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Behavioral approaches to promoting play

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ABSTRACT A variety of techniques grounded in behavioral psychology, and more specifically in applied behavior analysis, have been established to increase and improve play skills in children with autistic spectrum disorders. This article introduces a set of efficacious methods, which range from highly structured techniques to more naturalistic strategies. It focuses on object play as other authors in the issue discuss social play in greater depth. Behavioral techniques that are reviewed include: discrete trial training, use of stereotyped behaviors to increase play skills, pivotal response training, reciprocal imitation training, differential reinforcement of appropriate behavior, *in vivo* modeling and play scripts, and video modeling. A discussion of expanding behavior techniques to teach more complex play as well as training in varied environments is also presented. References are provided to allow the reader to obtain more in-depth information about each technique.

KEYWORDS *applied behavior analysis; autism; behavioral teaching; naturalistic methods; play*

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A variety of techniques grounded in behavioral psychology, and more specifically in applied behavior analysis, have been established to increase and improve play skills in children with autistic spectrum disorders. This article introduces a set of efficacious methods, ranging from highly structured techniques to more naturalistic strategies. We focus on object play as other authors in this issue discuss social play in greater depth. This is by no means an exhaustive review of behavioral methodologies, but instead a sampling of often used, research-based techniques.

Discrete trial training

Perhaps the most well-researched and well-known behavioral technique for the direct instruction of play behaviors is the discrete trial training approach. Discrete trial training was developed in the 1960s to target a variety of specific skills that would increase the behavioral repertoires of individuals with autism and developmental delay. Discrete trial training involves breaking down complex skills and teaching each subskill through a series of massed teaching trials. In discrete trial training, the learning environment is highly structured and controlled by the therapist. Play materials are chosen by the teacher, and the child is presented with a clear instruction for a response, typically the imitation of the therapist's model or compliance with a verbal instruction. Acquisition is facilitated by the use of explicit prompting and shaping techniques and systematic reinforcement contingent upon the child's production of the target response.

Play responses targeted early in treatment or with lower functioning children are usually one-step actions, such as rolling a car or pushing a pop-up toy. When teaching extended play sequences, the teacher breaks down the sequence into its component parts. For example, 'putting the baby to bed' might include: putting a pillow in the cradle, putting the doll into the cradle with its head on the pillow, putting a blanket on the doll, saying 'Goodnight, Baby', and kissing the doll goodnight. Each individual step is taught individually and forward or backward chaining is used to link the steps together in the correct order. Detailed accounts of targeting play skills using discrete trial training can be found in Leaf and McEachin (1999), Maurice et al. (1996), Smith (2001), and Weiss and Harris (2001).

Research has demonstrated that discrete trial techniques are effective for teaching a variety of types of play, from simple object manipulation (Eason et al., 1982; Greer et al., 1985; Nuzzolo-Gomez et al., 2002; Santarcarangelo et al., 1987) to complex play themes (e.g. Lifter et al., 1993). Studies using discrete trial training to increase toy play have found that newly acquired play skills are maintained over follow-up periods and generalize to a variety of novel settings (e.g. Eason et al., 1982; Greer et al., 1985). Nuzzolo-Gomez et al. (2002) found that after discrete trial play training and conditioned reinforcement of play, preschoolers with autism were able to initiate appropriate functional play in their classroom. As with other play interventions, all of the studies also found an inverse relationship between appropriate play and stereotyped or passive behavior, with increases in appropriate play replacing the previous inappropriate behavior (cf. Stahmer, 1993).

Using stereotyped behavior to increase appropriate play

Stereotyped behaviors have been used as reinforcers for a variety of target behaviors in intervention (e.g. Charlop-Christy and Haymes, 1996; Sugai and White, 1986; Wolery et al., 1985). Baker et al. (1998) broadened this application and used the perseverative themes of children with autism to create the theme for socially appropriate games. A perseverative theme was identified for each of the three children participating in the study, and that perseveration was incorporated into a common playground game. For example, one child perseverated on Disney characters and so these characters were incorporated into a follow-the-leader game. The inclusion of the perseverative theme increased the children's interest in social play and acted as reinforcement for play. All three children increased their positive social interactions with peers on the playground. Increases in positive interactions were maintained in other games and in the absence of an adult. This approach was replicated with younger children with autism playing with siblings (Baker, 2000). Perseverative behaviors, then, can serve as an excellent catalyst for improving play skills in children with autism.

Pivotal response training

As behavioral techniques have evolved, researchers have begun to develop more naturalistic behavioral methods. Naturalistic behavioral methods typically incorporate toys or other materials found in the child's natural settings as stimulus items (e.g. Koegel et al., 1999). Often, adults systematically arrange the environment in a way that elicits specific behaviors from the child and allows teaching opportunities to occur within the context of interactions in the natural setting. One method that has bridged the gap between highly structured discrete trial training (which typically uses analog or drill-oriented teaching) and very naturalistic methods such as incidental teaching (which is highly dependent upon the environment and the child's actions for each teaching opportunity) is pivotal response training (PRT). This method grew out of discrete trial training and can be used in a structured or naturalistic format. Pivotal response training is specifically designed to increase a child's motivation to participate in learning new skills. Pivotal response training involves specific strategies such as (1) clear instructions and questions presented by the therapist, (2) child choice of stimuli (based on choices offered by the therapist: Koegel et al., 1987), (3) interspersal of maintenance tasks (previously mastered tasks: Dunlap, 1984), (4) direct reinforcement (the chosen stimuli is the reinforcer: Koegel and Williams, 1980), (5) reinforcement of reasonable,

purposeful attempts at correct responding (Koegel et al., 1988), and (6) turn taking to allow modeling and appropriate pace of interaction.

Pivotal response training has proven to be a naturalistic training method that is structured enough to help children learn simple through complex play skills, while still flexible enough to allow children to remain creative in their play. An example of using the specific steps of pivotal response training to teach symbolic play might be as follows. A child may choose to play with a set of toy cars (choice). The child is then given a block and asked 'What can we do with these toys?' (acquisition task). The child is expected to use the block in a symbolic manner such as to 'wash' the car. If the child does not respond, the therapist would model the symbolic behavior (turn taking). The block would then be returned to the child. If the child still does not respond, a new toy would be chosen, or the therapist could assist the child. When the child does respond, the entire set of cars would be given to the child to play with in any manner he/she chooses, thus reinforcing the new behavior. This may include using the toy in a stereotyped manner. The child can be reinforced for single or multiple step play. The therapist has the opportunity to model more complex play and provide new play ideas on his/her turn. A more detailed description of using pivotal response training to teach complex play skills can be found in Stahmer (1999).

Research indicates that children with autism who are developmentally ready to learn symbolic and sociodramatic play skills can learn to engage in spontaneous, creative play with another adult at levels similar to those of language-age matched peers via pivotal response training (Stahmer, 1995; Thorp et al., 1995). In addition, social behaviors such as positive responding increase after play training. Generalization to new toys and new adults is also impressive and these behavioral changes remain stable over time (e.g. Stahmer, 1995). When rated by naive observers for creativity, spontaneity, and 'typical' play, children with autism improved significantly after pivotal response training play training; however, their play remained qualitatively distinguishable from the play of the typical children (Stahmer et al., 1994). One area of difficulty for the children that continued after play training was play with another peer, which did not improve. It seems that specific interaction training is needed to increase play with peers (see Yang et al., this issue).

Reciprocal imitation training

A variation on the pivotal response training procedure for teaching play skills is reciprocal imitation training (RIT). Reciprocal imitation training was developed to teach spontaneous imitation skills to young children with autism in a play environment; however, this intervention technique has also

been shown to increase pretend play actions (Ingersoll and Schreibman, 2002). Reciprocal imitation training is designed to encourage mutual or reciprocal imitation of play actions between a therapist and child. This procedure includes contingent imitation in which the therapist imitates actions and vocalizations of the child (e.g. Klinger and Dawson, 1992), linguistic mapping, in which the therapist label the actions that he/she and the child are simultaneously performing (e.g. Warren et al., 1993), as well as pivotal response training strategies such as: child choice of stimuli, direct reinforcement, reinforcement of reasonable, purposeful attempts at correct responding, and direct prompting of the correct response.

Ingersoll and Schreibman (2002) found that very young children with autism learned imitative pretend play with an adult using this procedure and this play generalized to novel settings, therapists, and materials. Several of the children also increased their spontaneous use of pretend play. In addition, the children exhibited increases in social behaviors such as coordinated joint attention after reciprocal imitation training, suggesting that both the imitative and the spontaneous play had taken on a social quality.

Differential reinforcement of appropriate behavior

Researchers and clinicians struggle with the development of methodologies that will increase play skills across settings and minimize the need for prompting. Generalization and independence in play have remained elusive for many children with autism. Although several studies report generalization and spontaneous use of play skills acquired through discrete trial training or pivotal response training techniques (e.g. Eason et al., 1982; Greer et al., 1985; Ingersoll and Schreibman, 2002; Stahmer, 1995), many families and therapists continue to struggle with teaching individuals with autism to sustain play and leisure activities over extended periods of time. One such strategy developed specifically to address these issues is the differential reinforcement of appropriate play behaviors (DRA).

In this technique, the therapist monitors the behavior of the individual with autism in repeated intervals. If at the end of the interval the individual with autism is playing appropriately, he/she is reinforced with a primary (edible) and/or secondary (praise, physical touch) reinforcer. If at the end of the interval the child is playing inappropriately or is unengaged, he/she is prompted to return to the task and receives no reinforcement.

Although this strategy appears to have strong methodology based on applied behavior analysis, studies of the effectiveness of a differential reinforcement of appropriate behaviors schedule for increasing appropriate behavior have been mixed. Nietupski et al. (1986) reinforced developmentally delayed adolescents on regularly scheduled intervals for engagement in

several previously acquired leisure activities that they only engaged in with direct supervision. Results indicated that the participants engaged in sustained episodes of play behaviors even after reinforcement was discontinued, and this increase was evident after 4 months without reinforcement.

In contrast, Santarcarangelo et al. (1987) found that a differential reinforcement of appropriate behaviors procedure was ineffective at increasing rates of appropriate play in two young children with autism, and that increases in appropriate play were seen only after direct play training. This finding suggests that differential reinforcement of appropriate behaviors procedures may be effective for maintaining extended periods of play behaviors previously acquired through direct instruction, and may be most effective for developing appropriate play behavior when combined with other techniques.

Self-management training

Self-management has been posited as an additional option for teaching children with autism to increase independence and generalization without increased reliance on a teacher or parent. Self-management typically involves some or all of the following components: self-evaluation of performance, self-monitoring, and self-delivery of reinforcement. Ideally, it includes teaching the child to monitor his/her own behavior in the absence of an adult. Stahmer and Schreibman (1992) used a self-management treatment package to train three school-age children with autism to engage in increased levels of appropriate play. These children displayed very little independent appropriate play before training, and typically engaged in inappropriate or self-stimulatory behavior when left on their own. With the introduction of the self-management training package, the children increased their appropriate play in both supervised and unsupervised settings, and across generalization settings and toys. Behaviors maintained after 1 month for two of the children. Decreases in self-stimulatory and disruptive behaviors were maintained in the unsupervised environments.

Newman et al. (2000) have extended self-management research by using this technique to help children with autism vary their play responding, thereby reducing perseverative play. Three preschool-age students learned new activities using favorite toys that typically elicited perseverative play. Children were prompted to engage in new behaviors with the toys, and were asked to take a token whenever they displayed a variation in the target behavior. All three children exhibited increases in variability of play after self-management training, with the behavior maintaining at a 1 month follow-up. The authors found this to be a promising method of increasing the variability of play in these children. Self-monitoring procedures have

also been used to increase social initiations while reducing disruptive behavior (Koegel et al., 1992) and to increase independent interactions with typical peers (Shearer et al., 1996).

In vivo modeling and play scripts

Another method of play training based on the principles of behavior analysis is modeling. Modeling research has shown that individuals with autism can learn new behaviors through the observation of predictable and repeated sequences. *In vivo* modeling techniques, which use live models, have been effective in teaching children with autism various developmental skills, including labeling (Charlop et al., 1983) and following one-step commands (Egel et al., 1981). Additionally, *in vivo* modeling has been shown to be effective in teaching children with autism appropriate play. For example, Tryon and Keane (1986) used modeling to increase independent play in children with autism. More recently, Jahr et al. (2000) used and compared two *in vivo* modeling procedures to teach children with autism to initiate and sustain cooperative play. In one approach, the children observed two models engaging in scripted episodes of cooperative play, following which they took the place of one of the models while the play episode just viewed was repeated. The second approach mirrored the first except that the children were required verbally to describe the modeled play episode before they took the place of one of the models. Results of the study indicated that the verbal recital of the scripted play episodes was a necessary component in the children's acquisition of play skills and generalization of those skills across play partners.

In another study utilizing live models and scripted play episodes, Goldstein and Cisar (1992) used sociodramatic play scripts modeled and taught by adults to increase sociodramatic play and social communicative interactions in children with autism. The investigators taught three play scripts to three triads of children, each including one child with autism and two typical classmates. Play script training involved modeling and teaching each child a role, and scripts included both verbal and non-verbal behaviors. During training, token reinforcement systems were used to deter off-task behavior when necessary. Results indicated that the children with autism were able to learn the play scripts and engaged in increased interactive social play activities following play training.

Video modeling in play training

Video modeling, like *in vivo* modeling, uses predictable and repeated presentations of target behaviors; however, these behaviors are presented in video

format, thus reducing variations in model performance. Video modeling has been shown to improve various skills in individuals with autism, including conversational speech (Charlop and Milstein, 1989; Sherer et al., 2001), verbal responding (Buggey et al., 1999), helping behaviors (Reeve, 2001), and purchasing skills (Haring et al., 1987). This medium has also been claimed to increase vocabulary, emotional understanding, attribute acquisition, and daily living skills (Zihni and Zihni, 2002). Video modeling interventions have used both self-as-model and other-as-model methods. In the first condition, individuals act as their own models, and the video is edited so that only desired behaviors are shown. The second and perhaps more prominent method of video modeling employs taping other individuals, typically adults or siblings, performing target behaviors. Video self-modeling has been theorized to be more effective than traditional video modeling because it may promote increased attention from the individual, although empirical studies have not substantiated this claim (cf. Buggey et al., 1999; Creer and Miklich, 1970; Sherer et al., 2001).

Applications of video modeling as an intervention technique are now being extended to teaching and increasing play in children with autism. For example, Schwandt and his colleagues (2002) used video modeling to teach 3- and 4-year-old children with autism to increase their play actions, duration of play, and play-related statements. Following three repeated presentations of a video clip showing play actions with a specific toy, the toy was given to the child and the child was instructed 'Play toy'. Time at play was systematically increased and differential reinforcement given for novel play statements and play actions during the intervention period, after which the videotape presentations were systematically faded. Following the intervention and fading, maintenance phase measures indicated that the young children in the study generalized the play behaviors to novel settings and toys, and some of the children began to generalize play statements that were shown in the videos (cf. Buggey et al., 1999; Reamer et al., 1998; Taylor et al., 1999).

In a study comparing video modeling and *in vivo* modeling (Charlop-Christy et al., 2000), video modeling was found to be more time and cost efficient than *in vivo* modeling and more effective at promoting generalization of skills in teaching five children with autism individually assigned tasks (e.g. expressive labeling of emotions, independent play). Thus, both video and *in vivo* modeling may be effective for teaching play skills in children with autism, who are sometimes described as being visual learners. The video method may be especially beneficial for children who initially avoid interactions and for whom effective reinforcers to use in more traditional behavioral teaching techniques are difficult to find.

Expanding behavioral play training

The methods discussed have also incorporated parents, peers, and siblings to teach children with autism a variety of skills, including play. For example, pivotal response training has been used extensively and primarily in parent training to increase both language and play in children with autism (e.g. Koegel et al., 1991; Schreibman and Koegel, 1996; Stahmer and Gist, 2001) and has also been successfully implemented by siblings (Oke, 1994) and peers (Pierce and Schreibman, 1997). Self-monitoring has been used to increase play interactions between children with autism and their non-disabled peers (e.g. Sainato et al., 1992; Shearer et al., 1996). *In vivo* and video modeling have been used with parents and peers, and video modeling has been used to increase play between siblings (Taylor et al., 1999). Naturalistic behavioral techniques such as incidental teaching are commonly used to increase play between children with autism and their typically developing peers (Kohler et al., 2001). In fact, model preschool programs, such as the Walden Program at Emory University (McGee et al., 1999) and the LEAP program in Colorado (Strain and Cordisco, 1994), have used behavioral techniques to increase play in children with autism and to train peers to facilitate interaction and play throughout an integrated school day. Training peers and family members to use these techniques is one method behaviorists have used to increase generalization and maintenance of behavior changes and to increase the intensity and duration of intervention.

The initial highly structured behavioral play training of the 1960s has expanded to involve many new naturalistic and creative methods for teaching play to children with autism, many of which are described above. Behaviorists have examined methods of altering the environment to encourage appropriate play and used areas of strength, such as visual processing skills, to teach new play skills. This review represents only a few of the creative methods of altering antecedents and consequences to foster play.

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