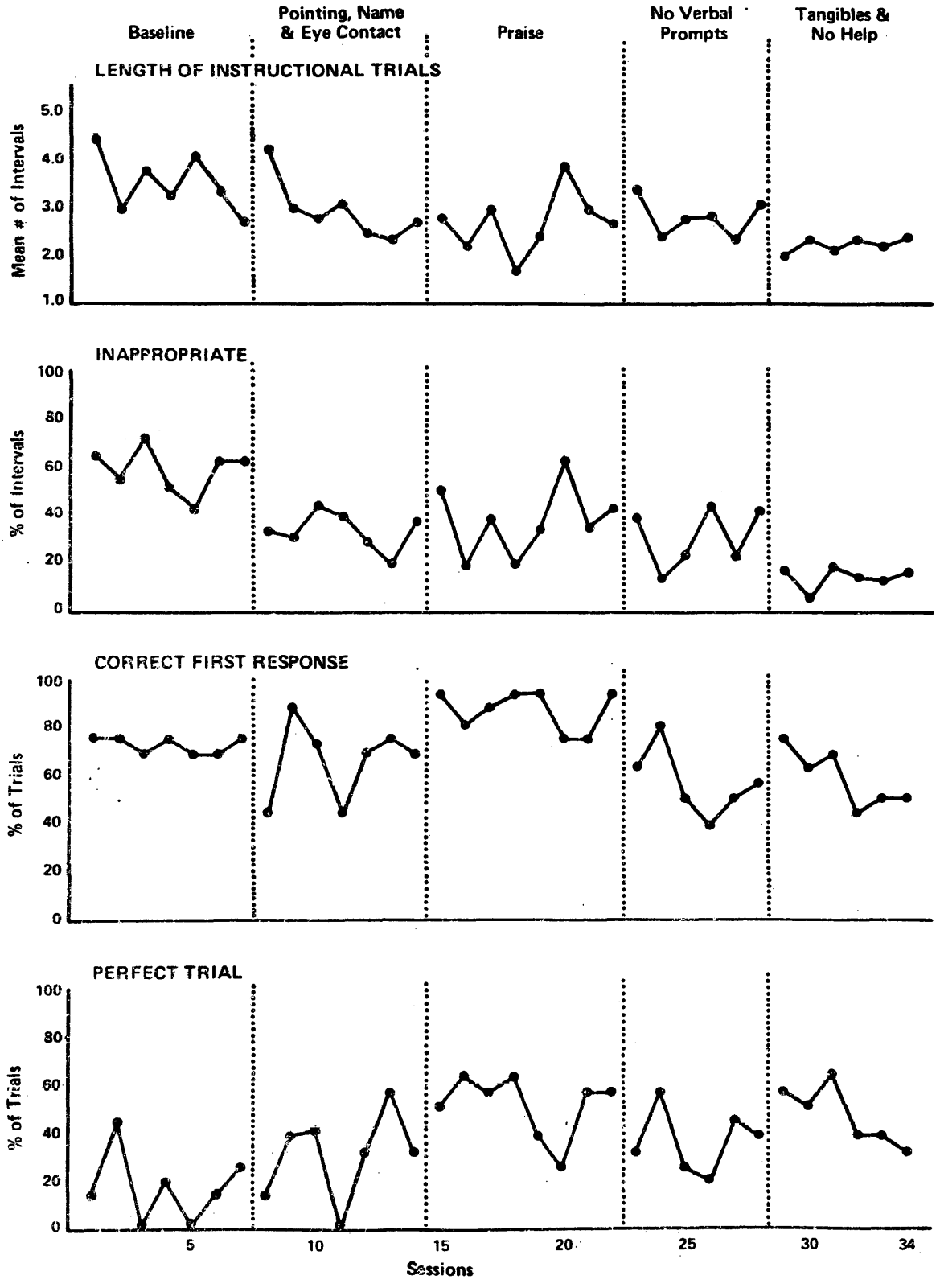
daughter's behavior are presented in Figures 3 and 4.

Figure 3 presents the daily levels of four aspects of Sarah's behavior in the structured laboratory setting. The first graph displays the average length of instructional trials, calculated as the mean number of 10-sec intervals per trial. As the study progressed, trial duration gradually decreased from an average of 3.5 10-sec intervals (i.e., between 30 and 40 sec) in Baseline to an average of 2.2 intervals in the final treatment condition. Similarly, the second graph shows a progressive decline in the rate of inappropriate child behavior, calculated as a percentage of total 10-sec intervals, across successive experimental conditions. During Baseline, Sarah's inappropriate behavior averaged 58% of the intervals, whereas by the final treatment condition her rate had decreased substantially to a mean of only 13% of the intervals.

Insert Figure 3 about here

The third graph presents the percentage of total instructional trials in which the child's first response to the instruction was correct. This graph differs from those presented above in that there is not a consistent pattern of improvement across successive parent-training imputs. Rather, Sarah's correct responding, which exhibited a stable rate averaging 72% during Baseline, showed little consistent change until the second parent-training condition, when the mother was asked to consistently praise Sarah's correct responses. Sarah's rate of correct responding improved during the praise condition to a mean of 87% of the trials; however, correct responding subsequently decreased in the next condition, when the mother was asked to remove her verbal prompts, to an average of 56%. No consistent improvement in correct responding occurred in the last treatment condition, when the mother was requested to remove all help for the

Fig. 3 Daily levels of four measures of child behavior in the structured laboratory setting. Dotted vertical lines indicate the introduction of successive training inputs on the parent behaviors as denoted by labels at the top of the figure.


Baseline
Pointing, Name & Eye Contact
Praise
No Verbal Prompts
Tangibles & No Help
LENGTH OF INSTRUCTIONAL TRIALS
Mean # of Intervals
5.0
4.0
3.0
2.0
1.0
INAPPROPRIATE
% of Intervals
100
80
60
40
20
0
CORRECT FIRST RESPONSE
% of Trials
100
80
60
40
20
0
PERFECT TRIAL
% of Trials
100
80
60
40
20
0
5
10
15
20
25
30
34
Sessions

first 15 sec after an instruction, and to provide a tangible reward for correct responses within that time period.

The last graph displays the rate of the child's perfect trials as a percentage of total instructional trials. The pattern of this graph is similar to that for correct responding, increasing from a mean Baseline rate of 16% to a height averaging 51% following training on praise, and then declining slightly in the final two experimental conditions.

The same four measures of child behavior, now in the structured home setting, are presented in Figure 4. As in Figure 3, the top two graphs in Figure 4 show a progressive reduction in trial duration and in the frequency of inappropriate behavior across successive experimental conditions. However, unlike Figure 3, Sarah's correct responding in the home maintained a stable, high level averaging 83% across the entire study; and her rate of perfect trials improved consistently across successive conditions from a Baseline average of 15% to a mean of 65% in the final treatment condition.

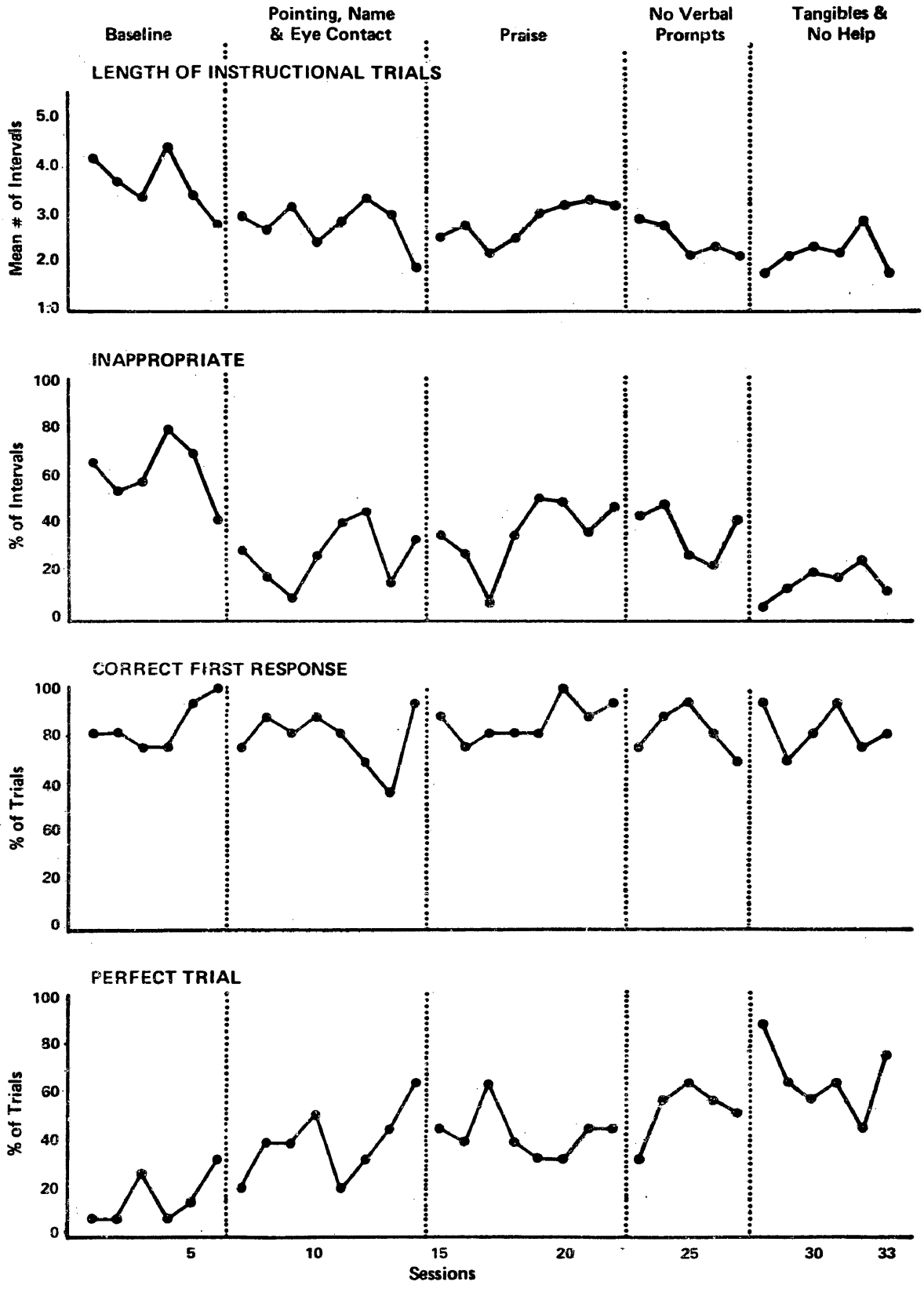
Insert Figure 4 about here

Thus, as Figures 3 and 4 show, the length of the instructional trials and the rate of the child's inappropriate behavior decreased following the successive application of the parent-training package to the mother's behavior. There were inconsistent changes in the child's correct responding and perfect trials across successive experimental conditions.

Unstructured Periods

The five parent behaviors and the four measures of child behavior in the unstructured laboratory and home settings are presented in Figure 5, and are calculated as means within each experimental condition. No graphs

Fig. 4 Daily levels of four measures of child behavior in the structured home setting. Dotted vertical lines represent the introduction of successive parent-training inputs in the structured laboratory setting as denoted by labels at the top of the figure.

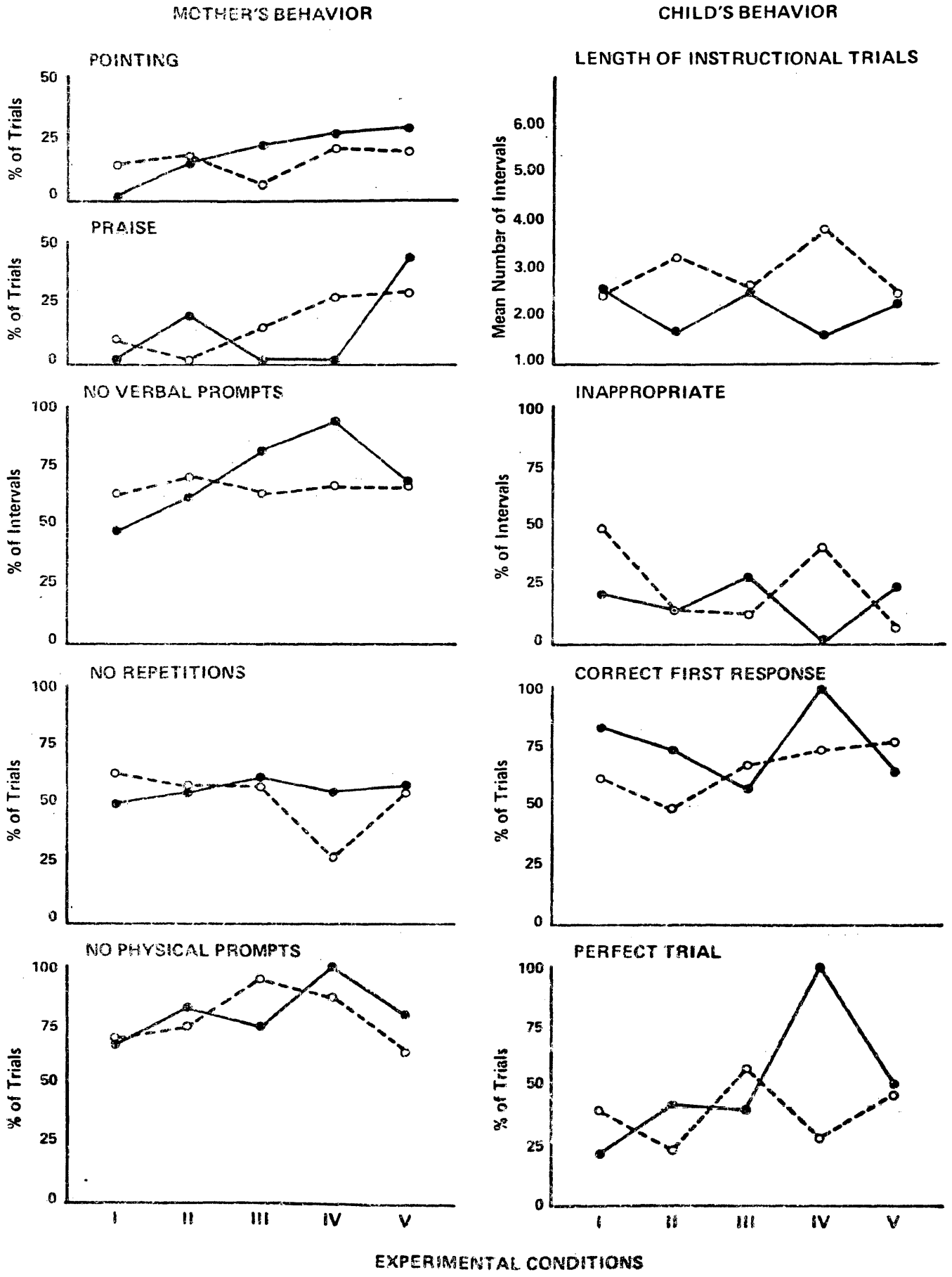

Baseline
Pointing, Name & Eye Contact
Praise
No Verbal Prompts
Tangibles & No Help
LENGTH OF INSTRUCTIONAL TRIALS
Mean # of Intervals
5.0
4.0
3.0
2.0
1.0
INAPPROPRIATE
% of Intervals
100
80
60
40
20
0
CORRECT FIRST RESPONSE
% of Trials
100
80
40
60
20
0
PERFECT TRIAL
% of Trials
100
80
60
40
20
0
5
10
15
20
25
30
33
Sessions

are provided for the mother's use of the child's name and eye contact or for the use of tangible rewards, because these behaviors remained at a zero rate in the unstructured periods throughout the study. As the graphs of the mother's behavior in Figure 5 show, there were no systematic changes in the mother's behavior in either the laboratory or home unstructured settings correlated with training in the structured laboratory setting. Likewise, the child's behavior in the unstructured settings, as displayed in Figure 5, showed inconsistent changes across treatment of the mother's behavior in the laboratory structured settings.

Insert Figure 5 about here

Thus, Figure 5 indicates that the mother did not generalize her behavior to the unstructured laboratory and home periods, and there were no systematic improvements in the child's behavior in these settings.

Fig. 5 Mean levels within treatment conditions of five parent behaviors and four measures of child behavior in the unstructured periods. The solid circles represent mean levels in the laboratory and the open circles represent the mean levels in the home. The experimental conditions, as indicated along the bottom of the figure, are: I - Baseline; II - Treatment on pointing, use of child's name and eye contact; III - Treatment on praise; IV - Treatment on verbal prompts; V - Treatment on tangible rewards and initial help.


MOTHER'S BEHAVIOR
CHILD'S BEHAVIOR
POINTING
LENGTH OF INSTRUCTIONAL TRIALS
% of Trials
Mean Number of Intervals
50
25
0
6.00
5.00
4.00
3.00
2.00
1.00
PRAISE
NO VERBAL PROMPTS
INAPPROPRIATE
% of Intervals
100
75
50
NO REPETITIONS
CORRECT FIRST RESPONSE
NO PHYSICAL PROMPTS
PERFECT TRIAL
I
II
III
IV
V
EXPERIMENTAL CONDITIONS

DISCUSSION

This study found that parent training in a structured laboratory setting led to systematic changes in different components of a mother's behavior both in the training setting and in a structured home setting in which no direct training occurred; however, there was no consistent change in the mother's behavior in either of two unstructured settings in the laboratory and in the home. Thus, this study demonstrated that the mother generalized her use of the child treatment procedures from a training setting in the laboratory to a similar structured setting in the home, but not to either of two dissimilar unstructured settings.

These results differ from those of Budd et al. (Note 3) in that Budd and her colleagues found no generalization of a mother's behavior either to a similar setting or a dissimilar setting in the home following training in a laboratory setting. There are several differences between these two studies that may have affected the results. First, these studies differed in the nature of the child treatment procedures trained. Budd et al. taught the mother simultaneously to use timeout and differential attention procedures, whereas the present experimenter introduced successive changes in a mother's social attention, plus use of tangible rewards. Perhaps the procedures taught by Budd et al. were more difficult and/or less convenient for the mother to apply than in the present study. In fact, in the present study, the treatment procedure used least consistently by the mother in the structured home setting was the delivery of tangible rewards for correct responses -- the one procedure requiring special supplies -- thus suggesting that the likelihood of generalization may be affected by the convenience of the procedures taught. Another difference between these two studies is the type of parent-training procedures used. Although both

experiments employed initial written and verbal instructions, Budd and her colleagues employed a cueing procedure in the laboratory to signal the mother when to use the timeout procedure, whereas the present experimenter provided daily feedback after the sessions regarding the mother's use of the treatment procedures. This cueing technique may have increased the mother's discrimination between laboratory and home settings, and thus contributed to the lack of generalization.

A third difference between the two experiments is the manner of presentation of the initial instructions to the mother regarding the use of the child treatment procedures. Whereas Budd and her colleagues provided no suggestions regarding the applicability of the procedures in other environments, the mother in the present study was told that the procedures should work in any setting and that training would be provided in other settings only if it was needed. It is possible that these experimenter suggestions were functional in facilitating the generalized change seen in this mother's behavior; however, because this study did not analyze the role of the experimenter's suggestions alone, further research is needed to determine the singular importance of the experimenter's statements. Nevertheless, the present study indicates that the use of the experimenter suggestions, coupled with the parent-training package, was sufficient to result in generalization to the structured home setting.

A major puzzling feature of the present findings is the fact that generalization occurred to the structured home setting but not to the unstructured laboratory or home settings. The study provides no experimental explanation for this restriction in generalization; however, an examination of the differences between the structured and unstructured settings may be helpful in illuminating possible factors. First, the mother

consistently provided 16 instructions in each structured session, while delivering a daily mean of only 2.6 in the unstructured laboratory setting and 3.8 in the unstructured home setting. Thus, the major activity in structured sessions was the instruction-following task, while instructions were given only occasionally in the unstructured sessions. Second, the instructions in the structured setting were pre-specified by the experimenter and requested a topographically similar response of the child, whereas the parent instructions in unstructured settings were spontaneous and diverse in nature. It is possible that these differences between settings were functional, such that they actually inhibited generalization of the parent's behavior to the dissimilar environments. Two other studies, outside the parent-training literature, have also found that the occurrence or non-occurrence of generalization to be directly correlated with the degree of similarity or dissimilarity between activities. Holman, Goetz, and Baer (in press) reinforced new forms made by children in a drawing task, and tested for new forms made in both a similar task and in two dissimilar tasks. They found some generalization to the topographically similar task but not to the dissimilar tasks. Likewise, Garcia, Baer, and Firestone (1971) trained imitation of vocal and motor responses and tested for generalization to untrained vocal and motor responses. They found generalization to topographically similar responses but not to dissimilar responses.

If indeed the generalization of parent-training techniques is restricted by differences between the training setting and natural environment, it becomes critical to develop parent-training programs that reduce the discriminability between these two settings. One means of reducing this discrimination would be to train parents within the most natural conditions possible, as has been suggested by other researchers (e.g., Hawkins et al.,

1966). However, since training in the natural environment is far more expensive in terms of professional time and may simply be infeasible for some behavior problems, it is important to investigate techniques for promoting generalization from training settings to other, naturalistic settings. Stokes and Baer (in press), in their discussion of procedures for enhancing generalization across settings, suggest programming stimili found in non-training settings into the training settings. Holman et al. (in press) also suggested that generalization might be facilitated by programming relevant environmental conditions into other settings or activities. In fact, this procedure was used successfully to achieve generalization of a student's appropriate behavior across experimental and regular classroom settings (Walker & Buckley, 1972), and to modify voice loudness in a teenaged girl (Jackson & Wallace, 1974). Further research is needed to determine if such stimulus programming procedures can be readily applied in parent training. These procedures could have been applied in the present study, for example, by changing the objects involved in the structured period in the laboatory to resemble objects commonly found in the home, or by having the mother provide some of her own instructions in the structured settings rather than having them all pre-specified.

If time had permitted, this study would have provided an opportunity to investigate additional procedures for promoting generalization of parent-training effects. Since experimenter suggestions regarding the applicability of the child treatment procedures were not sufficient to produce generalization of this mother's behavior to two dissimilar settings, the mother might have been specifically instructed to use her newly acquired child management skills in one of the two remaining unstructured settings (cf. Polk et al., Note 5). If instructions alone were not sufficient, the

daily feedback procedures might also have been employed temporarily, and then faded out, in the hope of teaching the mother independent use of the procedures.

The results of this study indicate that the parent-training package, consisting of initial written and verbal instructions along with daily verbal feedback, was effective in modifying specific components of a mother's attention to her child's behavior in the training setting. The training package was successively applied to five parent behaviors in a structured laboratory setting within a multiple baseline design; in each experimental condition, there was a desired increase in the target parent behavior associated with the introduction of the training. These findings replicate those of Budd et al. (in press), thus providing additional evidence of a highly effective parent-training procedure.

In addition to the observed changes in the mother's behavior in the structured settings, the application of parent training resulted in correlated improvements in some aspects of the child's behavior. Specifically, there was a substantial decrease in the frequency of inappropriate child behavior, as well as a decrease in the length of the instructional trials throughout the study. Unfortunately, the rate of correct responding did not show a consistent improvement, and, in fact, was lower in the final treatment condition than it was during Baseline in the laboratory. These results may be due in part to the particular parent behaviors targeted for treatment. Considering that this child was delayed in language development and had a history of hearing problems, some of the verbal and/or physical attention provided by the mother may have been necessary for the child's understanding of the instruction and, therefore, may have been functional in mediating the child's correct responding. The fact that the

decrement in correct responding only occurred in the laboratory is an additional, puzzling result; however, it is possible that the response locales used in the home were more familiar to the child, and thus the child required less assistance to complete the instruction correctly in this setting. In addition, the fact that four of the response locales in the home were always in the same position may have made the task easier for Sarah in the home than in the laboratory, where she had to first attend to which response locale was correct for the trial and then find the response locale.

In summary, this study demonstrated the generalization of a mother's use of behavior management techniques from a structured laboratory to a structured home setting following direct training in the laboratory, with no concurrent generalization to unstructured laboratory or home settings. A full explanation of the factors affecting the observed generalization must await further research; however, this study raises the possibility that generalization may be facilitated by experimenter suggestions regarding the usefulness of the child-management techniques outside the training sessions.

APPENDIX A

SAMPLE LIST OF PRESPECIFIED INSTRUCTIONS FOR STRUCTURED PERIODS

1. Put the horse in the box.
2. Put the apple in the bag.
3. Put the telephone on the chair.
4. Put the cookie cutter in the box.
5. Put the beads on the table.
6. Put the eraser on the chair.
7. Put the crayon on the table.
8. Put the banana in the bag.
9. Put the train in the box.
10. Put the ball on the table.
11. Put the puzzle on the chair.
12. Put the puppet in the bag.
13. Put the car on the table.
14. Put the bells in the bag.
15. Put the doll on the chair.
16. Put the mirror in the box.

APPENDIX B

Written Instructions for Parent-Training Conditions

Training on Pointing, Use of Child's Name, and Eye Contact During Initial Instructions

On the basis of the observations we have made, we feel we can be of help to you in increasing the rate of Sarah's compliance to your instructions and decreasing her inappropriate behavior. We have noticed that Sarah does not always seem to pay attention to your instructions, and this is one factor contributing to Sarah's noncompliance. It is also possible that she does not fully understand the instructions. The following procedures are designed to increase Sarah's understanding of and attention to your instructions. Please use the following procedures when given an instruction for the next few sessions so that we might be able to determine if they will be effective in increasing Sarah's compliance and reducing hr her inappropriate behavior. We will be providing feedback to you at the end of the sessions regarding your use of these procedures.

1. It is important that you get Sarah's full attention before giving her an instruction. This should be done by first calling her name and then, as you are giving her an instruction, establishing eye contact with her in any way you can. That is, Sarah must look at you at some time while you are giving the instruction.
2. At the same time you are giving the instruction, point to the location where you want an object placed.

In summary, the procedures include first getting her attention by calling her by name, getting her to look at you are you are giving an instruction, and pointing to the location where you want an object placed as the instruction is being given.

These procedures should work to increase Sarah's compliance to your

instructions both here in the laboratory and in other settings. For now, we will work on these procedures here in the laboratory. If we find we need to, we will work on these procedures in the home later.

Please feel free to ask any questions or make any comments you have regarding these procedures at the beginning or end of any of the sessions.

Training on Praise for Correct Responses

We would like to thank you for your cooperation and patience in following the procedures previously outlined. Our records show that your use of Sarah's name, establishing eye contact and pointing during the initial instruction have improved Sarah's behavior during our sessions. Now that we are reasonably sure that Sarah understands the instructions, we would like to introduce a new procedure to further improve her compliance.

Previous research has shown that an effective way to increase child behavior is to follow the behavior immediately with a pleasant event such as praise or attention. It is possible that Sarah's compliance can be increased by following her compliance with a positive event. You have been providing praise for some instructions in the past, but now we would like you to do so every time Sarah complies with your instructions. The following procedures are designed to increase the rate of Sarah's compliance with your instructions. Please use these procedures for the next few sessions so that we might determine if they will be effective. We will be providing feedback to you at the end of the sessions regarding your use of these procedures.

1. Every time Sarah complies with an instruction on her own, immediately provide lots of positive attention and praise. Compliance means putting the object on the correct location and releasing her hands from the object. Wait to praise until she has released her hand from the object.

2. Do not praise a correct response if she has first made an incorrect response during the same trial. This is so that Sarah will learn that she will only receive positive attention from you when her first response is correct.

3. In addition, continue to use the procedures you have been for getting Sarah's attention. That is, call her name, get her to look at you as you are giving an instruction, and point to the location where you want an object placed as the instruction is being given.

These procedures should work to increase Sarah's compliance both in the laboratory and in other settings. For now, we will work on these procedures here in the laboratory. If we find we need to, we will work on these procedures in the home later.

Please feel free to ask any questions or to make any comments regarding these procedures, at the beginning or end of any session. Again, thank you very much for your cooperation.

Training on Verbal Prompts

We would like to thank you again for your cooperation and patience in following the procedures previously outlined concerning the initial delivery of instructions and the use of praise for correct first responses. Our records indicate that Sarah's behavior in our sessions has improve considerably as a result of your using these procedures.

We would now like to try an additional procedure that we feel would be helpful in teaching Sarah to comply more independently with your instructions. After you deliver an initial instruction, we would like you to provide no verbal help to Sarah, except for repeating the instruction, until she has completed the correct response. This means not giving extra information about the instruction, talking about the object, making comments about her inappropriate behavior, or calling her name without

repeating all or part of the instruction. Some examples of these statements include: "No," "It goes right there," "What does a horse say?" "Take that out of your mouth."

On the other hand, it is fine for you to repeat all or part of the instruction when you feel it might be helpful for Sarah.

The reason for introducing these procedures is that we feel they might be effective in reducing Sarah's dependence on your help. For example, if you typically provide extra help, this may result in her not paying attention to your initial instruction. Occasionally you have played with Sarah or talked about the object after you have delivered the instruction. This delays the need for compliance and may increase the amount of Sarah's "messing around." Attending to her playing or inappropriate behavior may have the effect of increasing the behaviors you want to decrease. Your attention should be saved for times when Sarah has behaved appropriately - that is, when she has complied with your instruction.

Elimination of these extra verbal statements may initially result in more inappropriate behavior. You may find this difficult, but we ask that you please be patient and try as much as possible to reduce the number of these comments to zero. If you would like to play with Sarah or talk about one of the objects, please feel free to do so before giving her an instruction, or after she has complied with the instruction.

In addition, we would like you to continue with the fine job you have been doing in getting Sarah's attention during the initial delivery of the instruction by calling her name and establishing eye contact, pointing to the correct terminal location, and praising for correct first responses to your instructions.

As before, these procedures should work both in the laboratory and in other settings. For now, we will work on these procedures here in the laboratory. If we find it is needed, we will work on these procedures in the home later.

Please feel free to ask questions or make comments regarding these procedures before or after any session. Again, we thank you very much for your wonderful cooperation.

Training on Tangible Rewards and Initial Help

We would now like to try a new procedure to teach Sarah to follow your instructions correctly and with no help from you. We think the use of a tangible reward such as a special food treat might increase the rate of her compliance and reduce her inappropriate behavior. We would like Sarah to learn the difference between really good behavior, such as following your instructions quickly, and behavior that is just okay, such as eventually complying but only after some playing around and/or further help from you. We realize that it is not practical for you to provide Sarah with a food treat every time she complies with your instructions, but we would like you to do so during our sessions so that we might see if this procedure will increase Sarah's compliance and decrease inappropriate behavior.

Please follow the procedures outlined below for the next few sessions in order that we might evaluate their effectiveness. At the end of the sessions, we will provide you with feedback regarding your use of these procedures.

1. At the beginning of the session, tell Sarah that if she does what you ask her and does it fast, she will get a special food treat. Show her the treat that is available.

2. After you give Sarah the first instruction for a trial, wait 15 seconds to see if she will complete the instruction by herself. You can time this period by counting to yourself "1001," "1002," and so on up to "1015." During this time, do not provide any help or attention. By not providing help or attention, we mean that we would like you not to say anything or provide any physical assistance within the first 15 seconds following your initial instruction.

3. If Sarah responds correctly during the first 15 seconds, provide her with the special food treat as well as giving her lots of positive attention. Stress the fact that you like how she responded fast and all on her own.

4. If Sarah does not respond correctly within this 15-second period, feel free to repeat your instruction or point to the correct location if you feel this would be helpful in getting Sarah to comply. However, we would like you to continue to withhold your extra verbal help as you have been doing.

5. If Sarah responds correctly after the first 15 seconds, continue to provide lots of positive attention but do not give her the special food treat. This is to be saved for those times when she follows your instructions quickly and with no help from you.

6. If Sarah makes a correct response after she has responded incorrectly to the same instruction, continue to withhold your praise and attention.

7. Remind Sarah frequently between instructions that she can earn the special food treat if she complies quickly with your instructions.

8. Continue to get Sarah's attention before giving an instruction by calling her name and establishing eye contact with her. Continue, also, to point to the correct location as you are giving the instruction.

However, be sure that you discontinue pointing when you finish giving the instruction.

At first these procedures may increase the messing around done by Sarah and you may find it difficult to ignore her. However, it is important that you withhold your attention and help during the first 15-second period in order for Sarah to learn to respond quickly and independently to your instructions.

These procedures should work to increase Sarah's independent compliance with your instructions both here in the laboratory and in other settings. We will work on these procedures here in the laboratory for now. If we find we need to, we will work on these procedures in the home later.

As always, feel free to comment or ask questions about these procedures before or after any session. We thank you again for your cooperation.

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FOOTNOTES

[1] This research was supported in part by Project 405, Division of Maternal and Child Health Services, U. S. Department of Health, Education, and Welfare.

[2] A full copy of the observation code is available upon request.