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The Use of a Self-Directed Learning Program to Provide Introductory Training in Pivotal Response Treatment to Parents of Children With Autism

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There is increasing demand for access to effective interventions for families who have children with autism. Self-directed learning models have been successfully used with other populations as a way to reduce the service-need discrepancy. The purpose of this study was to evaluate, through a randomized clinical trial, whether the use of a self-directed learning program could result in changes in behavior for parents and their children with autism. Results indicated significant differences between treatment and control groups at posttest on all of the dependent measures. Furthermore, all of the parents who completed the self-directed learning program reported high ratings of satisfaction. The data suggest the efficacy and effectiveness of a self-directed learning program to serve as an initial step toward providing intervention for parents with children with autism.

Keywords: *autism; intervention; parents; self-directed; distance*

Autism is now diagnosed in 1 out of every 150 children (Centers for Disease Control and Prevention, 2007). There is a substantial body of research in support of behavior analytic techniques to treat the symptoms of autism (DeMyer, Hingtgen, & Jackson, 1981; Lord & McGee, 2001); however, the dissemination of empirically supported treatments (ESTs) has not grown along with the disorder, creating a service-need discrepancy (Croen, Grether, Hoogstrate, & Selvin, 2002; L. K. Koegel, Koegel, Harrower, & Carter, 1999; Sperry, Whaley, Shaw, & Brame, 1999; Stahmer & Gist, 2001; Symon, 2001). Because there is also a great deal of empirical support for the effectiveness of parent involvement in the treatment of autism (Hancock, Kaiser, & Delaney, 2002; R. L. Koegel, Bimbela, & Schreibman, 1996; R. L. Koegel, Schreibman, Britten, Burke, & O'Neill, 1982; McClannahan, Krantz, & McGee, 1982; Sanders & Glynn, 1981; Stahmer & Gist, 2001), the use of accelerated and/or brief parent training programs for parents of children with autism has emerged in an attempt to address this problem. Evaluations of these methods have indicated promising results including increases in parent use of procedures and child communication (L. K. Koegel, Nefdt, Koegel, Bruinsma, & Fredeen, 2006; R. L. Koegel, Symon, & Koegel, 2002; McConachie, Randle, Hammal, & Le Couteur, 2005; Openden, 2005; Stahmer & Gist, 2001).

Self-directed learning programs (SDLPs), delivered primarily via video instruction (Woodruff, Gordon, & Lobo, 1999), have been effectively used for decades in both health care and educational settings as a cost-effective method to change and/or teach behaviors to large numbers of people (Bjornson, Scheifele, & Gold, 1997; Lagges & Gordon, 1999; Mandel, Bigelow, & Lutzker, 1998; Niebel, Kallweit, Lange, & Fölster-Holst, 2000; Rosen et al., 2003; Sharry, Guerin, Griffin, & Drumm,

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2005; Webster-Stratton, Hollinsworth, & Kolpacoff, 1989). These fields have faced a similar need-service discrepancy and have successfully used SDLPs in an attempt to expand the availability of such services. SDLPs are based on the idea that when guided, one can be taught skills to independently modify one's own behavior (Halford, Sanders, & Behrens, 1994; Karoly, 1993). The application of this model has resulted in substantial success and support for the notion of self-directed learning. Thus, there is a great deal of research supporting the application of self-administered interventions to multiple populations and a small amount of research suggesting that it may be possible to apply this to the area of autism (Elgar & McGrath, 2003; R. L. Koegel, Glahn, & Nieminen, 1978).

With the current need for services, an SDLP may be a practical and effective way to provide introductory training to parents of children with autism who either have to wait for intervention services following a diagnosis or who are located in areas where ESTs are not easily accessible.

The goal of this study is to begin to evaluate, with a randomized clinical trial, an SDLP. In particular, the study will address whether (a) parents will complete an SDLP such as this one, (b) parents who complete the SDLP can demonstrate any use of the motivational procedures of pivotal response treatment (PRT), (c) parents who complete the SDLP increase their use of language opportunities, (d) parents who complete the SDLP exhibit any changes in their level of confidence during interactions with their child, and (e) children with autism will demonstrate an increase in the use of functional utterances.

With the demand for increased intervention services for children with autism, it is prudent to find additional avenues in which evidenced-based interventions can be delivered to children with autism.

Method

Participants

The participants were the primary caretakers of 27 children with autism. The research project was advertised on a university autism center Web site. The inclusion criteria for the families in this study was as follows: (a) The child had to have a diagnosis of autism spectrum disorder (ASD), as defined by the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; American Psychiatric Association, 2000), provided by a physician or psychologist; (b) the child had to be under the age of 60 months at the start of intervention; (c) the child with ASD had to have less than 20 functional words; (d) the parent could not have had previous training in the implementation of PRT; (e) the parent must have been waiting for services either at the time of referral or at a distance from the center; and (f) the parent must have had access to a video recorder and a DVD player. Thirty-four participants met inclusion criteria and entered the study, and 27 participants completed the study (79.4%).

Parents completed a demographics questionnaire and the *Parenting Stress Index* (PSI; Abidin, 1995) to identify any differences in stress level between the parents in each group, with the consideration that increased stress may negatively affect parent learning (Singer, Goldberg-Hamblin, Peckham-Hardin, Barry, & Santarelli, 2002). The average age of the participant parents in the treatment and control group was 36.31 years (SD = 5.38) and 36.21 years (SD = 4.54), respectively. The average age of the children in the treatment and control group was 38.92 months (SD = 14.57) and 38.43 months (SD = 11.20), respectively. The PSI indicated elevated levels of stress, with the average Total Stress Score of the parents in the treatment and control group being 259.08 (SD = 46.67) and 297.50 (SD = 42.73), respectively. These scores were in the 90th and 99th percentiles, respectively, according to Abidin's (1995) normative data, indicating clinically significant levels of stress. There were no significant differences between the groups on any of these variables.

The majority of participant children with autism were Caucasian (81%) and male (92.6%). A large percentage of the children were firstborn (~70%), and the majority of participant parents were mothers (~88%) who were married (~88%). A small number of parents had a graduate degree (15%), about half of the parents had completed college (~51%), many had completed some college (~29%), and a few had completed high school only (~4%). Many of the participating parents were stay-at-home parents (~52%), and the others were employed either full-time (~37%) or part-time (~11%). The yearly income of participating parents ranged from less than $15,000 to more than $75,000. Approximately 41% of families resided in small cities, and the rest were divided equally between metropolitan areas (~29%) and towns (~29%).

Settings and Materials

The independent variable in this study was an SDLP that consisted of an interactive DVD with an accompanying manual covering the procedures used in PRT to teach first words to children with autism. These procedures are described in *How to Teach Pivotal Behaviors*

to Children With Autism: A Training Manual (R. L. Koegel et al., 1989) and *Teaching First Words to Children With Autism and Communication Delays Using Pivotal Response Training* (L. K. Koegel, Koegel, Bruinsma, Brookman, & Fredeen, 2003). Specifically, the DVD was designed to teach parents strategies to increase child motivation to engage in social communication (R. L. Koegel, O'Dell, & Koegel, 1987). The motivational techniques for providing opportunities for child responses include child choice, incorporation of maintenance tasks, direct/natural reinforcers, and reinforcement of attempts. In addition to the strategies aimed at increasing motivation, the DVD was designed to teach parents basic behavioral techniques such as providing clear prompts and immediate, contingent consequences. For all of these children, the primary target behavior was expressive verbal language.

The DVD itself consisted of 14 chapters with accompanying quizzes covering both basic behavior principals and the motivational procedures used in PRT. The test following each chapter was self-guided, during which multiple-choice questions were presented on the DVD with duplicate hard copies in a workbook. Tests answers were provided in the workbook. Participants were asked to complete each test after the preceding chapter and before moving on to the next chapter. At the end of the DVD, a review of the material was presented along with an interactive learning task in which parents had the opportunity to view video clips of parents implementing intervention procedures, which they then judged for accuracy of implementation. Judging for accuracy involved scoring the use of the motivational procedures as present or absent. A scored data sheet with brief explanations for scoring was presented after each clip so that the parent could understand the reason for (if it was the case) discrepant scoring.

The material covered in the chapters was presented in a written format on the screen in conjunction with an audio presentation of the writing. Each chapter described each of the PRT points in detail and was written/spoken in the second-person point of view (e.g., "Give your child the reinforcer right after he says the word") to facilitate retention and generalization (Moreno & Mayer, 2000). Fully audible video examples were embedded in the chapters so that viewers could see and hear a demonstration of the point being discussed. For example, a clip of a parent handing his or her child a toy car contingent on the child's communicative verbal attempt (which was only an approximation of the word *car*) would be used to demonstrate the importance of reinforcing attempts. Each chapter had approximately two to three video examples, which varied in length from 1 min 22 s to 8 min 43 s, making the total running time (including interactive portions) 1 hr 6 min.

Design and Procedure

A randomized clinical trial was used to investigate the effects of an SDLP on parent implementation of skills, parent language opportunities, parent confidence, and child communicative improvement. There were two conditions (treatment and wait-list control) in which the aforementioned four dependent measures were assessed for change at two times: before and after treatment for the treatment group (TG) and Preintervention 1 and 2 for the control group (CG). Parents were randomly assigned to either the TG or CG based on the order in which the family information was received. Parents were not matched on any variables prior to group assignment; however, there were no significant differences between the TG and CG on demographic variables, stress scores, or dependent measures.

Comparison of Groups at Pretest

Independent sample *t* tests were conducted for continuous variables (child age, parent age, and PSI scores), and chi-square or Fisher's exact tests were conducted for categorical variables (parent and child gender, marital status, household income, ethnicity, birth order, education level, employment status, and relationship to the child), in order to test for significant differences between the groups at pretest. Results of the chi-square or Fisher's exact test indicated no significant differences between the two groups on any of the demographic variables or stress levels. Results of independent sample *t* tests suggested no significant differences between the groups on any of the dependent measures at pretest.

To analyze the data, a series of one-way analyses of covariance (ANCOVA) were used for each of the dependent measures with pretest scores as covariates. Bonferroni-adjusted alpha levels of .0125 per test (.05 / 4) were used to decrease the likelihood of mistakenly finding a significant difference between the groups following intervention. Effect sizes were calculated using the following formula: the mean of the TG minus the mean of the CG divided by the pooled standard deviation. As previously stated, the independent variable in this study was the use of an SDLP that covered the procedures used in PRT to teach first words.

Preintervention. Preintervention measures for both the TG and the wait-list control group (WCG) consisted

of a 10-min video probe of the parent and the child, prior to which the parent had received instructions that he or she should attempt to elicit speech from his or her child. A demographics questionnaire and the PSI (Abidin, 1995) were administered prior to the collection of the first video for both the TG and CG.

After the primary investigator's receipt of the preintervention video probe, demographics questionnaire, and stress measure, families in the TG were sent the DVD by mail. At this time, families were asked to take another video 1 week (7 days) after completing the SDLP and to send this video to the investigator. For the CG, approximately 7 days after the primary investigator's receipt of the preintervention video probe, demographics questionnaire, and stress measure, another 10-min video probe was taped by the family and sent to the primary investigator.

Postintervention. Upon receipt of this postintervention video probe, a social validity questionnaire was sent to the parent. For the CG, upon receipt of the second video, the DVD was sent to the family. Following this, procedures were the same as in the TG.

Data Collection Procedures

Data were collected from 15-min videotaped probes that had been collected by the parent. The first 10 min of each probe were scored. This was done in order to ensure consistency across participants due to variability in the length of videotaped sessions after 10 min because parents themselves had been collecting the videotaped probes. The videotaped probes included parents interacting with their child with autism in typical play interactions while attempting to elicit as much language as possible using materials found in the child's natural environment.

Dependent Measures

The following measures were obtained in an attempt to answer the aforementioned questions.

Fidelity of implementation of PRT procedures (parent measure). Using a continuous 1-min interval recording system for 10 min (ten 1-min intervals), parents were scored on their use of the PRT procedures. Each interval was scored as correct or incorrect for each of the five techniques. The parents received a correct score for the interval if they used the point correctly throughout the minute and an incorrect score if they did not. Use of the PRT techniques was measured globally by calculating the percentage of all intervals across all points during which the parent used the point correctly. The five PRT points were scored using the following definitions (adapted from R. L. Koegel et al., 2002):

1. *Presenting clear opportunities.* Correct use of the procedure was scored if the parent provided concise, clear opportunities for verbal responses and was able to maintain the child's attention either to the task or to the adult while presenting the opportunity.
2. *Child choice.* Correct use of the procedure was scored if the parent did any of the following: followed the child's lead by responding to the child's verbal ("ball") or nonverbal requests (reaching for the ball) to play with particular items or engage in particular activities, allowed the child to accept or reject an activity, or attempted to change the activity if the child did not show interest in the task.
3. *Immediate, contingent consequences.* Correct use of the procedure was scored if the parent provided the child with a reinforcer immediately following the child's verbal attempt and/or correct verbal response. Correct use of the procedure was also scored if the parent did not provide a reinforcer when the child was nonresponsive or when the child engaged in disruptive behavior.
4. *Natural reinforcers.* Correct use of the procedure was scored if the parent provided reinforcers (contingent on the child's verbal attempt and/or correct verbal response) that were directly related to the child's functional expressive utterance or to the item/activity that the child was engaged with.
5. *Reinforcing verbal attempts and correct verbal responses.* Correct use of the procedure was scored if the parent provided reinforcers, contingent on the child's verbal attempt and/or correct verbal response. For example, if the parent reinforced the child for saying "cooo" for a cookie instead of waiting for a closer approximation of the word *cookie*, the parent would receive a correct score.

Language opportunities (parent measure). Using a continuous 30-s partial-interval recording system for 10 min (twenty 30-s intervals), parent-provided language opportunities were recorded. A language opportunity was defined as any opportunity that the parent provided in which he or she expected a verbal response from the child. The occurrence or nonoccurrence of a language opportunity during each interval was recorded.

Functional verbal utterances (child measure). Using a continuous 15-s partial-interval recording system for 10 min (forty 15-s intervals), the children's functional utterances were recorded. The occurrence or nonoccurrence of a functional utterance during each interval was recorded.

Observed parent confidence (parent measure). Parent confidence was measured using a rating scale adapted from Brookman-Frazee (2004). Parent confidence during parent-child interactions was rated using a 6-point Likert scale numbered 0 to 5. *Low confidence*, defined as the parent appearing unsure of how to interact with and teach his or her child, was indicated with a 0 or 1. *Neutral confidence*, defined as the parent not appearing uncertain or particularly certain during interactions with the child was indicated with a 2 or a 3. And *high confidence*, defined as the parent appearing certain of how to teach his or her child, was indicated with a 4 or a 5.

Additional Measures

Social validity evaluation instrument. To measure the social validity of the SDLP, all participants who fulfilled the SDLP completed and returned a one-page *SDLP Satisfaction Questionnaire* on their experience using the SDLP. Parents were asked to evaluate the DVD on a number of components using a 5-point scale for which 1 represented *strongly disagree* and 5 represented *strongly agree*. The components were ease of understanding, usefulness, and entertainment value. Parents were also asked to evaluate the SDLP on additional qualitative components using the same 5-point scale and to give written feedback on what they liked about the program and what would improve it.

DVD usage data sheet. This data sheet was created by the primary investigator in an attempt to ensure that all participants viewed the DVD in a similar manner. It consists of a list of all of the chapters and tests, next to which participants were to check a box when they completed a chapter or test.

Interobserver Agreement

Interobserver agreement was calculated for 35% of probes for all observational variables across all participants. Tapes were presented in a random order for scoring and reliability. Agreement was derived using the following formula: number of agreements divided by the number of agreements plus disagreements, multiplied by 100.

For the fidelity of implementation measure, doctoral students with extensive experience implementing PRT who were blind to the experimental conditions independently recorded data using the interval recording procedures described above. An agreement was counted when both observers scored the interval the same way for each of the 5 points. Mean interobserver agreement results were 94.88% across all sessions, with a range of 82% to 100%.

For parent language opportunities and child functional verbal utterances, two undergraduate psychology students who were blind to the experimental condition independently recorded data using an interval recording procedure (described above). An agreement was counted when both of the observers scored the interval the same way. Mean interobserver agreement for language opportunities was 95% across all sessions, with a range of 80% to 100%. Mean interobserver agreement for functional verbal utterances was 92.8% across all sessions, with a range of 80% to 100%.

For the parent confidence measure, the observers rated the parent's confidence at the end of each 10-min probe. An agreement was defined as both observers scoring within the same confidence category. A disagreement was defined as one observer scoring one category of confidence while the other observer scored a different category. The percentage of agreement was 100% for the preintervention probes and 88.9% for the postintervention probes.

Results

Research Questions

The first research question asked if parents would complete an SDLP such as this one, and results showed that the majority of parents did complete the program. Specifically, of the 34 individuals who entered the study, 27 (79.4%) completed the SDLP and returned the postintervention measures. It should be noted that parents reported viewing the SDLP DVD an average of 2.04 times ($SD = 1.71$). For Questions 2 through 4, a series of ANCOVA was conducted, and Bonferroni-adjusted alpha levels of .0125 per test (.05 / 4) were used.

The second question asked if parents who completed the SDLP would demonstrate any use of the motivational procedures of PRT. Results of the one-way ANCOVA indicated a significant difference between the TG and the CG on the fidelity of implementation measure, indicating that parents who completed the SDLP did demonstrate use of the motivational procedures of PRT. On this measure, the ANCOVA with all pretest scores used as covariates produced $F = 107.02$ and $p = .000$ with an effect size of 4.12. See Table 1. Also see Figure 1, which

Table 1
Means, Standard Deviations, *F*s, Probability Values, and Effect Sizes at Posttest on Dependent Measures for Treatment and Control Groups

Measure	Group	*M*	*SD*	*F*	*p*	*d*
Fidelity of implementation	Treatment	75.35	26.61	107.02	.000	4.12
	Control	5.71	7.18			
Language opportunities	Treatment	75	21.31	91.58	.000	2.23
	Control	22.86	25.40			
Functional verbal utterances	Treatment	39.12	31.45	16.23	.001	0.953
	Control	16.14	16.77			
Observed confidence	Treatment	3.85	1.14	16.37	.001	1.28
	Control	2.21	1.42			

Note: Treatment group, $n = 13$; control group, $n = 14$.

Figure 1
Differences Between Treatment and Control Groups at Pre- and Posttest on Fidelity of Implementation

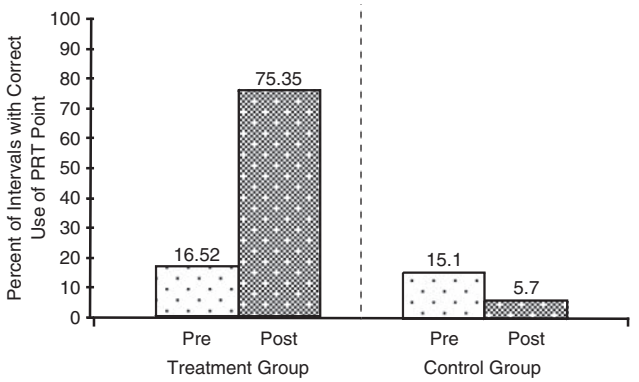
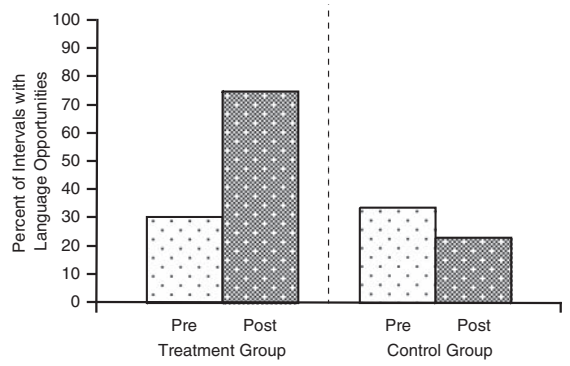


Figure 2
Differences Between Treatment and Control Groups at Pre- and Posttest on Parent-Provided Language Opportunities



illustrates the pre- and posttest scores for fidelity of implementation. It shows that there were no substantial differences between the TG and CG at pretest, consistent increases in the TG at posttest, and little or no change in the CG at posttest.

The third question asked if parents who completed the SDLP would increase their use of language opportunities. Results of the one-way ANCOVA indicated a significant difference between the TG and the CG on the parents' use of language opportunities, indicating that parents who completed the SDLP provided more language opportunities following the SDLP. On this measure, the ANCOVA with all pretest scores used as covariates produced $F = 91.58$ and $p = .000$ with an effect size of 2.23. See Table 1. Also see Figure 2, which illustrates the pre- and posttest scores for parent-provided language opportunities. It shows that there were no substantial differences between the TG and CG at pretest, consistent increases in the TG at posttest, and little or no change in the CG at posttest.

The third question asked if parents who completed the SDLP would exhibit any changes in their level of confidence during interactions with their child. Significant differences between the TG and CG on the observed confidence ratings indicated that parents were observed to look more confident during interactions with their child following the SDLP. The ANCOVA with all pretest scores used as covariates produced $F = 16.37$ and $p = .001$ with an effect size of 1.28. See Table 1. Also see Figure 3, which illustrates the pre- and posttest scores for ratings of observed confidence. It shows that there were no substantial differences between the TG and CG at pretest, consistent increases in the TG at posttest, and little or no change in the CG at posttest.

Last, the fourth question asked whether children with autism would demonstrate an increase in the use of

Figure 3
Differences Between Treatment and Control Groups at Pre- and Posttest on Observed Parent Confidence

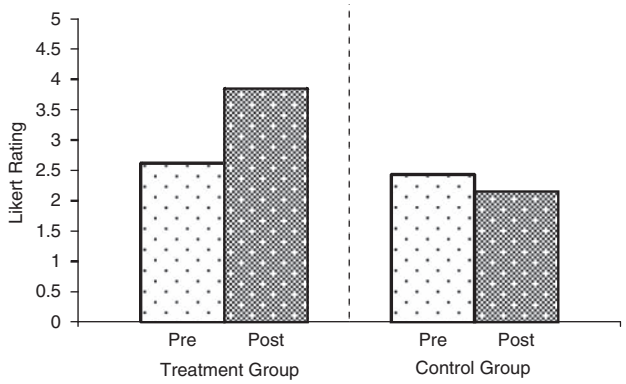
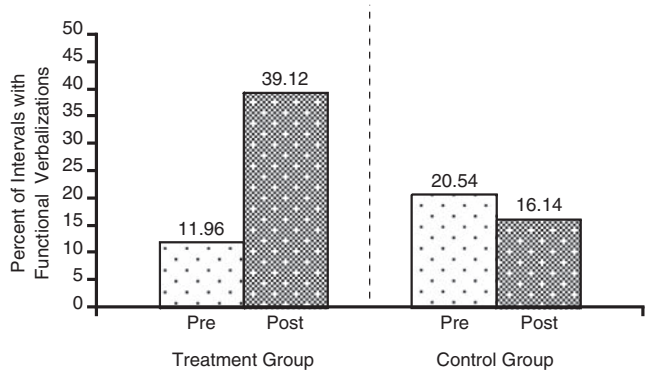


Figure 4
Differences Between Treatment and Control Groups at Pre- and Posttest on Child Functional Verbalizations



functional utterances. Results indicated a significant difference between the TG and the CG on this measure. This ANCOVA with all pretest scores used as covariates produced F =16.23 and p = .001 with an effect size of 0.953. See Table 1. Also see Figure 4, which illustrates the pre- and posttest scores for child functional verbalizations. It shows that there were no substantial differences between the TG and CG at pretest, consistent increases in the TG at posttest, and little or no change in the CG at posttest.

SDLP Social Validity

As previously described, participants in the TG were asked to complete a questionnaire about the SDLP. Analysis suggests that all parents reported that the DVD was easy to understand (M = 4.77, SD = 0.43) as well as useful and informative (M = 4.62, SD = 0.50). Similarly, all parents reported that the procedures they learned from the DVD changed the way they interacted with their child (M = 4.46, SD = 0.52) and that they would recommend the program to other parents (M = 4.54, SD = 0.52). Furthermore, the majority of parents (71.4%) reported that they enjoyed doing PRT with their child (M = 3.77, SD = 0.60), and the majority of parents (78.6%) reported that their child was trying to communicate more (M = 3.85, SD = 0.99).

Parents were also asked to report how well they understood the procedures of PRT. For child attention, the average was 4.63 (SD = 0.51); for maintenance tasks, the average was 4.00 (SD = 1.10); for shared control, the average was 4.23 (SD = 0.73); for contingent reinforcement, the average was 4.31 (SD = 0.63); for reinforcing attempts, the average was 4.31 (SD = 0.48); and for natural reinforcers, the average was 4.46 (SD = 0.66).

Discussion

With the current dilemma of the lack of needed services, there has been an effort to search for ways in which effective services can be provided (even if only temporarily) to families who are either on long waiting lists or located in areas where these services are not offered (R. L. Koegel et al., 2002; Stahmer & Gist, 2001). This study supports the effectiveness of the use of an SDLP, utilizing an interactive DVD, as a tool to provide parents of children with autism with introductory knowledge about how to implement evidenced-based procedures with their child while awaiting more intensive services.

The current study revealed, through the use of both a CG and observations of child and parent behaviors, that the majority of parents completed the program, demonstrated learning of specified procedures, and appeared more confident during parent-child interactions. Furthermore, the parents reported high satisfaction ratings, and the children with autism demonstrated a significant increase in their use of functional verbal utterances

These findings provide support for this model of self-directed learning and add to the literature on self-directed interventions and the effectiveness of parent education programs (Connell, Sanders, & Markie-Dadds, 1997; Endo, Sloane, Hawkes, Jenson, & Mcloughlin, 1991; Kacir & Gordon, 1999; R. L. Koegel et al., 2002; McClannahan et al., 1982; Morawska & Sanders, 2006; Openden, 2005). Specifically, the findings suggest the importance of acknowledging parents as resources and capable intervention providers. They also provide further support for the use of a PRT model of intervention for children with autism and support the literature suggesting

the value of naturalistic teaching procedures for parent education programs for children with autism (Charlop-Christy & Carpenter, 2000; Girolametto, Pearce, & Weitzman, 1996; Kaiser, Hancock, & Hester, 1998; Kaiser, Hancock, & Nietfeld, 2000; R. L. Koegel et al., 1987; R. L. Koegel, O'Dell, & Dunlap, 1988; Openden, 2005). It may be that parents can quickly learn to implement naturalistic procedures because naturalistic procedures (a) are conducted in an environment that is familiar to the parents and child, (b) are conducted using items and activities that the family is accustomed to, and (c) result in rapid increases in the responses of children with autism, which results in reinforcement of the parents' attempts at providing the intervention.

Presently, researchers are recommending the need for randomized clinical trials of interventions for autism; therefore, this study contributes by adding to the literature on the use of randomized controlled trials in applied settings to evaluate interventions for children with autism (Lord et al., 2005). However, because the intervention was done in an applied setting, there are certainly limitations compared to a more tightly controlled efficacy study. In subsequent studies, it will be important to evaluate the generalization and maintenance of skills demonstrated by participants because this study did not address this. Furthermore, it would be advantageous to analyze each participant's individual performance in order to ascertain profiles of parents and/or children who may respond best to this method of learning.

Future studies may want to evaluate an SDLP with the addition of individualized feedback from a trained clinician because some parents suggested that immediate feedback on the implementation of the procedures might have been helpful. Individualized feedback, although potentially expensive, might be important to address client variability (Addis, Wade, & Hatgis, 1999; Neef, Trachtenberg, Loeb, & Sterner, 1991; Webster-Stratton, 1990).

The success of this method of intervention suggests additional potential methods of treatment delivery for this population and may initiate a programmatic line of research in which investigators can determine the optimal variables for program delivery to individual clients. It may be an especially profitable area for future research.

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