*THE GENERALIZATION EFFECTS OF PARENT TRAINING
ACROSS STIMULUS SETTINGS¹*

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Five parents of nonverbal children were trained in two home settings to modify antecedents and consequences to their children's vocalizations. Generalization effects of the parent training on both the parent's and children's behaviors under different stimulus conditions were investigated using multiple-baseline designs. Increases in parent prompting and reinforcing their children's vocalizations generalized only minimally to a new setting in the home where parent training had not occurred. Child increases in vocalizations produced by the parents in the training settings did generalize to this new setting in the home. There was minimal generalization of child vocalizations to a free-play setting at school. In a formal speech session conducted by a behavior specialist at school, only one child showed definite increases in acquisition rate as a function of the parents starting to train the sound at home.

DESCRIPTORS: speech training, correct articulation, generalization, child training, parent training

Numerous studies have reported success in training parents to deal with their children more effectively in treatment settings (Engeln, Knutson, Laughy, and Garlington, 1968; Hawkins, Peterson, Schweid, and Bijou, 1966; Johnson and Brown, 1969; O'Leary, O'Leary, and Becker, 1967; Zeilberger, Sampen, and Sloane, 1968). There has been only one attempt, however, to measure the effects of parent training on their children's behavior in a new stimulus setting. Wahler (1969), in two cases studies, examined the influence of modifying contingencies for inappropriate behavior in the home on the same behaviors at school. The parents of two boys, 5 yr and 8 yr, were trained to reduce "oppositional" behavior in one and "disruptive" behavior in the other. Data obtained indicated that the parent training, with subsequent changes in the children's behaviors at home, did not change the children's behavior in the new stimulus setting at school. A related question of considerable importance in whether or not a parent's interactions

with her child, which are modified as a result of training, generalize to stimulus settings where no training has occurred.

In an important article that discussed the generalization of training effects on autistic children in behavior therapy, Lovaas, Koegel, Simmons and Long (1973) presented evidence supporting generalization of training effects to situations other than the training situation, and to responses other than those specifically trained. The former, stimulus generalization, involved differences between the training and generalization situation in physical setting, activity, and persons present. The latter, response generalization, purported to show changes in responses other than those specifically trained. Although from a clinical view point it appears that the treatment described produced beneficial changes, including generalization to new responses and situations, the lack of experimental design and control necessitated by the therapeutic requirements makes it difficult to assert that these changes were indeed due to generalization of specific training effects. In addition, the summated multiple response measures used make it possible that in some cases response generaliza-

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tion may not have occurred, but that changes were due to large increases in trained responses only.

Numerous recent studies have demonstrated successful remediation of speech deficits using operant techniques. For example, speech was established or facilitated in nonverbal schizophrenic and mentally retarded children by Peine, Gregerson, and Sloane (1970), Lovaas (1967), Risley and Wolf (1967a), and Wheeler and Sulzer (1970). These and other remedial studies in the area of behavior modification have focused mainly on children's speech acquisition (*e.g.*, Brookshire, 1967; Cook and Adams, 1966; Girardeau and Spradlin, 1970; Lovaas *et al.*, 1973; Sloane and MacAulay, 1968). Since parents are usually the primary agents of control for their child's behavior, it follows that the parents of nonverbal children may be applying inappropriate consequences to speech. Although there have been a number of studies on parent training of various behaviors using operant techniques, parent speech training has seldom been examined.

Programming the home for generalization of speech acquisition programs taking place at school was dealt with by Risley and Wolf (1967b). The mother of a 6-yr-old autistic boy was taught to conduct a labelling session similar to one being conducted at the special school he attended. The experimenter first modelled the session for the mother and then the mother took over, receiving intermittent instructions. The mother was also trained to prompt the child to use correct verbal requests instead of "chanting". The chanting behavior was eliminated in the home. The effects of the parent training on the child's behavior at school were not measured.

The purpose of the present study was to modify antecedents and consequences applied by parents to the speech of their nonverbal children, and to assess generalization of this training. Generalization of parent training provided in formal speech and snack sessions at home was examined in the following circumstances: (1) The rate of a child's speech and the consequences

the parent applied to her child's speech at home when a formal session was not being held. (2) The rate of speech that occurred in an unstructured play situation with other children at school. (3) The acquisition rate of sounds in a formal speech session with a behavior specialist at school.

METHOD

Subjects

The subjects were five mother-child pairs. The children were recruited from the developmental unit of Garfield School in Salt Lake City, Utah. Three were female, two were male. Ages ranged from 6 to 12 yr. All of the children were without functional speech, but had some vocalizations. None of the mothers had previously participated in formal parent-training programs.

Design

A multiple-baseline design across subjects was used to measure the effects of parent training on selected mothers' behaviors and children's behaviors. The selection of which parent would be trained first after all five parent-child pairs had been on baseline for one week was decided randomly. After the parent behaviors had increased at least 50%, another parent was randomly chosen for training while the remaining three were kept on baseline. After this second parent showed the above behavioral changes in her sessions with her child, another parent was randomly chosen for training, so that three parents were being trained and two were on baseline, and so on until all parents were trained. Training was provided for parents at home in two settings, a formal speech setting and a snack setting. Parent and child behaviors were recorded in these settings. Generalization was measured in three settings. One of these was a pre-snack setting at home in which both parent and child behaviors were assessed. Two of these generalization settings were at school (speech session and free play), and in these settings child behavior only was measured. These settings are described in detail in following sections.

Observation Procedures

Observation conditions. The experimenter spent approximately 45 min per session in the home, usually five days a week, over a period of three months. The experimenter also observed the children in school for a 10-min free-play session. In both these settings, a second observer collected reliability data. A short speech session was conducted by a behavior specialist with each child at school. Observations were started after adequate interobserver reliability was achieved. The behavior specialist collected data here, and the experimenter served as a reliability checker.

Behavior definitions. Appropriate child vocalizations were defined as correct imitation of the parent during the Formal Speech Setting conducted by the parent at home or the behavior specialist at school. The frequency of correct and incorrect imitations was tallied each session. In the other settings the occurrence or nonoccurrence of all child vocalizations were recorded in 5-sec intervals.

Parent attention was defined as any vocalization directed to the child, or physical contact with the child, or handing food or utensils to or accepting them from the child within 3 sec after the child verbalized. Parent prompting was defined as any question the parent directed to the child requiring a verbal answer (*e.g.*, What is this?) or any verbalization made along with instructions for the child to imitate verbally (*e.g.*, Say "mm"). Parent attention and parent prompting were recorded by the tally method.

Reliability. Reliability was assessed at least five times for each subject in both baseline and treatment phases where both occurred, and correlations (Pearson *r*'s) were computed between the scores of the primary and secondary observers over all observations.

For settings in which both a baseline and treatment phase existed, Table 1 presents the range of observer raw scores and reliability coefficients, and the average difference between observer raw scores. In the formal speech setting at home, reliability measures of parent attending to

Table 1

Observer Agreement

The range from the highest score of either observer to the lowest, the average difference between observer's scores, and the range of reliability coefficients.

Behavior	Variable		
	Range of Raw Scores	Average Difference	Range of Reliability Coefficients
SNACK SETTING			
Vocalizations	0-59	1.9	0.89-0.98
Parent prompting	0-54	1.6	0.92-0.99
Parent attending	0-41	1.4	0.85-1.00
PRE-SNACK SETTING			
Vocalizations	0-78	2.0	0.88-1.00
Parent prompting	0-23	1.7	0.88-1.00
Parent attending	0-22	1.0	0.86-0.99
FORMAL SPEECH SETTING AT SCHOOL			
Correct responses	0-2	0.4	0.90-1.00
FREE-PLAY SETTING			
Vocalizations	0-59	1.6	0.91-1.00

correct child imitations ranged from 0.92 to 1.00, reliability measures of parent attending to incorrect responses ranged from 0.94 to 1.00, and reliability measures for correct child imitations ranged from 0.81 to 0.96.

Parent-Training Settings

Before the experimental sessions, the purpose of the experiment was discussed with each parent. They were told that there might be a delay of up to four weeks before actual training was started, and the necessity of the delay was explained. The parents were not told the techniques that they would learn, but they were asked to have a favorite snack prepared to give the child. There were two parent-training settings.

Parent training in the snack setting. The observer sat approximately 1 m away from the kitchen table where the parent served her child a snack and then sat down with her child. Each snack-setting session lasted 10 min. Training was

instigated following baseline observations of child rate of vocalization, parent attending to vocalizations, and parent prompting vocalizations. On the first day of training, the following three points were discussed with the parent: (1) Sometimes a child never learns to speak because he does not need to speak to get what he wants. (2) It has been found helpful to make a child "pay" for what he gets by using speech. (3) Speech must be required by the parent before a child is given something he desires.

The parent was then given a wrist counter to keep track of the number of times she "requested" speech during the snack setting. The experimenter proceeded to model for 1 to 2 min maximum the following two behaviors: prompting vocalizations, and consequating them with praise. The child was intermittently given a hug and/or a portion of her snack following vocalizations. The mother then served the snack to her child. The modelling by the experimenter was continued briefly at the beginning of each session for five days.

Each parent was given feedback on her behavior immediately following the snack setting. She was praised for correct reinforcing and prompting and corrected when she had made an error. The experimenter mentioned specific incidences of the parent's behavior.

Parent training in the formal speech setting. This setting was a partial duplication of a concurrent setting at the child's school, where the child was being trained on two different sounds, with 10 trials daily on each. One of these sounds was selected for training by the parent by tossing a coin.

The parent and her child sat in two chairs facing each other. The parent presented a single sound and reinforced appropriate imitation of the sound with praise and a small piece of candy. Incorrect responses were followed by a period of 10 sec in which the parent looked away from the child. The parent recorded on a sheet of paper correct imitations with a "plus" and incorrect imitations with a "minus". The sound was presented 10 times each day.

A short explanation was given when training began, specifically instructing when to give the child candy and when to ignore the child. No general theory of operant conditioning was discussed. During training, the experimenter, serving as a model, presented the sound to the child for five trials before the 10 given by the parent at the start of each day.

The total number of trials that the parent correctly responded to as right or wrong was recorded. Data were also taken on whether or not the parent consequated a correct response by attending to the child within 3 sec. Each parent was given feedback immediately following the formal speech setting. She was praised for her appropriate behaviors and corrected for any inappropriate behaviors that had occurred.

No baseline data were gathered on this parent-training setting. The formal speech setting in the home was not started until parent training began in the snack setting.

Termination of parent training. The wrist counter was no longer used and verbal feedback was stopped five days after the parent had increased her frequency of prompting and attending to speech in the snack setting by 50% and was attending to correct imitative responses and identifying correct *versus* incorrect responses 80% of the time in the formal speech setting. Data collection continued on each subject until there were three consecutive days of no more than 20% variability in measures of generalization.

Generalization

Generalization of parent training was measured in three settings. Data collection was started in the generalization settings the same day that baseline data collection on the parent-training setting in the home was started.

Pre-snack setting. Changes in parent behaviors, as well as changes in child behaviors resulting from parent training were measured in the pre-snack setting. This setting lasted for 5 min between the formal speech setting in the home and the snack setting. The parent was told to

prepare a snack for the snack setting or to involve herself in other kitchen chores with the child present. The parent did not receive training or feedback on her behavior in this setting. The number of times the mother attended to her child's vocalizations was recorded. The occurrence of vocalizations of the child was also recorded in 5-sec intervals.

Formal speech setting at school. Generalization of the parent training in the formal speech setting at home to changes in the child's behavior at school was measured by observing differences in acquisition rate of the two sounds in the formal speech setting at school. The behavior specialist took a baseline on 10 to 15 sounds. The two words or sounds trained in the formal speech setting at school were chosen because they averaged between 30% to 60% correct in baseline. Each sound was presented 10 times. At the end of each session, the per cent of correct imitations for each sound was calculated. Only one of the sounds was trained by the parent in the formal speech setting at home. The behavior specialist training the two sounds at school did not know which sound the parent was training and when the Formal Speech Setting in the home was started.

Free-play setting at school. Generalization of parent training to the children's verbal behavior at school was measured in a second way. For 10 min each day, the child was observed at school in a free-play situation with other children present. The occurrence of vocalizations in 5-sec intervals was recorded.

Follow-up

Two months after the experiment ended, the experimenter observed the parent-child interactions in the home for one session. Observations were made in a pre-snack setting and a snack setting. Child vocalizations were recorded exactly as they had been during the experiment.

RESULTS

Parent-Training Settings

Snack setting. Figure 1 presents the frequen-

cies of parent prompting child vocalizations. A large increase is evident for all parents.

Parent's attending to child vocalizations are presented in Figure 2. Again, a sizeable training effect is seen for all parents. To assess whether this increase might merely reflect greater opportunity to attend due to an increase in children's vocalizations, the per cent of vocalizations attended to before and after training are presented in Table 2. Four of the five parents showed an increase in per cent of vocalizations attended to.

All children showed an increase in vocalization as a function of training (see Figure 3).

Formal speech setting at home. The average amount each parent attended to correct responses ranged between 87% and 99%. The average amount each parent ignored incorrect responses ranged between 91% and 100% (see Table 3).

Child 3 performed at the 100% level when training was instituted at home. The others all made moderate improvements, ranging down to 15%.

Generalization Settings

Pre-snack setting. Figure 4 shows the effects of training on parent prompting child vocalizations. The before-training rates were very low, and all parents showed an increase in average rate, varying from 82% to 305% after training.

Data on parent attending to vocalizations are presented in Figure 5. No systematic changes were noted as a function of training.

Figure 6 presents data on child vocalizations. Although four of five children showed increases in the average amount of vocalization, average increases were small and variability within subjects was large.

Formal speech setting at school. Figure 7 shows the per cent correct trials for each child on each of the two sounds taught at school. None of the children showed differences in acquisition rates of the two sounds after the start of the formal speech setting at home with the exception of Child 3. She immediately reached 100% correct imitation of the sound being trained by

Table 2

Percentage of Child Vocalizations Attended to by Parent before (BT) and after (AT) Training

	S ₁		S ₂		S ₃		S ₄		S ₅	
	BT	AT	BT	AT	BT	AT	BT	AT	BT	AT
Snack Setting	36%	75%	46%	80%	30%	48%	47%	41%	23%	60%
Pre-Snack Setting	68%	71%	53%	28%	33%	31%	4%	15%	96%	80%

the parent. After four days of baseline on a new sound at school, the parent started training the new sound in the formal speech setting at home. Again, there was an immediate increase to 100% correct imitations in the session at school.

After the formal speech setting at home was started, Child 2 showed an immediate increase to 100% in correct imitations of the sound not being worked with by the parent.

Free-play setting at school. Data on children's vocalizations in this generalization setting before and after training are presented in Figure 8. Although the average rates of vocalization increased for four of the five children, interpretation is unclear due to within-subject variability.

Follow-up

Follow-up data two months later are presented in Figures 1 to 6. Training effects in the snack settings persisted, all being higher than baseline and most somewhat lower than during training itself. No positive generalization effects were found after two months in the pre-snack (generalization) setting. Thus, the only effects that persisted over time were those explicitly trained.

Table 3

The average amount each parent attended to correct responses and ignored incorrect responses.

Parent	1	2	3	4	5
Attended To					
Correct Responses	87%	96%	98%	94%	99%
Ignored					
Incorrect Responses	94%	95%	91%	100%	97%

DISCUSSION

With training, all five parents immediately increased prompting and attending to their children's vocalizations in the snack setting. The immediate effectiveness of the training was probably due to four factors: (1) prompting vocalizations and reinforcing vocalizations, the parent behaviors that were trained, are relatively simple responses. No general theory of behavior modification was taught, so the concepts the parents had to learn were simple and situation specific. It was also quite easy for them to tell if the child had performed the prompted response (a vocalization). (2) In the first five sessions, the parents performed the behaviors immediately after observing them modelled by the experimenter. (3) The parents received immediate feedback after each session. (4) The parents recorded their own prompting behavior. It cannot be concluded from this study which parts of the treatment package produced the observed changes in parent behaviors, only that the combination of verbal instruction, modelling, immediate feedback, and self-recording was very effective in the training setting. The increases in parent and child behaviors were still apparent in follow-up, but had decreased below the training condition averages.

Generalization of all the parent behaviors to the pre-snack setting did not occur. Parent prompting in the generalization setting increased somewhat for all five parents. Only three of the parents showed average increases in attending to speech in the pre-snack setting and these increases were quite small. Most children's vocalization also increased in the pre-snack setting,

Fig. 1. Individual graphs showing parent prompting child vocalizations in the snack setting before and after training. Breaks in the figure indicate days for which data were not collected. Note the two-month interval before the follow-up session.

Fig. 2. Individual graphs showing parent attending to child vocalizations in the snack setting before and after training. Breaks in the figure indicate days for which data were not collected. Note the two-month interval before the follow-up session.

Fig. 3. Individual graphs showing child vocalizations in the snack setting before and after parent training. Breaks in the figure indicate days for which data were not collected. Note that there is a two-month interval before the follow-up session.

Fig. 4. Individual graphs showing parent prompting child vocalizations in the pre-snack setting before and after training. Breaks in the figure indicate days for which data were not collected. Note that there is a two-month interval before the follow-up session.

Fig. 5. Individual graphs showing parent attending to child vocalizations in the pre-snack setting before and after training. Breaks in the figure indicate days for which data were not collected. Note that there is a two-month interval before the follow-up session.

Fig. 6. Individual graphs showing child vocalizations in the pre-snack setting before and after parent training. Breaks in the figure indicate days for which data were not collected. Note that there is a two-month interval before the follow-up session.

Fig. 7. Graphs on each child showing number of correct imitations of two sounds presented in the Formal Speech Setting at school before and after parent training. Data were not collected on days indicated by breaks in the graph.

Fig. 8. Individual graphs showing child vocalizations in the free-play setting at school before and after parent training. Breaks indicate days during which data were not collected.

but the great amount of variability makes any interpretation difficult.

In the snack setting, both absolute rates of parent's attending to vocalizations, and per cent of vocalizations attended to, increased with training. In the pre-snack setting, neither of these consistently occurred. This suggests the possibility that in the pre-snack setting mothers were busy attending to food preparation, and were unable to emit the somewhat incompatible responses of attending to their children. If this was true, in retrospect the pre-snack setting might have been a poor choice in which to assess generalization.

Although parents learned to respond discriminatively to correct and incorrect imitations in the formal speech setting at home, no effect was systematically observed on speech training at school except for one child. This was the only child who showed a large improvement at home. It should be noted that for at least one child, (Child 4, see Figure 7) speech training at school did not appear to be having any effect, so assessing generalization would be difficult. The other three children made moderate improvements at home.

Four of five children showed an increase in vocalization during free play at school after training. However, these changes were not large when compared with the within-subject session variability.

In this study, changes in parent responses to their children and generalization effects on the parents in another stimulus setting were produced and measured. The study also measured the effects of the changes in parent behaviors on the behavior of their children, both at home and at school. All parents increased their rate of prompting and reinforcing children's vocalizations in the training setting, but parent behaviors changed only minimally in the generalization settings. The children's vocalizations in the training setting at home increased in response to their parent's increased prompting and reinforcing behaviors. These increases were also observed in the generalization setting at home. There were

also no clear changes in child vocalizations in the free-play setting at school. With the exception of one child, the parent training had no effect on the formal speech setting at school.

The setting for measuring generalization of parent behaviors in the home was physically similar to the stimulus setting at home where training had produced large behavior changes. It was in the same room, with the experimenter recording the parent's behavior in the same manner as during the training setting. Generalization occurred only minimally, regardless of the similarity of the stimulus settings and the presence of the experimenter. These findings support the conclusion reached by Kazdin and Bootzin (1972) regarding the generalization of behavior changes produced in token economies. The usefulness of training parents in one stimulus condition is thus questionable: It appears that generalization must be programmed (Walker and Buckley, 1972).

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