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Preparing Special Education Teachers in Evidence Based Strategies
to Address the Needs of Students With Autism Spectrum Disorders

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Abstract

The prevalence of children diagnosed with autism spectrum disorders (ASDs) has rapidly increased across the United States. This dramatic increase, in conjunction with federal and state mandates, challenges educators to meet the needs of children with ASDs in public school settings. Unfortunately, many children with ASDs are not receiving intervention based on empirically demonstrated methodologies. This shortfall can likely be attributed to the lack of emphasis on behavior analytic strategies within many institutions of higher education that prepare special education teachers. Yet, there is a preponderance of evidence supporting the use of methodologies based on applied behavior analysis for children with ASDs. Given the research supporting the efficacy of behaviorally based interventions, the authors propose several areas that should be addressed within training programs for prospective special education teachers.

The prevalence of children diagnosed with autism spectrum disorders (ASDs) has rapidly increased across the United States (Rice, 2007). In 2007, the Office of Special Education Programs (OSEP) reported that autism is the 6th most commonly classified disability in the United States. The Autism and Developmental Monitoring Network reported, in areas across the United States, an overall average of 1 in 150 8-year-old children had an ASD (Centers for Disease Control and Prevention, 2007).

The significant increase in the number of children diagnosed with ASDs is greatly impacting our educational systems (Sansosti, 2008). In fact, in the US, from 1997 to 2006, of all children between the ages of 6 and 21 who received special education and related services, *autism* is the disability noting the most significant increase from 42,517 (0.8% of all disability groups) to 224,565 (3.8% of all disability groups) (U.S. Department of Education, 2007). In fact, autism is the only disability category that more than *quintupled* in numbers (U.S. Department of Education, 2007). While researchers and the medical profession continue to grapple with this *surreal* realization of growth, educators have the challenge of meeting their needs within the classrooms of local public schools. In turn, teacher preparation programs must be providing prospective special educators with the skills they need to teach this growing population of students.

Federal mandates for educating all children with disabilities in the least restrictive environment has also had a tremendous impact on our educational systems, particularly those that relied on segregated educational settings. For example, in the Southeastern region of New York State, an increase in the number of children with ASDs in local districts has led to an increase in placement options with typically developing peers within local schools (Loiacono & Allen, 2008). Clearly, educational agencies continue to be challenged with the responsibility of

educating a statistically higher number of students diagnosed with ASDs in their general education classes (Goodman & Williams, 2007).

Federal legislation (No Child Left Behind [NCLB]; The Individuals with Disabilities Education Act [IDEA]) specifically calls for the use of strategies that are evidence based. In light of these mandates, teachers must be knowledgeable and proficient in the use of effective intervention strategies (Harrower & Dunlap, 2001; McCabe, 2008). Thus, as curriculum is designed (or redesigned) for special education teacher preparation programs, a strong emphasis should be placed on strategies that are well supported by empirical literature. There is a preponderance of evidence supporting the effectiveness of strategies grounded in applied behavior analysis (ABA) (Adair & Schneider, 1993; Davis & Chittum, 1994; Eikeseth, Smith, Jahr, & Eldevik, 2002; Heflin & Alaimo, 2007; Matson, Sevin, Fridley, & Love, 1990; Repp, Felce, & Barton, 1988; Sallows & Grauper, 2005; Smith, Groen, & Wynn, 2000 and countless others), beginning as early as the 1960s, for very young children with autism (e.g., Lovaas, 1987; Sheinkopf & Siegel, 1998), elementary aged children (e.g., Hagopian, Bruzek, Bowman, & Jennett, 2007; Peyton, Lindauer & Richman, 2005), adolescents (e.g., Anglesea, Hoch, & Taylor, 2008; Taylor, Hughes, Richard, Hoch, & Coello, 2004), and adults with ASDs (e.g., Jerome, Frantino, & Sturmey, 2007; Lattimore, Parsons, & Reid, 2006). The use of behaviorally based strategies is also supported by the U.S. Surgeon General (Rossenwasser & Axelrod, 2002), as well as the New York State Department of Health (Clinical Practice Guideline: Report of the Recommendations, 1999).

Applied behavior analysis is an area of psychology that applies principles of learning (e.g., individuals have a propensity to repeat reinforced behaviors and are less likely to repeat behaviors that do not result in reinforcement) towards the instruction of specific behaviors.

Outcomes are analyzed to determine the functional relationship between the intervention and changes in behavior (Baer, Wolf, & Risley, 1968). The impact that behavior analytic instruction can have on a child with autism is profound, in some instances resulting in children being indistinguishable from their typically developing peers (Lovaas, 1987; Sheingkopf & Seigel, 1998). For others, the systematic implementation of these evidence based strategies has resulted in substantially improved outcomes. A common application of behaviorally based strategies involves addressing challenging behaviors exhibited by children with autism (i.e., self-injurious, ritualistic, repetitive, aggressive, and disruptive behavior). Behavior analytic instruction has also been used to establish self-care skills (e.g., Lerman, Vorndran, Addison, & Kuhn, 2004a), speech and language (e.g., Bouxsein, Tiger, & Fisher, 2008), academic (Dunlap, Kern, & Worcester, 2001), social (e.g., Petursdottir, McComas, McMaster, & Horner, 2007), as well as vocational skills (e.g., Lattimore, Parsons, & Reid, 2006) in individuals with ASDs. Thus, the use of behavior analytic interventions throughout a child's education can result in drastic improvements across a variety of skill areas.

In spite of this empirical support, The National Research Council (2001) reported most teachers graduate from institutions of higher learning receiving limited training at best in evidenced based research practices for children with autism. Similarly, Loiacono and Allen (2008) found that only 20% of the randomly selected institutions of higher education in New York State indicated they offer a course in ABA to their prospective special education teachers at the undergraduate or graduate level. At a more fundamental level, Jacobson, Foxx, and Mulick (2005) noted, most educators lack the basic skills needed to understand scientific research reports and to incorporate their respective findings into program and service innovations. Others in the

field of developmental disabilities have documented a similar state of affairs (Heward, 2003; Kaufman, 1996; Moody, Vaughn, Hughes, & Fischer, 2000).

In the authors' region (Long Island, New York), the lack of preparedness on the part of educators has been repeatedly mentioned in local newspaper articles. For example, a reporter stated "School systems lack a sufficient number of appropriately trained teachers..." to teach children diagnosed with autism (Ricks, 2008, p. A15) and acknowledged that, as we begin the twenty-first century, autism "...is rapidly becoming a major public policy issue..." (Ricks, 2008, p. A15). In a recent study conducted in the Southeastern region of the state of New York, Loiacono and Allen (2008) found more than 88% of the employed special education teachers (in the 16 districts that responded to the survey) had received no training in methodologies grounded in ABA from their respective institutions of higher learning. However, there is an increased need for special educators well trained in ABA to accommodate the greater number of students with autism who will be spending a significant portion of their day in public schools (Lerman, Vorndran, Addison, & Kuhn, 2004b).

There have been recent attempts to address this problem. In 2002, Congress appropriated \$5,000,000 for fiscal years 2003 through 2007, via competitive grants, to assist State Educational Agencies in improving the learning outcomes for children with ASD (TEACH Act of 2002); and in 2007 amended the Internal Revenue Code through 2012 by offering tax credits for education and training expenditures pertaining to ASD in an attempt to increase the number of "highly qualified" teachers in this area (TEACH Act of 2007). However, to date, there is no research determining the impact of these Acts and their respective appropriations.

In another attempt to address this critical concern, states have begun to require special education teachers and school administrators to take coursework in the field of autism in order to be eligible for their respective certifications (e.g., New York State Education Department, 2006). However, in very few of these states' guidelines are ABA or evidence based practices specifically mentioned. The same issue stands with the No Child Left Behind Act which encourages all states to increase the number of highly qualified teachers and administrators to improve instructional outcomes of students with and without disabilities. Again, although evidence based practices are clearly noted, ABA is not specifically cited. Yet, as illustrated by the preponderance of literature, educators proficient in the utilization of behavior analytic strategies can enhance their students' skill acquisition and vastly improve outcomes (Alberto & Troutman, 2009; Eikeseth, Smith, Jahr, & Eldevik, 2002; Koegel, Russo, & Rincover, 1977; Lerman, Vorndran, Addison, & Kuhn, 2004b; Rosenwasser & Axelrod, 2002).

A tremendous problem exists, in that within far too many communities, parents are requesting evidence based practices, yet are unable to access such services within their public schools due to lack of teacher preparedness. In some instances, school administrators struggle with finding well trained personnel. In other instances, the school district has decided not to implement strategies requested by the family. Families in pursuit of evidence based strategies often experience a tremendous drain with respect to time, effort, emotion, as well as finances (Maurice, Mannion, Letso, & Perry, 2001). Unfortunately, an adversarial relationship between families and school systems results, often leading to litigation, in which in the majority of cases, families prevail (Yell & Drasgow, 2000).

Clearly, teacher preparation programs must change to address this need. Given the research conducted over the past several decades supporting the efficacy of behaviorally based

interventions, we propose several strategies that should be addressed within special education teacher preparation programs. At a basic level, prospective special educators would benefit from coursework on the fundamental principles of ABA, as the strategies presented are grounded in behavior analytic principles. The purpose of this paper is not to present specific principles, but to identify strategies that apply these principles and are particularly relevant for learners with ASDs. We do not contend this list is exhaustive, but it highlights evidence based strategies that can be addressed within special education teacher preparation programs.

Suggested Curriculum

To begin, we identify instructional contexts (e.g., discrete trial teaching, instruction embedded within an activity, and naturalistic instruction) that enable teachers to tailor educational opportunities to an individual learner's strengths and weaknesses. This is followed by an overview regarding best practice interventions to address challenging behavior as well as a description of specific strategies to address social and communication skills, three areas of significant concern for students with ASDs. Finally, packaged applications of behaviorally based strategies will be described, including (a) Intensive Early Behavioral Intervention, (b) Treatment & Education of Autistic and Related Communication-handicapped Children (TEACCH), and (c) Pivotal Response Treatment (PRT).

Tailoring instruction to meet the unique needs of each student with ASD

To effectively utilize instructional technologies to meet the varied needs of each of their students with ASDs, educators should be able to systematically deliver teaching opportunities that yield the most effective outcomes. Prospective special educators should be proficient at selecting salient cues to which students should respond, have basic knowledge in prompting procedures (including types of prompts, prompting hierarchies, and strategies for fading

prompts), as well as in reinforcement procedures (including types of reinforcement, selecting reinforcers, and implementing reinforcement schedules). These components are at the core of every instructional opportunity, thus a fundamental course on ABA would provide educators with the skills they need to design effective instructional opportunities.

With knowledge of the components of instructional opportunities, prospective special educators should become proficient at delivering opportunities in a variety of ways so they can choose from several “instructional contexts” with which to meet the needs of each of their students (Jones & Feeley, in prep). For example, instructional opportunities may vary in terms of the environment in which teaching occurs (ranging from a natural and possibly distracting environment to a distraction free environment), the extent to which the interventionist directs teaching opportunities versus the extent to which the student directs teaching opportunities, the density with which teaching opportunities are delivered (ranging relatively few to many within a specific time period), as well as the extent to which naturally occurring reinforcers are delivered following appropriate responding. There are many different combinations of these elements that have been empirically validated (Jones & Feeley, in prep); however, we have chosen three representative anchor points to describe in this paper.

Discrete trial instruction. Discrete Trial Instruction (DTI) (also referred to as massed discrete trials or discrete trial training/teaching) has been successfully utilized to teach children with autism basic skills including cognitive, communication, socialization, leisure and recreation, and daily living (see Cooper, Heron, & Heward, 2007). Implementation begins with a task analysis in which skills are broken into the smallest developmental and sequential steps. Instructional opportunities are delivered in close temporal proximity (i.e., several occur in a relatively brief period of time) and typically within a distraction free environment. Prompts

(stimulus prompts [e.g., placement cues, photos, etc.] as well as response prompts [e.g., verbal, physical, and/or gestural]) are implemented to ensure the student engages in the specific behavior that then results in the consistent application of reinforcement procedures.

There are many benefits of DTI including large numbers of opportunities implemented within a short period of time and the ease with which individualized prompting and reinforcement systems can be implemented. These instructional characteristics can lead to rapid skill acquisition, making DTI an effective and efficient context.

A common criticism of DTI is the failure to address the “generalization” of skills taught in this manner (Steege, Mace, Perry, & Longenecker, 2007). However, instruction can also take place in environments outside of the school (Brown et al., 1983), referred to as “community-based instruction.” Thus, in addition to be proficient in DTI, prospective special educators should be prepared to implement instruction in multiple environments in order to enhance the generalized performance of their students with ASDs.

Instruction embedded within an activity. Instruction embedded within an activity is characterized by instructional opportunities presented within a specific, age appropriate, motivating activity, often within the student’s natural environment. For example, a student with autism and a small group of peers are engaged in a game requiring matching of pictures with corresponding written words, with the set of words carefully chosen to reflect the reading level of the student with autism. While playing the game, instructional opportunities are presented to the student that specifically addresses his/her needs across a variety of skill areas (i.e., academic, communication, social, fine/gross motor skills). For example, while playing the matching game, when it is the student’s turn, a natural opportunity for him/her to be prompted to say “It’s my turn” arises. There are several evidence based approaches that fall within this context, including

activity-based intervention (ABI) (e.g., Bricker, Pretti-Frontczak, & McComas, 1998), *joint action routines* (e.g., Snyder-McLean, Solomonson, McLean, & Sack, 1984), and *embedded instruction* (e.g., Johnson, McDonnell, Holzwarth, & Hunter, 2004; McDonnell, Johnson, Polychronis, & Risen, 2002).

To effectively utilize instruction embedded within an activity, prospective special educators need to become proficient at selecting and orchestrating activities so that multiple teaching opportunities are generated (each of which involves the implementation of prompting and consequence procedures). When special educators utilize instruction embedded within an activity it not only allows for an increase in the number of instructional opportunities within potentially motivating activities, but provides a structure in which typical peers can participate and one that is likely to enhance generalized responding.

Naturalistic instruction. Naturalistic instruction allows interventionists to capitalize on opportunities that arise within a student's environment over the course of the day. For example, a teaching opportunity begins when a topic of conversation is raised which is of obvious importance to the student, providing a natural opportunity to interact and address communication and social development. Other opportunities to utilize naturalistic instruction occur when the student initiates by expressing his/her desire to obtain something from another person (i.e., a peer, teacher, or parent) or to avoid something (e.g., a non-preferred task). The interventionist can set up the environment to encourage the student to initiate communication and use those initiations as opportunities to teach more sophisticated skills. For example, the interventionist may put preferred items (e.g., toys, computer games) in sight but out of reach and, when the student attempts to gain access to one of the items (e.g., by pointing), the interventionist prompts a more sophisticated communicative utterance (e.g., a verbal request for the preferred item) (Hart

& Risley, 1975). There are several intervention strategies that rely on naturalistic instructional procedures including, incidental teaching (Hart & Risley, 1975), milieu language instruction (Warren, McQuarter, & Rogers-Warren, 1984); enhanced milieu teaching (Hancock & Kaiser, 2002), and SCERTS (Prizant, Wetherby, Rubin, & Laurent, 2003).

In using a naturalistic instructional context, the number of instructional opportunities is dictated by naturally occurring events, sometimes resulting in relatively few opportunities (e.g., a student being taught the social nicety “excuse me” may have few naturally occurring opportunities within a day). However, naturalistic instruction can enhance generalized responding and is particularly effective in addressing skills that do not readily lend themselves to other instructional contexts (e.g., social communicative behavior with partners in the community). Because naturalistic instruction is characterized by recognizing learner initiated teaching opportunities, prospective educators need to be proficient in planning for these opportunities (by seeding the environment with interesting stimuli) as well as implementing systematic prompting procedures so that more sophisticated skills can be established.

Strategies to Address Challenging Behavior

Functional behavior assessments and positive behavior support plans. Many students with autism engage in challenging behavior, due in part to significant communication impairments, an inability to tolerate change, and, in some cases, a limited repertoire of reinforcers (i.e., because many children with autism are not reinforced by social interactions, educators often find it difficult to reinforce more appropriate behaviors). A necessary component of all special education teacher preparation programs is curriculum that prepares teachers to conduct *functional behavior assessments* (O’Neill, Horner, Albin, Storey, & Sprague, 1997) and develop and implement *positive behavior support plans* (Carr et al., 1999; O’Neill et al., 1997).

The purpose of a functional behavior assessment is to identify the times of day when and environments in which challenging behaviors are *most* and *least* likely to occur, as well as the consequences that are maintaining the challenging behavior so that the function(s) the challenging behavior(s) serves for the student can be determined (i.e., the reason why the behaviors occur). The functional behavior assessment process consists of three components (O'Neill et al.): the interview, direct observations, and environmental manipulations/functional analysis (i.e., the systematic manipulation of environmental variables to determine the function of a behavior) (Iwata, Dorsey, Slifer, Bauman, & Richman, 1982).

Once prospective special educators have a firm understanding of the functional assessment process, they should be prepared to develop a four component intervention plan (O'Neill, et al.) that addresses setting events (i.e., events that occur prior to or are not directly related to immediate antecedents associated with the challenging behavior that affect the likelihood of its occurrence) (Wahler & Fox, 1981), antecedent strategies (e.g., the provision of choice [e.g., Dunlap et al., 1994], high probability request sequences [e.g., Davis, Brady, Williams, & Hamilton, 1992], preferred stimuli as a distractor [e.g., Davis, Reichle, & Southard, 2000]), and skill replacement strategies (communicative replacements to challenging behavior [e.g., Carr & Durand, 1985; Reichle & Wacker, 1993] and social skill instruction [e.g., Koegel & Frea, 1993]). The intervention plan should also address appropriate consequence procedures (including those that increase the future likelihood of appropriate responding [e.g., differential use of reinforcement]) as well as those that will prevent future problem behaviors from arising (i.e., systematically refraining from reinforcing challenging behaviors) (e.g., Rehfeldt & Chambers, 2003; Shabani & Fisher, 2006).

Curriculum addressing functional behavior assessments and positive behavior support plans can easily be incorporated into an existing class on behavior management, or a methods class addressing the needs of students with emotional disorders or severe disabilities. Proficiency in these two areas will prepare special educators with preventative strategies to address challenging behavior as soon as the student with autism enters their classroom. Preparing prospective special educators to conduct functional behavior assessment and develop positive behavior support plans can prevent the wasting of a tremendous amount of time attending to challenging behaviors, allowing for more time to be dedicated to meeting the communicative, social, and academic needs of the students with ASDs.

Strategies to Enhance Communication Skills in Students with Autism

The communicative skills of individuals with autism vary greatly, with some students having sophisticated verbal repertoires while others fail to acquire any functional speech. Fortunately, there exists a compendium of evidence based intervention strategies to address the varied needs of students with autism reflecting instruction across a range of communicative modes (verbal, graphic, gestural/sign). These interventions have been implemented within each of the three instructional contexts and have been demonstrated to effectively address a range of communication skills. For example, discrete trial instruction has been used extensively to meet the communication needs of students with autism (e.g., Buffington, Krantz, McClannahan, & Poulson, 1998; Jones, Feeley, & Takacs, 2007). Instruction embedded within an activity (e.g., Johnston, Nelson, Evans, & Palazolo, 2003) and naturalistic instruction (e.g., Hunt, Alwell, & Goetz, 1988) have also been used to address the communication needs of students with ASDs.

Because there are several “methodologies” from which educators can choose, it is essential to provide prospective special educators with information so they are able to make

thoughtful choices in addition to helping families sort through the vast amount of information as they choose strategies for their children. To follow is an overview of behaviorally based methodologies that address the communicative needs of students with autism.

Lovaas model of applied behavior analysis. Lovaas's model of ABA is an intensive behaviorally based intervention for children with autism that dedicates a significant amount of instructional time to the acquisition of speech and language skills (Lovaas, 1987). Early programming focuses on the use of discrete trial instruction to teach students to imitate motor behaviors, follow simple instructions, and then verbal imitation skills are addressed (Lovaas et al., 1981). In general, receptive language skills are taught first, followed by expressive use of language. The Lovaas approach has a substantial empirical base demonstrating its effectiveness (e.g., Eikeseth, Smith, Jahr, & Eldevik, 2002; Howard, Sparkman, Cohen, Green, & Stanislaw, 2005).

Verbal behavior intervention. In 1957, Skinner proposed language (verbal behavior) is a learned behavior that is acquired, extended, and maintained by the same types of environmental variables and principles that control other forms of behavior. Thus, verbal behavior is behavior that is reinforced through the mediation of another person's behavior (Sundberg & Michael, 2001) (e.g., the child's statement "Hi mommy" results in reinforcement when his mother comes and gives him a hug). Skinner described six verbal operants: mand (a request for a reinforcer), tact (naming objects/events), echoic (the imitation of a verbal behavior), intraverbal (engaging in conversation e.g., answering a question), textual (decoding written words), and transcription (writing and spelling of words).

For decades, speech/language interventions designed to meet the needs of individuals with developmental disabilities have drawn upon the concepts introduced by Skinner (1957).

More recently, researchers have specifically utilized Skinner's analysis of verbal behavior to develop assessment (Partington & Sundberg, 1998) and intervention protocols for individuals with autism (Sundberg & Michael, 2001). Instruction begins with the expressive use of "mands" in which students are taught the expressive use of "words" results in reinforcement. A combination of DTI and natural instruction (termed Natural Environment Training [NET]) (Sundberg & Partington, 1999) is used. NET involves language training conducted in the presence of stimuli that would naturally occasion the communicative response.

It is important to note that while there are empirical demonstrations of the verbal behavior approach, there is not empirical evidence to support its long-term efficacy (Carr & Firth, 2005).

Augmentative and alternative communication. For students who have significant challenges communicating verbally, augmentative communication systems can be used to enhance communication skills. There are several demonstrations of effective interventions to teach sign language to individuals with autism (e.g., Barrera & Sulzer-Azaroff, 1983), as well as graphic communication applications (actual objects, photos, or line drawings) representing "no tech" (i.e., communication books or boards), "low tech" (i.e., switch activated tape recorders), as well as "high tech" applications (i.e., electronic communication aids) (see Mirenda, 2003).

One application of augmentative communication is *The Picture Exchange Communication System (PECS)* developed by Bondy and Frost (1998) which combines behavior analytic principles (i.e., shaping, differential reinforcement, and transfer of stimulus control) with the use of graphic symbols to teach students diagnosed with ASDs a functional communication system (Charlop-Christy, Carpenter, Le, LeBlanc, & Kellet, 2002). Its implementation allows for the instruction of children with social-communication deficits to initiate requests, respond to questions, and make social comments (e.g., "I see [object]") (Charlop-Christy et al, 2002). As

with other forms of augmentative communication, children utilizing PECS may ultimately benefit in the areas of spontaneous communication, enhanced vocabularies, and increased speech development (Tincani, Crozier, & Alazetta, 2006).

Prospective special educators should be prepared to carefully consider each mode of communication (verbal, gestural, and graphic) for each of their students with ASDs and have an understanding that the use of one does not preclude the use of another (i.e., a student who has some verbal skills may sign in some situations [e.g., to request a break] and use line drawings or photographs in other situations [e.g., to select a favorite leisure activity not in his verbal repertoire]). Prospective special educators should gain experience working with students who use augmentative systems within a variety of instructional contexts, providing them with the experience they need to address the communicative needs of students with ASDs within a classroom setting.

Strategies to Address Social Skills

Individuals diagnosed with autism experience pervasive challenges during social situations that present difficulties across the life span (Kuoeh & Mirenda, 2003). A limited skill repertoire, in conjunction with the inability to interpret social cues, negatively impacts the social development of students with ASDs and further results in limited social opportunities (Church, Alisanski, & Amanullah, 2000). As educators, it is important to understand this limited repertoire of social communicative behavior interferes with all aspects of the individual's life, including academic progress, friendship development (Thiemann & Goldstein, 2001), as well as the development of adaptive and vocational skills. However, there are compendiums of intervention strategies that can be implemented with students with autism. Many of these strategies are designed to be implemented alongside typically developing peers. Therefore, prospective

teachers should learn not only how to implement the strategies, but how to do so while including typical students.

Peer based strategies. Three types of peer based interventions emerge in the recent literature. *Peer interventionists* involving the peers of students with autism engaged in specific instructional activities with the student with autism. These activities might take place within scheduled tutoring sessions to address academic goals (Kamps, Barbetta, Leonard, & Delquadri, 1994; Kamps, Dugan, Potucek, & Collins, 1999) or within ongoing activities (McGee, Almeida, Sulzer-Azaroff, & Feldman, 1992). *Peer models* which entails instructing students with autism (through the use of reinforcement procedures) to imitate behaviors emitted by their typical peers (Egel, Richman, & Keogel, 1981; Garfinkle & Schwartz, 2002). There are also several demonstrations of the effectiveness of *peer mentoring* interventions which consist of orchestrating relationships among individuals with autism and their typically developing peers (Garrison-Harrell, Kamps, & Kravits, 1997; Haring & Breen, 1992). Peer interventionists and peer modeling strategies incorporate a level of “instruction” with relationships sometimes occurring as a result of their implementation. Peer mentoring is less prescriptive than the other strategies and concentrates on the establishment of relationships.

Peer based social skills interventions are particularly important as more children with autism are accessing general education environments (Kaufman, 2002). Thus, educators should be prepared to use evidence based strategies that incorporate the individuals (i.e., peers) who should be interactive partners. It seems this should be an obvious strategy and is certainly one that is effective (Bellini, Peters, Benner, & Hopf, 2007).

Video modeling. Video modeling entails the use of video recordings to provide a visual model of target behaviors. In some cases, the model is the learner him/her self, pre-recorded

engaging in the target social behaviors (Buggey, Toombs, Gardener, & Cervetti, 1999; Thiemann & Goldstein, 2001). In other instances, the video is of a similar age peer or an adult (Dauphin, Kinney, & Stromer, 2004; Gena, Couloura, & Kymissis, 2005). Video modeling has been used to teach a variety of skills including social, self help, and play skills (see McCoy & Hermansen, 2007 for a review). With students with ASD tending to rely on visual stimuli for skill acquisition, educators should capitalize on its effectiveness with their students with ASDs.

Social stories. Social stories designed by Gray (1991), provide individuals with autism information (i.e., about social situations and people's expectations) to help them to understand social situations and then to engage in appropriate behaviors (Kuoch & Mirenda, 2003). Using a brief narrative that describes a specific social situation, relevant social cues and corresponding responses are presented to the student in written and or pictorial form and then rehearsed by the student prior to entering the particular situation described in the social story. There is a growing literature demonstrating the effectiveness of social stories within a variety of social contexts with students across a wide age range (Delano & Snell, 2006; Kuoch & Mirenda, 2003; Lorimer, Simpson, Smith Myles, & Ganz, 2002; Sansosti & Powell-Smith, 2006). Importantly for educators, Quilty (2007) demonstrated that social stories can be written and implemented by paraprofessionals resulting in positive behavior changes for students with ASD. Interestingly, as Sansosti (2008) notes, the preponderance of the studies demonstrating the effectiveness of social stories incorporated behaviorally based interventions, such as prompting, the delivery of reinforcement, and modeling. Thus, prospective special educators should be well versed in ABA to successfully implement social stories.

Strategies to Address Academic Instruction

With much attention directed toward the instruction of functional skills for students with ASDs, strategies for the instruction of academic skills have been considered less crucial (Dunlap, Kern, & Worchester, 2001). However, because of the diverse abilities of individuals with ASD as well as the successful implementation of interventions to address challenging behaviors enabling more children with ASD to access less restrictive environments, prospective special educators should be prepared to address a range of academic needs. Dunlap, Kern, and Worcester (2001) describe two areas of research and practice in which behavior analytic methodologies can greatly impact performance in academic skills. The first is the use of antecedent interventions based on an assessment of environmental factors that lead to enhanced performance. These include modifying the task difficulty, size and/or duration, as well as the inclusion of curriculum activities that are of interest to the student with ASD.

The second area is that of curriculum-based assessment (CBA) (Deno, 1987). Curriculum-based assessment involves the systematic implementation of interventions with careful measurement of student performance, two core characteristics of ABA methodology. This evidence based approach to instruction can be easily applied to meet the needs of students with ASD allowing for frequent assessment of the effectiveness of instruction and problem solving that will lead to better outcomes.

Packaged Interventions

There are several “packaged” interventions that have, as their foundation, behavior analytic methodologies. It is important for prospective special educators to have basic knowledge regarding these instructional packages. This is particularly important for professionals who work with young children transitioning to school aged programs, as it is likely their families (as well as other team members) will request similar programming as they enter elementary school.

Early intensive behavioral intervention (EIBI). Early Intensive Behavioral Intervention consists of the intensive (approximately 5 hours per day) behaviorally based interventions beginning at the point of diagnosis for the young child with autism (Lovaas, 1996). EIBI can be implemented within center based programs or within home programs, in both cases, there is a strong family component. There are several demonstrations of its effectiveness; including the seminal work of Lovaas (1987) in which a substantial number of the children diagnosed with autism receiving EIBI were indistinguishable from their typical peers.

The treatment and education of autistic and related communication-handicapped children (TEACCH). The TEACCH is a program of services, that incorporates many methodologies to address the needs of students with ASDs (Mesibov, Shea, & Schopler, 2005). Although there are empirical demonstrations of the effectiveness of the TEACCH model (Probst & Leppert, 2008), as well as studies demonstrating the effectiveness of its components (e.g., Hume & Odom, 2007), studies examining its effectiveness in comparison to other evidence based strategies are warranted.

Pivotal response treatment (PRT). Pivotal Response Treatment is a comprehensive, naturalistic, and child-directed treatment for children with autism that is based on the principles of ABA (Koegel & Koegel, 2006). Koegel and Koegel (2006) hypothesize that autism may be a much milder disorder than suspected, with many severe aspects of the disorder being side effects of abnormal development. They propose that if addressed early, significant gains may be possible. Pivotal response treatments focus on five core (i.e., pivotal) areas of the disorder including: motivation, responsivity to multiple cues, self-management, self-initiations, and empathy. There are several demonstrations of the effectiveness of this approach (e.g., Koegel, Carter, & Koegel, 2003; Koegel & Frea, 1993).

Additional Recommendations for Teacher Preparation Programs

The No Child Left Behind Act requires the implementation of evidence based instructional practices within educational settings. Given the dramatic increase in numbers of children with autism receiving their education in the public schools, it is inevitable that school districts are searching for teachers who have expertise in evidence based practices to comply with the *spirit* of the law (Lerman et al, 2004). Thus, in addition to including within their curriculum the instructional strategies described in this paper, teacher preparation programs should consider the following additional recommendations.

Field work experience. Ideally, these courses would require field work experience to enable students to practice the strategies addressed within their courses. Few placements provide special education students an opportunity to observe best practice interventions implemented within integrated educational settings. At present, our students are often forced to compromise, observing best practice interventions in a segregated setting or seeing less than adequate services provided in a local school. As teacher preparation programs are revamped, it will be important to establish ties with quality programs and to provide adequate supervision of field work experiences to assist students in discriminating what is truly best practice and what warrants improvement.

Access to course work in ASD by general education majors. As more children with ASDs are entering general education classrooms, we suggest that institutions of higher education ensure opportunities for general education majors to take course work to prepare them for the students with autism within their classrooms. This might take the form of a summer institute on autism offering a sampling of the interventions addressed throughout the program. Alternatively, or in addition, general education majors can be required to take a methods course in special

education that would include a subset of the strategies addressed within this paper. It is the authors' experience that the required course work in special education for general education majors concentrates more on talking about different disabilities rather than explicit strategies regarding how to educate students with disabilities.

Development of in-service courses. The development of an in-service training program should be considered as it would enable veteran educators to be kept abreast of best practice interventions, easing the transition of new teachers to positions within the school system. Courses for either college credit and/or continuing education credit offered within the schools allows for convenient access on the part of the educators. Prospective educators can then participate in these courses as either enrollees, or for advanced graduate students, as presenters of specific course content (Reichle et al., 1996). This can in turn lead to collaborations between prospective students and professional within the field.

Final Thoughts

The curriculum addressed within higher education programs can positively influence the lives of children diagnosed with autism. Thus, teacher preparation programs must offer training that enables prospective special education teachers to (a) understand the complexities of students with autism, (b) become proficient in effective intervention strategies, and (c) receive hands-on experiences within natural settings (school, home, and communities). As higher educators, by providing teachers with proper training, giving them the confidence and tools required to effectively teach, we can drastically improve the outcomes for children with ASDs.

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