

Understanding and Implementing Positive Reinforcement as an Intervention Strategy for Children With Disabilities

Renee Watling,
Ilene S. Schwartz

The intervention strategies associated with applied behavior analysis (ABA) repeatedly have been demonstrated as effective techniques for shaping behavior and teaching new skills to children with disabilities. While ABA has been a mainstay of early intervention in special education for decades, occupational therapists typically do not receive training in ABA or the instructional strategies associated with this discipline. Occupational therapists may be able to improve the effectiveness and efficiency of their practice by becoming familiar with the principles of ABA and learning to integrate them into their clinical work. This paper will describe briefly ABA and argue that occupational therapists could enhance their services for children with disabilities through conscientious integration of contingent positive reinforcement into practice.

Applied Behavioral Analysis

ABA is a discipline dedicated to the application of behavioral principles to socially important issues including improving the function of children with disabilities (Baer, Wolf, & Risley, 1968). Over 30 years of investigation have led to a refined understanding of the function and application of

behavioral principles, including reinforcement, punishment, and stimulus control.

Behavioral intervention is built around an understanding of antecedents to and consequences of behavior. Antecedents are those events that precede a behavior, and consequences are those events that follow a behavior (Reynolds, 1975). Antecedents are presented in a way that maximally encourages performance of the desired behavior, and consequences are delivered in a way that of maximally affect the probability of the desired behavior occurring. When the consequence of a behavior increases the probability that the behavior will occur again, the behavior is said to be strengthened, and the consequence is referred to as positive reinforcement. The most widely used behavioral principle in educational and clinical settings is positive reinforcement.

Description of Positive Reinforcement

All behaviors are followed by consequences, whether recognized or not, and those consequences are defined by the effect they have on the behavior. A consequence is termed a positive reinforcer when it results in strengthening the behavior it follows. Thus, a positive reinforcer is a type of consequence that, when presented contingently and immediately following a behavior, increases the probability of the behavior happening again (Malott, Malott, & Trojan, 2000). For example, when one person greets another with a smile and the second person responds with a wave, the first person's smiling behavior is reinforced and it is more likely to occur again. We only know if a consequence is a

positive reinforcer by the effect it has on the behavior. When positive reinforcement is applied systematically in learning situations, it can be used to strengthen existing behaviors or to help an individual acquire new behaviors.

What Positive Reinforcement Is Not

Common misconceptions of positive reinforcement include beliefs that it is coercion or bribery. According to the dictionary definition (Mish, 1993) bribery occurs when an individual is rewarded for unethical behavior, and coercion occurs when an individual is compelled by force without regard for the individual's desire. By definition, positive reinforcement is neither bribery or coercion. Positive reinforcement involves providing a preferred object or activity to someone after they independently have performed a behavior that is desired. Further, positive reinforcement rewards an individual for desired, appropriate behavior. In fact, positive reinforcement can foster enhanced motivation to behave in ways which have been reinforced.

Making Positive Reinforcement Work

The discipline of ABA has identified many factors that are important for the successful application of positive reinforcement. Four of them are presented here. First, it is necessary to identify systematically stimuli (e.g., objects or activities) that are reinforcing for an individual client. Next, elements of timing and frequency of reinforcement must be considered. Third, attention must be given to the accessibility of reinforcement to reduce satiation. Finally, care must be taken to adjust the schedule of reinforce-

Renee Watling, MS, OTR/L, is Doctoral Candidate, College of Education, Predoctoral Fellow, Department of Rehabilitation Medicine, University of Washington, Division of Occupational Therapy, Box 356490, Seattle, Washington 98195; Rwatling@u.washington.edu

Ilene S. Schwartz, PhD, is Professor, College of Education, University of Washington, Seattle, Washington.

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ment during learning and maintenance phases of skill development.

Reinforcer Assessment

The consequences, or stimuli that function as reinforcers, vary from person to person and can change over time therefore, identification of positive reinforcers must be individualized and systematic. Reinforcer identification can be accomplished through various methods of reinforcer assessment. Some of these include asking a caregiver what objects or activities are preferred by the child (e.g., Windsor, Piche, & Locke, 1994); directly observing a child's approaches to independently available stimuli (e.g., Pace, Ivancic, Edwards, Iwata, & Page, 1985); and observing the child's approaches to each of concurrently available stimuli (e.g., DeLeon & Iwata, 1996).

Reinforcer assessment is important for two primary reasons: to identify possible reinforcers and to generate a variety of possible reinforcers so that the therapist can vary the reinforcer used. However, reinforcer assessment also can be challenging because the same stimulus may not always function in the same way. For example, a bite of food may function as a positive reinforcer during a morning session with a child, but not after lunch when the child is satiated on food. For other children, especially those who have feeding issues, food may never function as a reinforcer. Because the same consequence may function as a positive reinforcer in some conditions but not in others, it is important to be alert to the effect of a consequence and to change it as necessary to maintain the client's interest and motivation. Further, it is important to note that consequences an adult considers undesirable can function as reinforcers. For example, if a child who is not receiving any adult attention begins to throw toys, the adult may respond by lecturing the child about the proper way to care for toys. This attention, even though negative in content and assumed by the adult to be punishing, may function as a positive reinforcer.

Timing and Frequency of Reinforcement

Timing is critical to successful use of positive reinforcement. Positive reinforcement should be delivered immediately and contingently upon performance of the desired

behavior. Immediate delivery of the reinforcer insures that the desired behavior, rather than an interim and possibly inappropriate behavior, is reinforced. For this reason, it is important that the therapist be cognizant of her actions and be cautious that the wrong behavior is not reinforced unintentionally.

Access to Reinforcement

In some cases it may be necessary to control access to a reinforcer in order for it to retain its power. For example, in many families there is a rule that the television remains off until homework is finished. Assuming that television is a reinforcer, parents are making access to this reinforcer contingent upon completing the target task (i.e., homework). For children who have a limited range of reinforcers, which is common among children with disabilities, it may be necessary to reserve some highly reinforcing toys or activities or both for motivating important behaviors. For example, if a child for whom music is very reinforcing has a favorite tape, parents may choose to limit the child's access to that tape, saving it to reinforce appropriate car riding behavior.

Schedules of Reinforcement

When working to establish a behavior, reinforcement is most effective when it is delivered every time the desired behavior occurs. However, continuous reinforcement introduces the possibility that the child will come to expect reinforcement every time the behavior is exhibited. Proactive alteration of the reinforcement schedule as the child becomes skilled at a given behavior reduces the possibility of the behavior being dependent upon continuous reinforcement. When a child reliably performs a behavior under the continuous reinforcement condition, the reinforcement schedule can be changed to an intermittent schedule. Four types of intermittent schedules can be used. Ratio schedules provide reinforcement according to the frequency of behavior. For example, a *fixed ratio* results in reinforcement every third time the desired behavior occurs, and a *variable ratio* results in reinforcement on an average of every seven behaviors. Interval schedules provide reinforcement according to time. A *fixed interval* results in reinforcement the

first time the target behavior occurs following a specified interval of time, and a *variable interval* results in reinforcement following the first time the target behavior occurs after a variable period of time has elapsed since the last reinforcement. Variable ratio schedules of reinforcement produce the strongest, most durable behaviors because the child does not know when reinforcement will be delivered and therefore continues performing the behavior in an effort to access the reinforcer.

Natural Reinforcers

Natural reinforcers are positive consequences that are directly related to a child's behavior and are built directly into the task or activity. For example, if bubbles were a powerful reinforcer for a child and you were teaching color discrimination, you could have different color bubble containers. When you ask the child to "touch blue" and he did, he would receive the blue container of bubbles and have an opportunity to blow bubbles. The use of natural reinforcers has been demonstrated to facilitate motivation and generalization (Koegel, Koegel, Frea, & Smith, 1995).

Efficacy of Positive Reinforcement in Children With Disabilities

The efficacy of using positive reinforcement to modify behavior is supported by over 35 years of research. The literature demonstrates the use of positive reinforcement to modify the behavior of children with developmental disabilities in virtually every developmental domain. For example, positive reinforcement has been used to increase social behavior (e.g., Zannolli & Daggett, 1998), improve cognitive and language skills (e.g., Koegel, O'Dell, & Dunlap, 1988), increase functional skills (e.g., Williams, Koegel, & Egel, 1981), and improve play skills (e.g., Haring & Lovinger, 1989).

In one of the first intervention studies that demonstrated success using positive reinforcement with a child with multiple disabilities, Wolf, Risley, and Mees (1964) used positive reinforcement to teach a child to wear his glasses. This behavior was chosen because the child had significant visual impairments that worsened if he did not

wear his glasses. This study is an excellent illustration of the importance of understanding positive reinforcement and the way in which natural activities can be turned into positive reinforcers if delivered contingently.

In another study, positive reinforcement was used successfully in a preschool environment to increase the frequency with which a child engaged in peer play (Allen, Hart, Buell, Harris, & Wolf, 1964). The positive reinforcers were attention, touch, smiles, and assistance. Positive reinforcement was delivered contingent upon the child's interactions with peers, was withheld when the child isolated herself, and was minimized when she sought adult social attention. This study was powerful in showing how positive reinforcement effectively increased each of the behaviors that were targeted during the various phases of this study, and in demonstrating how naturally occurring consequences can be systematically applied to modify social behavior.

Application to Occupational Therapy

When encountering the term applied behavioral analysis, occupational therapists often think of discrete trial sessions in which children are repeatedly asked to perform the same task in a highly structured and instructive manner, a format that contrasts with the child-directed nature of pediatric occupational therapy. While positive reinforcement often is used within the discrete trial format, it is not exclusive to that form of skill development. In fact, because every behavior has consequences, many occupational therapists already may be using some aspects of positive reinforcement in their intervention sessions with children with disabilities. However, to insure that this strategy has its greatest possible effect, it is important that positive reinforcement techniques are applied in a systematic and conscientious manner, and that therapists are aware of the philosophical roots from which these strategies emerge.

We believe that occupational therapists could capitalize on the technology of positive reinforcement to enhance their service delivery to children with disabilities. Because the strategy has been widely

researched, there is a wealth of literature providing data that demonstrate the effectiveness of the techniques and describe its application to a variety of therapeutic situations. Further, because every behavior has a consequence, positive reinforcement can be blended with other therapeutic interventions without detracting from the child-directed nature of pediatric occupational therapy.

The following examples suggest possible ways positive reinforcement could be woven into occupational therapy sessions to increase efficiency and effectiveness of intervention when working to increase a desired behavior or decrease a challenging behavior.

Increasing a Desired Behavior

Differential reinforcement, that is, contingently reinforcing appropriate behavior and ignoring or correcting inappropriate behavior, is a powerful strategy for increasing a specific behavior. Consider a child who does not like to sit at the table, but who needs supportive positioning to work on fine motor activities. Whenever instructed to sit for fine motor work, the child typically complies for a brief moment then pushes his chair back and stands for the remainder of the activity. To increase the probability of sitting in the chair, the occupational therapist could reinforce the behavior of sitting with access to a preferred fine motor activity (e.g., beads). When the child sits down in the chair, he gets to play with the beads. If he gets out of the chair, the beads are removed. When he sits down again, the beads are presented. Doing this in a systematic way will increase the amount of time the child spends sitting in the chair, and thus the opportunity to work on fine motor skills.

Decreasing a Challenging Behavior

Positive reinforcement also is an effective strategy for decreasing challenging behavior. Consider a child who screams loudly when asked to engage in therapeutic activities. Use of positive reinforcement in this situation might include planned ignoring and differential reinforcement of other behaviors (DRO). Whenever the child screams the therapist removes her attention, when the child uses appropriate communication or tolerates instruction she provides

tickles, attention, and deep pressure (which were identified as powerful reinforcers through a reinforcer assessment). Each time the child screams, the therapist turns away. When he does not scream, she engages him socially, praises him, rubs his shoulders, and provides him with attention. The key to the effectiveness of this intervention is the systematic withdrawal of attention contingent on inappropriate behaviors paired with the contingent attention for behaviors incompatible with screaming.

Integrating Positive Reinforcement Into Therapy

The instructional strategies developed by and associated with applied behavior analysis have been proven to be effective with people of all ages and all ability levels (see the *Journal of Applied Behavior Analysis*). As therapists are encountering more children with challenging behaviors, including children with autism spectrum disorders and attention deficit hyperactivity disorder (ADHD), these strategies are essential to facilitate effective therapy sessions and meaningful outcomes for children. The first step in adding these strategies to your own practice is to evaluate your current practice patterns. As a form of self-assessment we offer the following guiding questions:

1. How do I deal with challenging behaviors during therapy sessions?
2. How do I structure therapy sessions to facilitate appropriate behaviors?
3. What strategies do I use to teach new behaviors?
4. How am I currently using positive reinforcement in my therapy?
5. How can I use positive reinforcement more effectively in my practice?

Using positive reinforcement can be an effective way to increase the rate of child learning and decrease challenging behaviors. A thorough discussion of reinforcement and other instructional strategies associated with applied behavior analysis are beyond the scope of this paper. More information about applied behavior analysis, including the systematic and conscientious application of positive reinforcement can be found in a number of excellent resources (e.g., Alberto & Troutman, 1998;

Cooper, Heron, & Heward, 1990; Leaf & McEachin, 1999).

Conclusion

Because occupational therapists are actively providing services to children with disabilities, it is crucial that they learn to use intervention strategies that have been shown to be effective. When used appropriately, positive reinforcement can be extremely effective and developmentally appropriate for people of all ages and at all levels of development. Positive reinforcement is a behavioral principle that has been demonstrated to be extremely effective in teaching children with disabilities new skills and behaviors. Occupational therapists are encouraged to learn to use positive reinforcement as a means of reducing noncompliance, increasing responsiveness to intervention, and improving the effectiveness and efficiency of intervention. ▲

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