

Collateral Effects of Parent Training on Family Interactions¹

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Recent research suggests that using naturalistic teaching paradigms leads to therapeutic gains in clinic settings for children with autism and related disorders. More recent studies are demonstrating that implementing these strategies within a parent training format may produce collateral effects in other areas of family life. The present experiment assessed collateral effects of two very different parent training paradigms during unstructured dinnertime interactions in the family setting. One paradigm focused on teaching individual target behaviors (ITB) serially, and the other focused on a recently developed naturalistic paradigm that teaches the pivotal responses (PRT) of motivation and responsivity to multiple cues. Two groups of families were randomly assigned to each of the parent training conditions. Pretraining and post-parent-training videotapes of dinnertime interactions were scored in a random order across four interactional scales (level of happiness, interest, stress, and style of communication). Results obtained for the four interactional scales showed that the families in both conditions initially scored in the neutral range, and the ITB training paradigm produced no significant influence on the interactions from pretraining to posttraining. In contrast, however the PRT parent training paradigm resulted in the families showing positive interactions

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on all four scales, with the parent-child interactions rated as happier, the parents more interested in the interaction, the interaction less stressful, and the communication style as more positive.

Numerous investigators in the field of autism and related disabilities have reported that parent training approaches are an extremely effective form of treatment delivery. (J. N. Baker, 1989; Daurelle, Fox, MacLean, & Kaiser, 1987; Graziano & Diament, 1992; Polster, Dangel, & Rasp, 1986-1987; Schaefer & Briesmeister, 1989; Tiedemann, Georgia, & Johnston, 1992; Webster-Stratton & Hammond, 1990; Webster-Stratton, Hollinsworth, & Kolpacoff, 1989). Until recently, the research community has focused primarily on the treatment gains made by the children, leaving unanswered questions about how parent training programs affect other family members. As a consequence, a number of investigators have attempted to examine the impact of parent training programs on parents (B. L. Baker, 1988; B. L. Baker, Landen, & Kashima, 1991; Forehand, Steffe, Furey, & Walley, 1983; Laski, Charlop, & Schreibman, 1988). Additionally, a variety of parent training programs have been employed successfully as part of the parent training approach. One interesting line of research has concerned the effectiveness of naturalistic teaching interventions. This research suggests that naturalistic treatment delivery paradigms typically produce highly effective treatment gains when examining the children's behavior under clinical conditions (Camarata, 1993; Forehand, Wells, & Griest, 1980; Koegel, Dyer, & Bell, 1987; Koegel, Koegel, & Surratt, 1992; Koegel, O'Dell, & Dunlap, 1988; Koegel, O'Dell, & Koegel, 1987; Laski et al., 1988; McGee, Krantz, & McClannahan, 1985; Sutton, 1992; Warren & Kaiser, 1986a,b). In our laboratories we have pursued a line of research to develop an effective naturalistic treatment intervention, which consists of increasing important pivotal behaviors in children with autism. These behaviors are pivotal in that changes in these behaviors are associated with widespread behavioral gains in the children. These pivotal behaviors are motivation (the procedures designed to increase motivation have been referred to in the intervention literature as the Natural Language Paradigm) and responsivity to multiple cues. Taken together this set of procedures is referred to as Pivotal Response Training (PRT). When such interventions have been used in a parent training format, parents have shown high levels of positive affect when they are using PRT procedures in comparison to when they are conducting treatment on individual target behaviors (ITB) sequentially (Schreibman, Kaneko, & Koegel, 1991). Because of such results, and since the parents have been taught to employ naturalistic types of interventions that could be construed as very similar to their normal everyday interac-

tions, one also might expect these training procedures to have a spillover effect into the parents' more global interactions with their children during nontreatment activities.

Because of such questions, the specific purpose of the present investigation was to assess whether the parents' global style of interactions during unstructured home activities might be differentially affected by these two very different types of parent training interventions.

METHOD

Participants

A total of 17 children with autism and their families participated in this experiment. The children were all diagnosed as autistic by independent agencies using DSM-III-R criteria (American Psychiatric Association, 1987) and the criteria of the Autism Society of America (Ritvo & Freeman, 1977). To insure that there would not be any systematic difference between the groups, the families were randomly assigned to one of the two parent training conditions. This resulted in similar demographic characteristics for both groups. Specifically, the children in both groups were in the preschool/early elementary age range (with average chronological ages near 6 years for both groups). The functioning levels of the children in both groups was near the 3-year-old level (with average Vineland Social Maturity and Adaptive Behavior Scales Scores near 50 for both groups). The children in both groups represented both sexes. The full spectrum of socioeconomic status (SES) was represented, with most parents in both groups in the middle range. Specific information for individual children is provided in Table I.

Experimental Conditions

To assess whether different parent training interventions might differentially influence parents' global style of interactions with their children, two very different parent training paradigms were compared. The two groups of parents were videotaped in their home setting before and after they successfully completed one of the two parent training programs. Both paradigms used general procedures of behavior modification. However, one approach was designed to be implemented in a PRT format emphasizing principles of motivation and responsivity to multiple cues, while the other was designed to be implemented in a format working on teaching one target at a time (each of these conditions is described separately below). While

Table I. Demographic Characteristics for the Children in Each Training Condition

Child	Gender	Age (years)	Vineland score
PRT condition			
1	Male	6	49
2	Male	6	53
3	Male	6	63
4	Female	5	59
5	Male	4	69
6	Male	3	69
7	Female	3	55
ITB condition			
1	Male	6	40
2	Female	9	49
3	Male	5	62
4	Male	3	44
5	Male	9	48
6	Female	6	55
7	Male	4	89
8	Female	9	66
9	Female	4	29
10	Female	4	48

the format of instruction (ITB vs. PRT) was different across the two treatment conditions, the selection of target behaviors taught in the two conditions was identical. The specific target behaviors taught to each child were derived (in the identical manner in each condition) from three sources: (a) the results of pretreatment assessments indicating behavioral deficits and excesses in need of remediation; (b) parental choice of important target behaviors; and (c) information obtained from the child's school Individualized Educational Plan (IEP).

Individual Target Behavior Condition. Parents who were trained in the ITB condition were taught to provide treatment on individual target behaviors serially (cf. Koegel, Schreibman, Britten, Burke, & O'Neill, 1982; Lovaas, 1977; Schreibman & Koegel, 1981). In this format, parents were instructed to select the skill to be taught and the stimuli to be used during training. Also the parents were taught (a) to present a series of discrete trials to the child one task at a time until the child acquired the task; (b) to present clear task instructions on each trial; (c) to select functional reinforcers including edible reinforcers (e.g., raisin) and social reinforcers (e.g., "good") and to present them in a clear and unambiguous way; (d) to present reinforcers only when the child performed a correct response; and (e) to use principles of behavior shaping and prompting when the child did not initially provide correct responses.

Table II. Differences Between the ITB and the PRT Conditions

	ITB condition	PRT condition
Stimulus items	a. Chosen by parent b. Repeated until criterion is met c. Beginning step of age-appropriate items, irrespective of whether they were functional in the natural environment	a. Chosen by child b. Varied every few trials c. Age-appropriate items that can be found in child's natural environment
Interaction	Parent holds up stimulus item; stimulus item not functional within interaction	Parent and child play with stimulus item (i.e., stimulus item is functional within interaction)
Response	Correct responses or successive approximations reinforced	Looser shaping contingency so that attempts to respond (except self-stimulation) are also reinforced
Consequences	Edible reinforcers paired with social reinforcer	Natural reinforcer (e.g., opportunity to play with the item) paired with social reinforcers
Target behaviors	Chosen by parent one at a time	Motivation and responsivity to multiple cues

Pivotal Response Training Condition. The other group of parents participated in training emphasizing motivational procedures and responsivity to multiple cues. Parents who participated in the PRT condition were taught the same general procedures as described above in the ITB condition, but they were taught to focus on key pivotal behaviors. Specifically, in contrast to the ITB parent training condition where each individual behavior was taught serially, the PRT condition focused on increasing the children's level of motivation and responsivity to multiple cues in the context of providing trials on a variety of the same types of tasks that were employed in the ITB condition (Koegel, Dyer, & Bell, 1987; Koegel & Koegel, 1988; Laski et al., 1988). As noted above, the same general principles of presenting instructions and reinforcements were used as in the ITB condition. However, the treatment paradigm was systematically altered in the following ways so that the parents in the PRT condition were taught (a) to allow the child to participate in the choice of the teaching materials to be used; (b) to intersperse maintenance (previously mastered) tasks among new acquisition tasks; (c) to broaden the reinforcement contingency so that *attempts* to respond correctly were also reinforced in addition to only reinforcing correct responses; and (d) to use only naturally occurring reinforcers that were an intrinsic part of the task being taught. The parents also were taught to present tasks requiring the child to respond to more than one cue (e.g., Let's play with the *red*

ball) instead of sequentially teaching color and object as separate isolated tasks (e.g., Koegel & Schreibman, 1977; Schreibman, Charlop, & Koegel, 1982). Differences between the conditions are shown in Table II.

General Training Procedures

To insure that parents in both conditions were trained equally well, the parents were taught using manualized procedures, videotaped and in vivo examples from therapists who routinely used each respective treatment paradigm, and in vivo feedback from therapists who were familiar with the technique in each respective treatment condition. The parents continued training until each parent demonstrated a minimum of 80% accuracy on each of the components relevant to their training condition. Criterion videotapes of the parents were scored by two independent observers with 80% interobserver agreement that the parent had reached criterion and were correctly using the specific procedures taught in each condition.

In addition to the above procedures, other procedures were implemented to minimize any systematic bias during training. Different trainers taught different parents, and the trainers were kept naive to the fact that the purpose of the experiments was to examine the influence of this parent training on nontreatment family interactions in the home setting.

In summary, the above procedures served to insure that (a) parents in both conditions were trained in a similar manner; and (b) parents in both conditions achieved similar levels of skill acquisition in their assigned tasks.

Home Interaction Videotapes

There were 34 videotape assessments used in this study. Each stimulus tape consisted of 5-minute interaction samples obtained during dinnertime at the child's home. Dinnertime was selected for observation as it was most likely that family members would be together in one location at that time. For each of the families, a pretraining and a posttraining dinner tape was obtained. The tapes were obtained by graduate student research assistants in exactly the same way for each session in each condition. Specifically, all of the parents in each condition were told that we would like to record the child at dinnertime in order to observe the child's behavior in the home setting. In each session, the camera was set up before the meal began. The camera was then turned on and the research assistant left the room until the meal was completed. All interactions between the parent and the child that took place during the middle section of each 15-minute tape were scored according to the interactions scales described below.

Table III. Rating Scale Guidelines

Negative (0-1)	Neutral (2-3)	Positive (4-5)
Happiness		
Adults appear discontent with the ongoing activities; Seem not to be enjoying themselves.	Do not appear to be decidedly happy or particularly unhappy. May smile or frown occasionally but overall, seem rather neutral in this situation	Smiles, laughs appropriately; seems to be enjoying self.
Interest		
The adults show little indication of wanting to interact with child. Will ask few questions if any to the child.	Not clear whether adults seem interested in the child. Occasionally, the adults may ask a question or get the child's attention.	Seem interested in interacting with child. Attempt to encourage child to communicate. Try to interact with child by asking questions or making requests.
Stress		
Adults look frustrated; Seem tense; Exhibit little patience; Quick to correct child.	Adults do not seem either stressed or relaxed; The parents will correct child though the emotions of the adults are not obviously negative nor positive.	The adults seem relaxed; Appear to feel comfortable interacting with the children. Will sometimes laugh, smile, or show humor.
Communication Style		
Adults place demands on child in unpleasant manner; Little positive feedback is said to child. Adults seem to insist more than request.	Not clear whether parents seem demanding; The way parents ask child to do something does not seem positive nor negative.	The way the adults communicate appears pleasant. Adults tend to use questions and requests for getting the child to do something.

Interaction Rating Scales

The interaction rating scales used in this study were adapted from similar scales used by Koegel and Egel (1979) and by Schreibman et al. (1991) looking at affect during direct treatment interventions in a clinic setting. Four 6-point Likert scales, each numbered 0-5, were used to assess level of Happiness, Interest, Stress, and Communication Style of each interaction. Each scale was divided into three categories ranging from a negative interactional style (0-1), to a neutral interactional style (2-3), to a positive interactional style (4-5). All categories were presented to the raters according to the written operational definitions in Table III.

Procedure

The independent observers were university students with knowledge and experience in the field of autism, but who were naive to the experimental condition for each family. They were asked to use the interaction rating scales to evaluate the parents' interactional style. The raters were informed that they would be viewing several videos of families engaged in dinnertime activities. For each family, a pretraining and posttraining measure segment was rated. To control for order effects, the pretraining and posttraining segments were counterbalanced, and tapes were viewed in a random order with respect to pretraining versus posttraining and treatment condition. After presenting each segment, the raters were allotted a few minutes to complete the rating sheet. The rating sheets were then collected, and new rating sheets were distributed before the next segment. All the other segments were rated in the same manner.

Reliability

Two observers, blind to the experimental conditions, independently rated each of the 34 tapes on each of the four interaction rating scales. Percentage agreement between the two observers was calculated separately for each of the four scales. Percentage agreement between the observers was calculated by the formula, number of agreements divided by number of agreements plus disagreements times 100. An agreement was defined as the two observers' scores being within 1 point of each other (on each of the specific 6-point rating scales) on a session by session basis. The resulting reliability calculations yielded an average percentage agreement score of 95% (range: 88–100%).

RESULTS

Figure 1 presents the results for each of the four interaction rating scales for the families in both conditions. The left portion of Figure 1 shows the results for the ITB condition for each of the four scales. The white bars represent pretraining scores and the black bars represent posttraining scores. All of the pretraining and posttraining scores for parents in the ITB condition were within the neutral range, with neither a decidedly positive or negative interactional style.

In contrast, the results for the PRT condition were quite different. These results, shown on the right portion of Figure 1, show large differ-

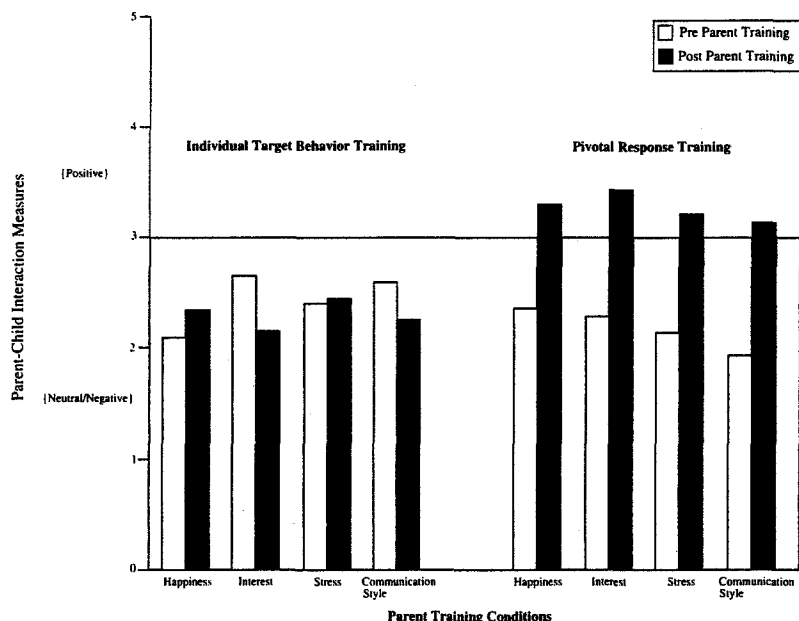


Fig. 1. Results for the ratings of family interactions on each of the four interaction scales. Scores from 0–1 represent negative interactions, 2–3 neutral interactions, and 4–5 positive interactions. The bars on the left portion of the figure represent the results for parents in the Individual Target Behavior Training condition, and the bars on the right represent the Pivotal Response Training condition. Open bars represent pretraining scores and solid bars represent posttraining scores.

ences between the pretraining and posttraining scores on each of the four interaction rating scales. Whereas the pretraining measures were all in the neutral range, all of the posttraining scores in the PRT condition were in the positive range, suggesting relatively high degrees of happiness and interest, relatively low stress during the interactions, and a more positive style of parent-child communication.

To test for statistically significant differences between the two parent training conditions and to insure that there were no initial differences between the two groups prior to training, one-way multivariate analyses of variance (MANOVAs) between the two conditions were conducted. Table IV shows the pretraining and posttraining mean scores for each treatment condition (ITB vs. PRT) on each interaction scale. The results for the pretraining scores showed no significant differences between the groups, suggesting that the groups were equivalent on our dependent measures prior to training. The results for the gain scores (posttraining scores minus pretraining scores) showed a significant effect for condition, indicating overall a more positive parent-child interaction for parents trained with the PRT format,

Table IV. Pretraining and Posttraining Mean Scores for Different Treatment Conditions Across the Interaction Scales

Scales	PRT training condition				ITB training condition			
	Pre		Post		Pre		Post	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Happiness	2.36	.38	3.29	.57	2.10	.78	2.35	.53
Interest	2.29	.76	3.43	.73	2.65	1.23	2.15	1.23
Stress	2.14	.75	3.21	.64	2.40	.81	2.45	.64
Communication Style	1.93	.93	3.14	.63	2.60	.74	2.25	.79

$F(4, 12) = 4.70, p < .016$. Follow-up univariate analyses for each scale all showed significant differences, indicating that the PRT parent training condition produced more positive changes for Happiness, $F(1, 15) = 8.52, p < .011$; Interest, $F(1, 15) = 5.62, p < .032$; Stress, $F(1, 15) = 14.52, p < .002$; and Communication Style, $F(1, 15) = 17.88, p < .001$.

DISCUSSION

The results of the present experiment suggest that parent training may have relatively broad effects, extending beyond the specific treatment procedures the parents are taught in the clinic setting. Furthermore, the results suggest that different parent training approaches to treatment delivery may result in different expressive affect associated with parent-child interactional patterns, even though affect is not targeted in either parent training paradigm.

Specifically, the results indicate that during the pretraining measures, parent-child interactional patterns were characterized as neither very positive nor very negative. All four scales showed results in the neutral range for both conditions. Moreover, the ITB training condition did not appear to have any significant or notable impact on the parents' interactional style between pretraining and posttraining measures. In contrast, training using PRT procedures appeared to produce a pattern of interactions that was decidedly more positive for all four scales than the ITB training condition. In comparing the two conditions for each of the scales, parents in the PRT condition appeared to be happier, more interested, exhibiting lower levels of stress, and engaged in a more pleasant type of communication interaction with their child diagnosed with autism.

Because of the possibility that the general style of parent-child interactions might be improved, and because there is a growing body of literature that addresses the severe level of stress that having a child with a severe disability may have on family life, there is an increasing interest in

whether different types of parent training interventions might differentially influence the level of stress that exists during general family interactions outside of the specific treatment activities (Koegel et al., 1992; Moes, Koegel, Schreibman, & Loos, 1992). The results of the present study suggest that *type* of parent training may have a positive influence on reducing stress in everyday life.

One might speculate as to the specific reasons for differences in the interactional pattern of parents in each of the two conditions. One plausible explanation may be that the more naturalistic PRT treatment approach generalized to the dinnertime home setting, and that the parents demonstrated less difficulty with incorporating the treatment procedures into their daily mealtime activities.

Another possibility is that the interactions associated with this treatment approach were simply more pleasant than either no treatment at all, or than the ITB treatment. This result would be consistent with previous literature showing that parents participating in more naturalistic treatment programs exhibit relatively more positive affect in a clinic setting (Schreibman et al., 1991). Additionally, the findings appear to be consistent with the interpretation that the parent training procedures generalized to everyday life.

Whatever the reason for our findings, it is clear that certain types of parent training interventions are capable of producing collateral effects in nonclinic settings (cf. Koegel, Schreibman, Johnson, O'Neill, & Dunlap, 1984). In this particular experiment, the results were either neutral (for the ITB condition) or positive (for the PRT condition). It is important to realize, however, that where there is potential for good, there also is potential for harm, and the results of this experiment suggest that collateral effects of parent training, like collateral effects of other types of treatment, should be carefully monitored, with a goal of producing widespread positive gains throughout the families' lives.

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