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Errorless Compliance Training

Success-Focused Behavioral Treatment of Children With Asperger Syndrome

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Errorless compliance training is a noncoercive, success-focused approach to treatment of problem behavior in children. The intervention involves graduated exposure of a child to increasingly more challenging requests at a slow enough rate to ensure that noncompliance rarely occurs, providing parents with many opportunities to reinforce cooperative responses and rendering punishment unnecessary. The authors evaluated this approach with three boys with characteristics of Asperger syndrome. Mothers first delivered a range of requests to their children and recorded child responses. For each child, the authors calculated compliance probability for all requests and categorized them into four probability levels, from those yielding high compliance (Level 1) to those that commonly led to opposition (Level 4). Treatment began with delivery of Level 1 requests. Requests from Levels 2 through 4 were faded in sequentially over several weeks. All three children demonstrated substantial generalized improvement in compliance.

Keywords: *Asperger syndrome; noncompliance; parent training; treatment of problem behavior; errorless intervention*

Asperger syndrome (AS) is one of the pervasive developmental disorders and, as with a diagnosis of autism, is characterized by restricted

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and repetitive behaviors and interests, as well as impairments in social interaction. The primary distinction between the two disorders is the preservation of both language skills and cognitive development in AS (American Psychiatric Association, 1994). In a review of epidemiological surveys for AS, Fombonne and Tidmarsh (2003) cited rates ranging from 0.3 to 48.4 per 10,000 but suggested a rate of 2 per 10,000 as a starting point.

In addition to the above core characteristics, associated features of AS often include anxiety disorders and depression (e.g., Green, Gilchrist, Burton, & Cox, 2000; Howlin & Goode, 1998; Kim, Szatmari, Bryson, Streiner, & Wilson, 2000). These children are also at risk for significant disruptive behavior and management difficulties (Ghaziuddin, 2002; Green et al., 2000; Szatmari, 1991; Tonge, Brereton, Gray, & Einfeld, 1999). Noncompliance to parent and teacher requests is a common behavioral characteristic of children with AS (Ghaziuddin, 2002; Myles, 2003). As noted by Asperger (1944/1991), children with this syndrome may have intense clashes with their parents around requests to complete essential household routines such as washing, dressing, and eating.

Given that many children with AS have difficulties with compliance to careprovider directives, a focus on this behavior for applicable youngsters may provide a potential treatment option for a range of challenging behavioral characteristics. Compliance is a particularly important target for intervention because this skill is a keystone to prosocial child behavior (Loeber & Schmaling, 1985); intervention focused on compliance often produces widespread positive change in other externalizing responses (e.g., Ducharme, Atkinson, & Poulton, 2000; Parrish, Cataldo, Kolko, Neef, & Egel, 1986).

Traditional compliance training involves parent-mediated intervention that includes reinforcement for child compliance and use of decelerative consequences, usually in the form of timeout for problem responses (e.g., Barkley, 1997; Forehand & McMahon, 1981). Although compliance training has been demonstrated effective with a wide range of behaviorally disordered children, the timeout component may be problematic with some children. For example, timeout may serve as a reinforcer for the targeted problem behavior in some cases and can potentially lead to excessive use or misuse of power assertive consequences by parents (Cavell, 2001; Howlin, 1998).

For many children with AS, these concerns are particularly problematic. These children tend to exhibit severe distress and anxiety when exposed to circumstances and demands that they view as overwhelming or threatening. The use of constraining consequences could feasibly serve to exacerbate this distress (Mesibov, Shea, & Adams, 2001), leading to an escalation of parent-child conflict.

We developed errorless compliance training (Ducharme, 2005) as an alternative to traditional compliance training. Errorless compliance training is a noncoercive, parent-mediated approach to child management that involves teaching children in a systematic and graduated manner to comply to the requests of their parents. The errorless approach is based on the same principles that underlie errorless discrimination teaching (Stoddard & Sidman, 1967; Terrace, 1966; Touchette, 1968), mainly reinforcement and stimulus fading.

The approach involves an initial observational assessment to determine the probability of child compliance to a wide range of parent requests and the development of a hierarchy of compliance probabilities (Levels 1 through 4) based on this assessment. In the early stages of errorless compliance training, parents deliver a high density of Level 1 requests, those associated with high levels of child compliance (e.g., "give me five"), and provide extensive praise and reinforcement for cooperation. Lower probability requests are gradually faded in at a slow enough rate to prevent noncompliant responses. By the end of treatment, children typically show high levels of compliance with requests that were initially associated with severe oppositional responses. In light of the low levels of noncompliance that occur with this intervention, punitive consequences are unnecessary throughout and following intervention to produce broad positive behavioral changes. Errorless compliance training has been demonstrated effective in improving child compliance and reducing oppositionality in children from a variety of diagnostic groups, including child witnesses and victims of family violence (e.g., Ducharme et al., 2000), children with developmental disabilities (e.g., Ducharme & Drain, 2004; Ducharme, Popynick, Pontes, & Steele, 1996), and children of parents with cognitive, emotional, and physical impairments associated with brain injury (e.g., Ducharme, Spencer, Davidson, & Rushford, 2002).

The primary objective of this study was to pilot the effectiveness of errorless compliance training with two children diagnosed with AS and a sibling of one of the children who had a similar diagnostic profile. All three children exhibited extreme noncompliance and other antisocial behavior in response to requests by their parents. We anticipated that the proactive and noncoercive nature of the errorless approach would be particularly well suited to children with AS due to their high levels of anxiety and distress when exposed to challenging circumstances and the potential for exacerbating this distress with constraining consequences. With errorless compliance training, children are not exposed to difficult demands until they have been taught to tolerate such conditions, thereby rendering problem

responses unlikely and decelerative consequences unnecessary. We predicted improvements in child compliance and reductions in severe oppositional responses to demands following intervention.

Method

Participants and Setting

Two boys diagnosed with AS and a sibling demonstrating characteristics consistent with AS served as participants. Five children and their parents were originally included in the study. Two participant children and their parents dropped out for reasons unrelated to treatment.

At the start of treatment, Child 1 was 6 years old and attended Grade 1. At the age of 4, he was diagnosed with AS by a developmental pediatrician who had extensive experience with autistic spectrum disorders. The child was extremely noncompliant and aggressive in response to daily requests. He was receiving speech therapy and was on no medications.

Child 2a and 2b were brothers. Child 2a was a 10-year-old boy diagnosed with AS at the age of 8 by a psychiatrist who specialized in autistic spectrum disorders. He exhibited severe noncompliance as well as verbal and physical aggression. At school, he presented as extremely anxious. More than 2 years before our involvement, he began regular use of Paxil and Resperidol for treatment of anxiety and aggression.

Child 2b was almost 4 years old at study initiation. Approximately 1 year before treatment initiation, he received a nonspecific diagnosis of autistic spectrum disorder. Although behavioral characteristics were consistent with AS, the psychologist provided the less specific diagnosis because of the child's age (note that differentiating between AS and autism can be difficult with children under 4 years of age [Szatmari, 1991]). At the time of treatment, Child 2b was receiving sensory integration and speech therapy. Child 2b was on no medications during treatment.

Mothers were the primary intervention agents and collected all the necessary data. Both mothers were employed and had completed postsecondary education. Parent workshops were conducted in a small conference room in a clinic setting. All observational sessions were conducted in the family home.

Research Design

We used a multiple baseline across subjects design (Barlow & Hersen, 1984). In this design, observational data on child compliance to parental

requests were collected regularly, throughout baseline and treatment. Baseline evaluation began simultaneously for all children. Treatment was initiated first for Child 1. Child 2a and 2b began treatment 1 week later in multiple baseline fashion.

Data Collection and Dependent Measures

Compliance. Both mothers were trained to collect observational compliance data throughout baseline and treatment during daily sessions in which they delivered typical daily requests (see below). Percentage of child compliance to parental requests was the dependent measure. Compliance was defined as the initiation of the appropriate motor response to the parent's request within 10 seconds of the request, and completion of the motor response within 60 seconds, in the absence of verbal protest by the child.

Maternal report measures. Parent report measures were obtained before and after treatment through use of the Compliance Probability Checklist (e.g., Ducharme et al., 1996, 2000). This checklist provides an indication of parent perceptions of child compliance to parental requests and is used as a basis for selection of requests to be included in the observational assessment of compliance probabilities (described below). Included in this checklist are 122 common household requests across nine compliance domains, including dressing (e.g., "Put on your shoes"), hygiene (e.g., "Brush your teeth"), and cleanup (e.g., "Put your toys away"). On this checklist, parents are asked to rate their child's compliance to a specific request as *almost always* (76%-100% of the time), *usually* (51%-75%), *occasionally* (26%-50%), and *rarely* (0%-25%).

A consumer satisfaction questionnaire that has been used in most previous evaluations of errorless compliance training was administered after treatment completion. It comprised 17 items rated on a 5-point Likert scale related to satisfaction with both the treatment and therapist.

Interobserver agreement. An observer (the second author) visited the family homes of participants regularly throughout baseline, treatment, and follow-up to obtain a measure of interobserver agreement on the compliance data collected by mothers. Agreement was obtained on 38% of parent sessions (22% of baseline assessment sessions, 21% of treatment sessions, 29% of generalization sessions, and 78% of follow-up sessions). Interobserver agreement was defined as both persons (mother and observer) independently agreeing on occurrence of compliance or noncompliance.

The overall kappa coefficient was .81, representing a high level of concordance between observers (Landis & Koch, 1977).

Parent Training Workshops

The two authors served as co-trainers and provided parent training of assessment and treatment procedures during four workshops conducted over the course of baseline and treatment. All workshops were conducted in a group format with the exception of Workshop 3 (initiation of treatment) that was conducted individually for each family in a time-lagged manner to fulfill multiple baseline requirements.

Workshop 1

The first group training workshop began with a brief introduction of parents and trainers and a discussion of the specific behavior problems being experienced by parents. This was followed by an overview of errorless compliance training and its potential benefits. Finally, parents completed the Compliance Probability Checklist.

Request Selection

Following the first workshop, 24 requests, including approximately 6 requests from each of the four probability levels of the Compliance Probability Checklist as completed by each parent, were selected for each child and included in random order on an assessment data sheet for baseline data collection.

Workshop 2

At the second group training workshop, the trainers used modeling, rehearsal, and performance-feedback procedures to teach parents request delivery and data collection procedures. Request delivery included issuing requests naturally in the form of a statement rather than a question, using single rather than multiple component requests, maintaining eye contact and proximity, avoiding request repetition, using a polite but firm tone of voice, avoiding prompts or discussion following a request, and allowing the child 10 seconds to respond. Parents were asked to continue to respond to their child's compliance or noncompliance as they had in the past to provide a representative picture of pretreatment child behavior. Trainers then

provided parents with the operational definition of compliance and non-compliance and taught them to record the child's response to parental requests.

Baseline

Following the second workshop, parents initiated baseline assessment of compliance probabilities in their homes. During each baseline session, parents delivered the requests listed on the assessment data sheet and recorded the responses of their children. After parents collected baseline data, the probability of child compliance was calculated for each request by adding the total number of compliant responses for a specific request and dividing by the total number of compliant and noncompliant responses to that request. Requests were then arranged in order of compliance probability for each child and divided into a hierarchy of four probability levels approximating the following compliance ranges: Level 1 (76%-100%), Level 2 (51%-75%), Level 3 (26%-50%), and Level 4 (0%-25%). Each level contained approximately six requests. Of these requests, four per level were selected for inclusion in treatment sessions and two per level were designated for posttreatment assessment of generalization (see below). For each child, four individualized treatment data sheets were developed, one for each phase (probability level) of treatment. Four repetitions of the four treatment requests were printed on each data sheet.

Workshop 3

At the third parent training workshop, parents learned three skill sets necessary to begin the treatment phases, including reinforcing child compliance, ignoring noncompliance, and avoiding requests from lower (untrained) probability levels. Training procedures were performance based, as in Workshop 2. Reinforcement procedures included rewarding compliance immediately and consistently, being enthusiastic when praising, using a variety of effective rewards, and labeling cooperative child responses. With regard to ignoring noncompliance, parents were trained to act as though the request had never been made by avoiding the use of punitive consequences, verbal responses, or facial reactions.

In addition, we trained parents to avoid issuing requests from subsequent levels. For tasks that needed to be completed, parents were asked to do one of two things: either prompt the child through tasks using statements that did not involve formal request delivery (e.g., "It's time to get dressed") or

simply complete the task for the child. Parents were then provided with the Level 1 treatment data sheet individualized for their child.

Treatment: Phase 1 (Level 1 Requests)

Parents conducted treatment sessions in the home approximately five times per week. During a typical session, parents issued approximately two repetitions of each of the four requests from Level 1. The mother of Child 1 used social reinforcers, such as praise, almost exclusively. The mother of Child 2a and 2b used praise and a structured point system as reinforcers.

Treatment: Transition Sessions

Transitions to the next phase of treatment were typically initiated when the child demonstrated compliance to approximately 75% of parent requests over three consecutive sessions. We conducted transition sessions to ensure smooth progression between phases. These sessions consisted of two requests from the current phase of treatment and two requests from the subsequent phase. Transition phases continued until the child demonstrated compliance to 75% of parent requests over two consecutive sessions.

Treatment: Phases 2, 3, and 4 (Level 2, 3, and 4 Requests)

Parents conducted these sessions sequentially in the home exactly as in Phase 1, with the exception that they issued only Level 2 requests in Phase 2, Level 3 requests in Phase 3, and Level 4 requests in Phase 4.

Workshop 4

This workshop was conducted near the midpoint of treatment to provide support to mothers through discussion of treatment progress and problem solving of issues related to treatment and child behavior.

Generalization

As noted above, approximately two requests from each of Levels 3 and 4 were selected for assessment of generalization to requests not included in treatment (only lower probability requests were relevant for assessment of

generalization). Parents conducted from three to five generalization sessions using these Level 3 and 4 requests after all treatment phases were completed.

Follow-Up

Parents conducted follow-up sessions at 1 and 2 months after treatment completion. Follow-up sessions included all Level 4 treatment and generalization requests.

Results

Observational Data

Baseline assessment. Figure 1 depicts time-series observational data for child compliance across baseline and treatment phases for the three children. Baseline data points on this graph represent percentage of child compliance to Level 4 requests for each day that data were collected. Level 4 requests were used as they yielded the lowest levels of compliance and therefore represented the primary focus for treatment (e.g., Ducharme et al., 1996, 2000, 2002). When fewer than three requests were delivered by the mother on one day, data were combined with those collected on the following day, to ensure that all data were included but that each data point was optimally representative (in both baseline and treatment). The overall mean percentage of compliance for the three children during baseline was 93% for Level 1 requests, 66% for Level 2 requests, 52% for Level 3 requests, and 26% for Level 4 requests.

Treatment. Each treatment data point in Figure 1 represents child compliance to requests targeted in that specific phase. Transition points represent child compliance to requests from the two adjacent levels. Shaded areas correspond to the mean pretreatment percentage of compliance to requests from the probability level being trained in that phase. The shading allows a direct comparison between pretreatment and treatment data for each probability level.

Across all children, mean compliance to Level 1 requests in Phase 1 of treatment was 95%. These results were similar to baseline levels, as these requests were high probability even before treatment. Level 2 requests were introduced in Phase 2 and overall mean compliance was 89%, an increase of 23 percentage points over pretreatment levels.

In Phase 3 of treatment, overall mean compliance was 76%, an increase of 24 percentage points over baseline levels. Phase 4 compliance levels
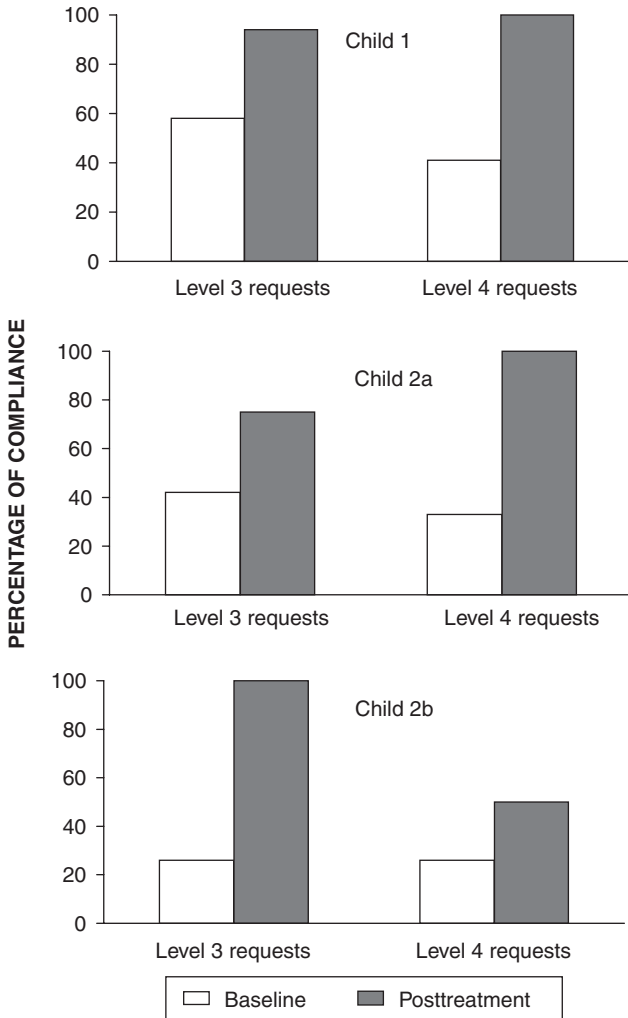
Figure 1
Child Compliance Across Baseline and All Treatment Phases
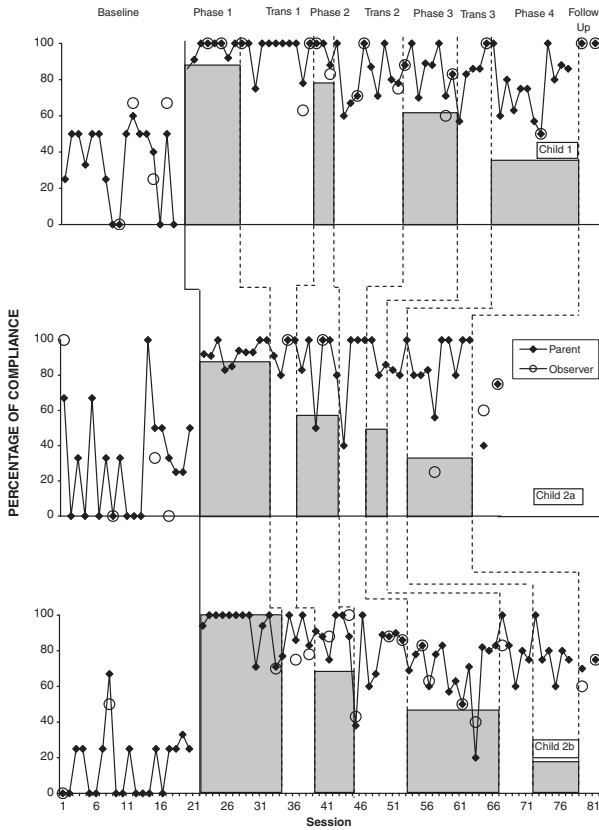
Note: Graphed baseline data represent compliance to Level 4 requests. Each treatment point represents child compliance to requests targeted in that specific level. Shaded areas correspond to the mean pretreatment compliance to requests for the probability level being trained in that phase. Data collected by both parents and observers are included.

demonstrated the greatest divergence from pretreatment levels. Overall mean compliance for Level 4 requests was 80%, a mean increase of 54 percentage points over baseline levels. These results indicate that compliance to parental requests that had previously posed significant problems to parents was substantially improved during treatment.

Figure 2
Compliance to Level 3 and Level 4 Generalization Requests Before
and After Treatment for Each Child

Generalization. As shown in Figure 2, child compliance to Level 3 and 4 requests that had not been included in treatment improved substantially after intervention. Overall mean compliance to these requests before treatment was 45% for Level 3 requests and 35% for Level 4 requests. These means increased to 86% for Level 3 requests and 86% for Level 4 requests, an increase of 41 and 51 percentage points, respectively. These findings suggest that compliance improvements were widespread and not specific to requests included in treatment.

Follow-up. Improved levels of compliance to Level 4 requests largely continued into follow-up (see Figure 1). Overall mean compliance was 65% at the 1-month follow-up. For this first follow-up, Child 1 and 2b demonstrated high compliance levels, but Child 2a complied with only 40% of parent requests. Compliance at the 2-month follow-up recovered for Child 2a and was high for all three children with an overall mean score of 85%.

Maternal Report Measures

Compliance probability checklist. Results of the premeasures and postmeasures of the Compliance Probability Checklist are shown in Figure 3. Consistent with observational data, maternal reports indicated that mothers perceived their children to be much more compliant to requests after intervention. The mother of Child 1 rated 56% of the requests on the checklist as Level 1 or 2 (high probability of compliance) before treatment and 100% of the requests in these levels after treatment. The mother of Child 2a rated 22% of the requests as Level 1 or 2 before treatment and 100% after treatment. For Child 2b, she rated 24% of requests as Level 1 or 2 before treatment and 94% after treatment.

Consumer satisfaction questionnaire. Both mothers completed this questionnaire. From a total possible score of 5.0, results indicated a mean satisfaction score of 4.5 for the treatment and 4.9 for the therapist.

Discussion

We evaluated the effectiveness of errorless compliance training on the behavior of children with characteristics of AS. Parent-collected observational data indicated substantial improvements in child compliance during

Figure 3
Maternal Responses to the Compliance Probability Checklist Before and After Treatment for Each Child
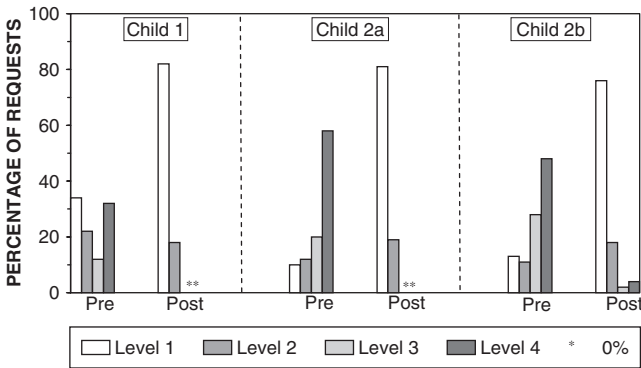
Note: Bars represents the percentage of requests reported by mothers as Level 1 (child almost always complies), Level 2 (child usually complies), Level 3 (child occasionally complies), and Level 4 (child rarely complies).

and following intervention to requests that had been observed in baseline as posing significant problems to parents. These data demonstrated that children were much less likely to respond with severe opposition to challenging parental demands after treatment. Given that the errorless approach allowed parents to avoid exposing their children to requests associated with opposition until they had learned to tolerate such demands, treatment gains were accomplished without use of timeout or other decelerative consequences.

The intervention appeared to produce generalized and durable effects. All three children demonstrated high compliance to requests that had not been included during the treatment process. Although these findings must be viewed cautiously given that generalization data were less extensive than treatment data, the results suggest that the intervention promoted widespread compliance to parental requests, rather than specific compliance to those requests included in treatment. Follow-up measures suggested that compliance maintained up to 2 months after treatment completion. This finding is particularly encouraging given the severity of the compliance problems with these children before treatment.

Maternal report measures provided supplementary evidence for behavioral improvement. Mothers' responses to the Compliance Probability Checklist indicated that they perceived child compliance to be substantially improved after intervention. In addition, the consumer satisfaction questionnaire showed that parents were satisfied with the intervention and therapist support. These parent report findings provide social validation (Wolf, 1978) for the experimental results.

The study had several limitations. First, the small sample size greatly reduces the extent to which we can draw meaningful conclusions about the utility of errorless compliance training for the population investigated in this study. Second, we were unable to collect follow-up data beyond a 2-month period with either family for a variety of reasons unrelated to the treatment, limiting our knowledge about long-term maintenance of gains. Finally, although there are clear treatment effects in the present study, the posttreatment compliance data for all three children show a fair degree of variability (especially in comparison to our previous studies using errorless compliance training). These data may be a demonstration of the highly variable nature of behavioral issues in AS. Alternatively, they could be related to procedural integrity issues. Unfortunately, we did not collect measures of treatment adherence and therefore cannot draw firm conclusions about these findings.

Although the results of the present study are preliminary due to the small sample size, they suggest that errorless compliance training has potential as an effective treatment for oppositionality in children with AS. Due to its proactive, noncoercive, and success-based focus, the approach may be well suited to treatment of the severe reactions that children with AS often demonstrate when exposed to challenging situations. Inasmuch as these youngsters may be accustomed to frequent social failures and a focus on their deficits (Krasny, Williams, Provencal, & Ozonoff, 2003), the errorless approach supports parents in exposing the children to conditions that result in accomplishment and successful interactions, thus increasing the likelihood of enhanced child self-esteem and parent-child relations.

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