EXPANDING ABA INTERVENTION IN INTENSIVE PROGRAMS FOR CHILDREN WITH AUTISM: THE INCLUSION OF NATURAL ENVIRONMENT TRAINING AND FLUENCY BASED INSTRUCTION

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ABA has documented effectiveness for learners with autism. Over the past 15 years, the effectiveness of early intensive behavioral intervention has been empirically validated. Many of these ABA programs have utilized an impressive array of ABA technology, while some programs have relied heavily on the use of discrete trial instruction. Recently, the model of Natural Environment Training has been discussed as an important expansion of these programs. In addition, the utility of Fluency Based Instruction for learners with autism has been highlighted. These two ABA approaches have much to offer students with autism. Their inclusion in educational programming may enhance the effectiveness of instructional efforts.

There is substantial research documenting the effectiveness of ABA intervention for children with autism (e.g. Birnbrauer & Leach, 1993; Lovaas, 1987; Maurice, 1993; McEachin, Smith, & Lovaas, 1993; Perry, Cohen, & DeCarlo, 1995). Research has indicated that one of the most significant elements is intensity. Intensity is generally defined as 30 to 40 hours per week of intervention. Other elements of intensity include a rich ratio of teacher to student attention and maximizing learning opportunities.

Some new directions for children with autism within ABA involve incorporating broader applications of ABA to build comprehensive programs. Many students with autism have been receiving educational programs that rely heavily on the use of discrete trial training (DTT). Discrete trial training uses repetition of learning opportunities to build skills (Lovaas, 1981; Lovaas, Koegel, Simmons, & Long, 1973; Smith, 1993). Some of the components of discrete trial training that have been documented to be effective include errorless learning (e.g., Etzel & LeBlanc, 1979; Lancioni & Smeets, 1986; Terrace, 1963; Touchette & Howard, 1984), and task variation and interspersal (e.g., Dunlap, 1984; Mace, Hock, Lalli, West, Belfiore, Pinter, & Brown, 1988; Winterling, Dunlap, & O'Neill, 1987; Zarcone, Iwata, Hughes, & Vollmer, 1993).

While this methodology is extremely effective in building skills in these learners, the addition and integration of several other approaches may further enhance instructional outcomes.

NATURAL ENVIRONMENT TRAINING

Sundberg & Partington (1998) have outlined an educational program based on the principles of Verbal Behavior. Skinner's (1957) classifications of verbal behavior have tremendous curricular implications for individuals with autism. Autism involves deficits in many of the areas outlined by Skinner. The deficit in manding may be the most obvious and longstanding. Most students with autism present with significant deficits in spontaneity. Even with intervention, these deficits also persist. Sundberg & Partington's emphasis on mand training, in particular, adds a unique and extremely important focus for students with autism.

Sundberg & Partington have developed the method of Natural Environment Training (NET). This model capitalizes on establishing operations to build spontaneity. Specifically, the instructor assesses what the learner is motivated by at that particular moment in time. The instructor targets requesting (manding) as the initial skill. The learner's skills in requesting are built through the constant processes of capturing and contriving establishing operations. The learner's spontaneous mands are counted and increased. The instructor serves as an agent of reinforcement, which builds rapport. Gradually, demands are faded into the instructional context and small delays in the receipt of desired items are implemented. In this way, the instructional context begins to include instructor demands as well as learner requests.

Natural Environment Training is similar to the Natural Language Paradigm (NLP) and to Pivotal Response Training, which both emphasized the use of intrinsically motivating materials, teaching in natural contexts, and focusing on the child's immediate interests to guide language instruction (Koegel, O'Dell, & Koegel, 1987; Laski, Charlop, & Schreibman, 1988). NLP, as described by Koegel, Koegel, & Surrat (1992) involves items chosen by the child, variations in instructional targets every few trials, loose shaping contingencies, natural reinforcers, and playful interactions. NET is usually

conducted in the child's typical daily environment (Sundberg & Partington, 1999). Sundberg and Partington have used the context of Skinner's analysis of verbal behavior to analyze the utility of both DTT and NET in instructing children with autism, and have created an instructional model based on this analysis.

FLUENCY BASED INSTRUCTION

An additional direction which has received attention in the autism community is Fluency-Based Instruction (FBI). Fluency is defined as responding accurately, quickly, and without hesitation (Binder, 1996; Dougherty & Johnston, 1996). Fluency is achieved through fluency building, which involves practice or overlearning (Binder, 1996). While FBI has been conducted with learners within ABA approaches for many years (e.g., Lindsley, 1992), its extension to autism is rather recent. However, there are a number of good reasons to explore its use for learners with autism. Many individuals with autism exhibit significant disfluencies; that is, motor output is slowed because of poor coordination or pacing of motions. Secondly, response latency is a significant issue for learners with autism. Many students with autism miss social and educational opportunities because of their long latencies to respond. This is especially true for interactions with peers, where peer initiations may be extinguished when responses do not occur in a timely fashion. In Fluency Based Instruction, it is possible to assess the automaticity of the skill, which may have implications for its practical application.

In Fluency Based Instruction, the focus is on the rate at which the learner can demonstrate the skill. The learner demonstrates the skill at maximum speed, with coaching from an instructor. This skill demonstration occurs initially for very brief periods of time (e. g., 10 seconds), and is gradually increased as performance increases. There is a performance aim, which is depicted on a standard celeration chart. Both the type of skill and the current performance of the learner determine the goal for a particular skill. Progress is charted on a daily basis, and the learner is actively engaged in tracking his or her progress. A variety of instructional adjustments are made to increase rate and/or reduce latency, including guided timings (where physical assistance is given), changes in timing lengths, or alterations in the skill being addressed.

Fluency Based Instruction also gives information on performance that is not typically available within a discrete trial format. For example, errors and correct responses are recorded and tracked separately. This gives more data on which to base clinical decisions. Furthermore, rate based measures yield information that percent correct measures cannot yield.

The goals of FBI (RESAA: Retention [maintenance], Endurance [sustained performance for a sufficient length of time], Stability [ability to persevere despite distraction], Application [ability to perform skill at fluent rates with novel materials, instructions, locations, and persons], and Adduction [the creation of new skills through the building of component skills]; Johnson & Layng, 1996) are goals, which have always been important to instructional efforts within ABA. The systematic assessment of these learning outcomes is an excellent addition to educational intervention.

WHAT IS IMPROVED THROUGH THE ADDITION OF THESE APPROACHES?

Some of the challenging characteristics of a DTT program can be an inadequate emphasis on the development of manding skills and limited control and choice for the learner. Learners may wait for instructions, rather than communicate more spontaneously. The primary advantage to incorporating NET into DTT is that establishing operations are utilized. As a result of this, rapport is readily built with instructors. The instructional context itself is conditioned as a reinforcer. Furthermore, spontaneity is increased, because mand training is so strongly emphasized. Finally, because the instructor is paired with the delivery of reinforcers, positive reinforcement is used much more than negative reinforcement to increase compliance and responsiveness.

Additional characteristics that may be overlooked in DTT programs include the rate/automaticity of the skill, the number of learning opportunities in a given period of time, and independent analyses of correct responses and errors. FBI adds these elements. Automaticity, in particular, has implications for the functional use of skills. Children with autism often miss out on social and educational opportunities because their latencies to respond are so long. Building the automaticity of the skill ensures that the skill will be available and

quickly demonstrated when appropriate (Binder, 1996). Furthermore, an independent analysis of correct responses and errors can be highly instructive. Data based decision making can be more accurate. FBI also adds the dimension of component and composite skills. A careful assessment is done of the composite skill, to identify component skills. Component skills refer to sub-skills, which are essential for the execution of a target task, while composite skills refer to the larger target task. Identifying objects receptively (composite skill) requires the sub-skills of scanning and touching objects or photos (component skills). Component skill deficits are identified so that composite skills may be more efficiently taught (Dougherty & Johnston, 1996).

A COMPREHENSIVE ABA PROGRAM

One of the greatest challenges to our field now is potential divisiveness within the ABA community. There is a tendency to dichotomize approaches that are both clearly advantageous to the learner and complementary from an instructional perspective. Sundberg & Partington (1999) discuss that both DTT and NET are important for teaching language to children with autism. They point out that the two approaches typically focus on different types of verbal behavior. NET is initially based primarily on manding, which is accomplished by utilizing the child's current EOs, while DTT is based primarily on tact and receptive training (Sundberg & Partington, 1999).

These authors point out a number of advantages of discrete trial training: a high number of training trials, a solid way to develop tact, receptive, echoic, and imitative behaviors, ease of staff training, clarity of target response, simplicity of data collection, ease of assessment of progress, and clearly defined curricular steps (Sundberg & Partington, 1999). They also outline the advantages of NET, which include: optimal conditions to teach manding, the use of stimuli in the natural environment as target SDs, the reduced need for elaborate generalization procedures, the naturalistic instructional context, the ease of teaching intraverbal behavior, and the reduced need for aversive control. They outline five phases of instruction regarding the relative emphasis of DTT or NET, depending on the child's characteristics and the instructional goals.

The critical importance of individualizing the decisions in this context was underscored by Cummings (1999). This author emphasized the need to address the "goodness of fit" framework (Bailey et al., 1990) in matching interventions to learners. Individualization requires that we attend to all of the aspects of the learner's environment, to the learner's characteristics and skills, to the quality of implementation, and to the maintenance of skills (Cummings, 1999).

The global message is that people with autism learn in a variety of ways and through a variety of instructional procedures, and that the broad spectrum of empirically validated approaches should be utilized. Krantz (2000) made this point eloquently:

> "Finally, we can optimize our research and practice by reminding ourselves not to put all of our 'eggs' (i.e., resources, hopes) in any single procedural basket. People with autism, like all of us, must learn to learn in a variety of ways: from direct instruction; from incidental teaching; from television, videotape, and computer; from parents, teachers, peers, and employers; and from pictoral, auditory, and textual cues. There are various intervention procedures, all firmly grounded in science, that accomplish these different but equally important objectives. The most important aspect of these procedures is their scientific underpinnings. The challenges are to support and promote intervention efforts that reflect the array of contemporary, empirically based procedures and to teach discriminations between scientific and unscientific approaches to treatment ". (p. 413)

While the need to expand the repertoire of approaches utilized with children with autism is obvious, it is important to balance our enthusiasm with cautions as well. An over emphasis on any particular approach diminishes the potential influence of our intervention efforts, and threatens the individualization which is a hallmark characteristic of ABA. It is imperative that the application of these procedures be done in the context of a thorough assessment of the learner's strengths, weaknesses, and needs. It is also important to monitor the functionality of these interventions. Finally, it is particularly important to be open to changing

instructional procedures when the data does not indicate adequate progress.

The inclusion of NET and FBI in educational intervention for children with autism improves our educational technology by expanding our array of instructional strategies. As our field moves forward, there have been and there will continue to be advances in the application of empirically validated behavior analytic techniques. We look forward to the identification and incorporation of these strategies, which will improve outcomes for our learners.

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STUDY QUESTIONS

1. Describe/define both the Fluency Based Instruction and Natural Environment Training methodologies.

2. Compare and contrast the strengths and weaknesses of Discrete Trial Training against either Fluency Based Instruction or Natural Environment Training.

3. What current assessment technology could be used to screen learners with autism for "goodness of fit" with the appropriate methodology (DTT, FBI, NET)?

4. How does Natural Environment Training differ from Pivotal Response Training?

5. Compare and contrast the efficacy and applicability of using 'rate' vs. 'percent correct' for both a recording paradigm as well as for data based decision making.