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Interventions for Children With Autism Spectrum Disorders in Inclusive School Settings

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Students with ASD present unique challenges to school systems. Despite these challenges, federal laws require that schools implement research-based practices in the least restrictive environment (LRE). The LRE is often deemed to be the general education classroom and the primary intervention agent is often the classroom teacher. Ensuring students with ASD receive effective intervention in these least restrictive and inclusive school settings will depend, in part, on the extent to which teachers and school personnel are prepared to implement research-based interventions. The purpose of this article is to provide a summary of research-based interventions for students with ASD. Our focus in this summary is on interventions that can be implemented in inclusive school settings by teachers and classroom support personnel. We first provide a general overview of interventions designed to reduce challenging behavior, teach communication skills, and improve social relationships. This is followed by a discussion of the obstacles to intervention implementation that may be present in school settings. Finally, we conclude by offering a list of intervention guidelines.

Public schools should provide an ideal mechanism for delivering interventions for autism, as children are in school for many hours a day and for the majority of their developing years. This provides opportunity to deliver an intensive, comprehensive intervention focusing on improving communication and socialization, and expanding the autistic child's interests. Further, if the educational program is coordinated with parent education, a substantial portion of the child's day can be covered with intervention in the natural environment. Such intensive and coordinated programs correspond with recommendations made by the National Research Council (2001) for comprehensive intervention for autism. Yet, delivering these services through the school system is challenging. Research findings related to addressing these challenges are described in detail in this article.

The number of public school children in the United States diagnosed with an autism spectrum disorder (ASD) has increased and may now be as high as 1 case per 110 students (Center for Disease Control, 2010). Students with ASD often fail to develop meaningful social relationships with teachers and classmates, may struggle to communicate (in some instances totally lacking spoken language), and are likely to engage in challenging behavior, ranging from tantrums to self-injury, aggression, and property destruction (*DSM-IV-TR*; American Psychiatric Association, 2000; National Research Council, 2001; Sigafoos, Arthur, & O'Reilly, 2003).

Despite these challenges, the Individuals with Disabilities Education Act (IDEA; 2004) and the No Child Left Behind Act of 2001 (P.L. 107-110, Section 1001) require that schools implement research-based practices in the least restrictive environment (LRE). The LRE is often deemed to be the general education classroom and the primary intervention agent is often the classroom teacher (Fisher & Meyer, 2002). Ensuring that students with ASD receive effective intervention in the LRE will depend, in part, on the extent to which teachers and school personnel are prepared to implement research-based interventions (Boardman, Arguelles, Vaughn, Hughes, & Klingner, 2005; Ochs, Kremer-Sadlik, Solomon, & Sirota, 2001).

The challenges presented by these students and the legal requirements to implement research-based practices in the LRE support the need for summaries of research-based interventions suitable for inclusive school settings. Additionally, teacher training programs need to be designed that provide classroom teachers with the required skills and expertise. For example, because symptom severity varies immensely across the autism population, it is critical that teachers understand the importance of carefully defining and measuring behaviors and developing intervention plans based on the symptom presentation of individual students.

Thus, the purpose of this article is to provide a summary of research-based interventions for students with ASD in a variety of areas. The focus in this summary is on

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interventions that can be implemented in inclusive school settings by teachers and classroom support personnel. We first provide a general overview of interventions designed to reduce challenging behavior, teach communication skills, and improve social relationships. This is followed by a discussion of the obstacles to intervention implementation that may be present in school settings. Finally, we conclude by offering a list of intervention guidelines.

Challenging Behavior

Challenging behaviors may impede academic instruction, limit opportunities for social interaction, and cause physical injury (Sigafoos et al., 2003). Children with ASD engage in more severe and frequent challenging behavior than typically developing children (Matson, Wilkins, & Macken, 2009), and without appropriate intervention, these behaviors tend to persist across an individual's lifespan (Murphy et al., 2005). A large body of intervention research targeting challenging behavior has focused on understanding the environmental conditions most commonly associated with challenging behavior. Then, interventions are designed to alter the environment in order to support and encourage appropriate behavior (Conroy, Dunlap, Clarke, & Alter, 2005; Horner, Carr, Strain, Todd, & Reed, 2002; Machalicek, O'Reilly, Beretvas, Sigafoos, & Lancioni, 2007). This approach has two main components, a Functional Behavioral Assessment (FBA) followed by a function-based intervention.

Functional Behavioral Assessment of Challenging Behavior

The FBA is a problem-solving process used in the treatment of challenging behavior. This assessment goes beyond merely describing the appearance, form, or topography of behavior and is designed to identify the contextual and social variables that occasion and maintain an individual's challenging behavior. This broader perspective offers a better understanding of the function or purpose behind student behavior by focusing on determining "why" a student misbehaves instead of simply "how" a student misbehaves. Behavioral intervention plans based on FBA results have been shown to outperform behavioral interventions created without input from this process. Therefore, teachers need to know that input from FBA procedures should be integrated throughout developing, reviewing, and revising behavioral intervention plans (for reviews, see Hanley, Iwata, & McCord, 2003; Matson & Minshawi, 2007; Matson & Nebal-Schwalm, 2007).

FBAs are conducted by combining observations of the student in the setting in which challenging behavior occurs (natural environment) with input from stakeholders who interact with the student frequently. Teachers can collect preliminary FBA data by making a note of environmental changes that precede challenging behavior (often called "antecedents") as well as the contingent consequences following the behavior. For example, following the occurrence of aggression, the teacher should note what happened in the classroom right before the student was aggressive (e.g., worksheets were passed out) and what happened immediately following the aggression (e.g., student sent to time-out). In this way potential behavior-outcome contingencies can be hypothesized. In this case, because passing out worksheets was the antecedent and being sent to time-out resulted in a temporary break from academic work, the hypothesis might be that the student is engaging in aggression in order to avoid work. We would say then that "the function of aggression is escaping task demands" or that "aggression is maintained by work avoidance." Once the antecedents and consequences for challenging behavior have been identified and a function is hypothesized, an intervention designed to alter behavior-outcome contingencies and/or relevant antecedent events can be implemented. An example FBA form is included in Appendix A (both a completed form and an uncompleted form). As can be noted, behaviors can be analyzed according to time, place, antecedent (before), and consequence (after). The teacher can then assess for patterns within the data and develop a data-based intervention plan. Common functions of problem behavior involve avoidance or escape from tasks, access to desired items, and obtaining attention (cf. Iwata et al., 1994). It should also be noted that, while some children exhibit challenging behavior for attention-seeking purposes, this is less common in children with autism. For this reason, it is important that teachers understand that using time-out, exclusion from the classroom, sending a child to the principal's office, and other isolating strategies may actually function as a reward for challenging behavior.

Function-Based Challenging Behavior Interventions

Machalicek et al. (2007) reviewed challenging behavior interventions that have been evaluated in school settings and identified a number of potentially successful function-based interventions including differential reinforcement, modified instructional schedules or demands, and teaching communication to replace challenging behavior. Differential reinforcement involves simply reinforcing (rewarding) desirable behaviors (e.g., sitting at desk working) and withholding reinforcement following the challenging behaviors (Cooper, Heron, & Heward, 2007). Differential reinforcement may be most effective when the behavior selected for reinforcement is incompatible with the challenging behavior. For example, by reinforcing a student for staying seated, elopement (i.e., running away from the classroom) can be decreased because elopement and remaining in one's seat cannot

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co-occur. In this way, challenging behavior may be decreased without the use of punishment.

Modified assignments or instruction may reduce challenging behavior when the function is to escape from task demands (as in the above worksheet example). Escape maintained behavior most likely occurs because the student finds a task demand aversive or not sufficiently reinforcing. For example, the student may consider the worksheet to be boring or may lack a prerequisite skill. Modifications such as shortening the task, simplifying the demands, clarifying the instructions, or providing additional instruction in prerequisite skills may reduce challenging behavior in these circumstances. To be specific, these strategies may reduce a student's a motivation to escape (Janney & Snell, 2000).

For students with challenging behavior and severe communication impairment, perhaps the most common and successful intervention involves teaching communication to replace challenging behavior. This intervention is called Functional Communication Training (FCT; Carr & Durand, 1985). FCT has four steps: (a) determine the communicative intent (i.e., function) of the behavior via FBA; (b) teach an appropriate behavior to replace the challenging behavior; (c) reward the replacement behavior with the reinforcing consequence identified during functional assessment; and (d) withhold reinforcement following challenging behavior (i.e., extinction; for reviews and specific FCT instructions see Durand & Merges, 2001; Mirenda, 1997). Based on the information collected during the FBA, the teacher can develop a specific intervention plan to replace the problem behavior with an appropriate behavior that serves the same function. For example, if a child engages in disruptive behavior because the academic assignment is too difficult, the child can be taught to ask for help. It is important to remember when teaching a functionally equivalent replacement behavior that it needs to be practiced frequently until the child is able to use it efficiently and readily without engaging in the problem behaviors.

Another potentially effective procedure for improving behavior in inclusive school settings is self-management (Dunlap, Koegel, & Koegel, 1991). Self-management has effectively been used in inclusion settings to improve behavior and the completion of school work (Koegel, Koegel, & Parks, 1992). Self-management is a procedure that requires some initial preparation. The preparation may include (a) teaching the child with ASD to discriminate between the desirable and undesirable behaviors, (b) establishing a reinforcement system, and (c) gradually and systematically increasing time or response increments (for detailed instructions see Koegel et al., 1992). Once these initial steps are completed, self-management interventions can be incorporated into inclusive settings. It is important to remember that the end goal of self-management is to improve the child's independence and to decrease the amount of time school personnel need to spend with the child. For example, in an early inclusion article Koegel and Koegel (1990) showed that self-management could be used to reduce disruptive repetitive verbalizations in full-inclusion settings and that the self-management can be taught to occur in the absence of an interventionist. To do this, the teacher may need to start with very short time intervals so the child experiences success, then gradually and systematically increase these intervals. Rewards are provided for accurate self-management and for appropriate behavior. It should be noted that self-management, while effectively reducing challenging behaviors, may not directly target a functional relation between behavior and maintaining consequence. Therefore, combining self-management with the FBA results is recommended for producing a more immediate and permanent reduction in challenging behaviors. Again, most challenging behaviors have a communicative function; thus, the need for ongoing intervention in the area of communication is warranted with this population. Issues related to communication will be discussed in the following section.

Communication

Communication is intertwined with many other aspects of education and development, including socialization, behavior, and academics. Many different school personnel work with various aspects of communication, including speech language specialists, school psychologists, and teachers. Deficits in communication in students with ASD vary in severity ranging from monotone speech, limited to a specific preferred topic, to a total absence of verbal communication (National Research Council, 2001). Weitz, Dexter, and Moore (1997) reported that as many as 61% of children with autism initially present with little to no functional speech, which may present particular challenges for school staff, because communication impairment has been linked to an increased risk of challenging behavior and reduced opportunities for school involvement (Sigafoos, Arthur-Kelly, & Butterfield, 2006).

Given that communication deficits are prevalent, persistent, and a core feature of ASD, it is not surprising that a considerable amount of intervention research has focused on developing successful procedures for improving communication in children with ASD (Goldstein, 2002; Schlosser & Wendt, 2008). These interventions not only result in improvements in verbalization, mean length of utterance, and spontaneity of language use, but may also result in decreases in challenging behavior, increases in positive affect, and higher levels of joint attention (e.g., Carr & Durand, 1985; Charlop-Christy & Trasowech, 1991; Harding, Wacker, Berg, Barretto, & Ringdahl, 2005; Koegel, O'Dell, & Koegel, 1987). Therefore, it is always

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important to include goals related to communication on students' individualized education plans.

Perhaps the most efficient way to improve communication is simply to provide more opportunities for the child with ASD to communicate. Most students with ASD are provided with very few opportunities to communicate during the school day (Chiang, 2009). On average teachers provide as few as one opportunity for communication per hour throughout the school day (Chiang, 2009). Providing and arranging for more communicative opportunities during the student's day may meaningfully improve communication. When providing communication opportunities, it is important to do so when the child is motivated to communicate. For example, students may be particularly motivated to make a verbal request when they desire an item that can not be obtained without assistance from the teacher (e.g., snack, toy on a high shelf, or access to the computer). So, during snack time, a teacher could divide the student's snack in pieces and require that the student make multiple verbal requests (or verbal approximations) for the snack as opposed to delivering the entire snack without the student requesting. Likewise, the teacher can provide a desired toy or computer access contingent upon the child's verbal request. A second possibility for embedding communication opportunities is to offer the student choices and require the student to respond. For example, "Do you want to use the blue crayon or the green crayon?" Using these methods, opportunities for verbal communication are created and the student's communicative attempts can be reinforced in a natural way.

Interventions for Students With Severe Communication Deficits

If a student requires more intensive communication intervention, two research-based interventions that may be appropriate are Picture Exchange Communication System (PECS; Bondy & Frost, 2003) and Pivotal Response Training (PRT; Koegel & Koegel, 2006). Both PECS and PRT are based upon Applied Behavior Analysis (ABA; Cooper et al., 2007) and emphasize the importance of child motivation in communication. The interventions are designed to increase motivation by following the child's lead, allowing the child to choose between intervention stimuli, arranging the environment to encourage communication, and providing immediate natural reinforcement contingent upon communication behavior (see implementation manuals Bondy & Frost, 2003; Koegel & Koegel, 2006).

PECS involves teaching children to communicate via handing their partner a picture or symbol card which depicts the child's communicative intent (Bondy & Frost, 2003). For example, if a child desires a snack then the child hands a picture of the snack food to the teacher. When instructing a child to use PECS, the teacher physically prompts the child to engage in picture exchange and blocks the child from obtaining the desired reinforcer via another behavior (e.g., reaching for snack directly). Over time, these physical prompts are systematically faded and morecomplex exchanges (i.e., multiple cards forming a sentence) are taught. In addition to increases in picture exchange-based communicative acts, PECS has also been shown to increase spoken communication in children with ASD (e.g., Charlop-Christy, Carpenter, Leblanc, & Kellet, 2002; Ganz & Simpson, 2004; Ganz, Simpson, Corbin-Newsome, 2007; Tincanni, 2004; Tincanni, Crozier, & Alazetta, 2006; Yoder & Stone, 2006).

PRT targets verbal behavior as opposed to picture exchange. For example, if the child desires a snack then the therapist would verbally model the request by saying the name of the snack food (e.g., "crackers") as a prompt for the child. If the child is not able to articulate "crackers" completely, then a verbal approximation is prompted and reinforced (e.g., "cra"). This type of trial provides the opportunity for a child to receive a natural reward for communication, and thus the connection between communication and the effect it can have is created. Over time, prompts are faded until spontaneous verbal communication occurs (Koegel & Koegel, 2006). Like PECS, previous research has demonstrated that PRT may significantly improve verbal communication in students with ASD (e.g., Koegel, Camarata, Valdez-Menchaca, & Koegel, 1998; Koegel, Koegel, Shoshan, & McNerney, 1999; Taylor & Harris, 1995). Communication delays undoubtedly play a role in difficulties with social interaction but, regardless of a child's communication level, social skills also often need to be targeted for instruction.

Socialization

The inability to form and maintain meaningful social relationships is perhaps the most detrimental and ubiquitous characteristic of ASD (Kanner, 1943; Rogers, 2000). Although there exists some individual variability, the most commonly cited social deficits include initiating and sustaining interactions, turn-taking, perseveration on topics or activities, identifying and interpreting emotions, and perspective-taking (Koegel, Koegel, Fredeen, & Gengoux, 2008; Rao, Beidel, & Murray; 2008; Williams, Keonig, & Scahill, 2007).

Recent literature reviews identify a number of research-based intervention strategies to improve social skills in children with ASD (for recent reviews see Matson & Wilkins, 2007; Rao et al., 2008; Williams et al., 2007). Some intervention strategies with potential to be effective and efficient in inclusive classroom settings include priming, self-management, script-fading, peer-mediated interventions, and organizing social activities involving the interests of the student with ASD. Priming involves providing

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opportunities for the student with ASD to practice social activities (e.g., rehearsing specific games) before the student is expected to participate in a natural social context (Koegel, Koegel, Frea, & Green-Hopkins, 2003). For example, if the class is going to play kickball at recess, then the student with ASD could be taught beforehand how to throw the ball, the rules of the game, appropriate comments to make when teammates score points, and how to behave in the event of certain game outcomes. Research has shown that priming can also be successful in improving socialization when board games are taught at home or in a different setting then provided to the children on the playground (Gengoux, 2009). Practice activities should be fun with the aim to simply familiarize the child with the upcoming activities. During the practice sessions, the student can receive reinforcement that will make these desired behaviors more likely to occur when the activities occurs again in the natural setting (e.g., recess; Harrower & Dunlap, 2001).

Self-management and initiation training involve the child with ASD taking ownership and leadership of his or her own intervention. The students with ASD are taught to discriminate between appropriate and inappropriate social behaviors and then to reward themselves when they engage in those appropriate behavior (Harrower & Dunlap, 2001). For example, a student with ASD may self-monitor by pressing the lever on a wrist counter each time he or she compliments a peer during recess. Target behaviors are usually practiced in one-on-one sessions with a special educator, school psychologist or speech and language specialist. When the child understands the use of the target behavior, the wrist counter serves as a way of prompting the behavior to take place in the student's natural settings. When the counter reaches a predetermined number, the student rewards him- or herself or can be rewarded during sessions with the special educator. Similarly, initiation training consists of teaching the child with ASD to initiate social behaviors (e.g., requesting turns, asking questions, commenting) rather than relying on adults to prompt social interactions. Children that are taught to use these social initiations have been shown to have improved long-term outcomes over those who are not (Koegel et al., 1999).

Other methods may more directly teach targeted social behaviors. For example, script-fading or social scripting involves the use of a written or pictorial script with cues regarding how to behave in specific social situations or interactions (Boutot, 2009). As the student's social behavior begins to improve (i.e., they adhere to the script), certain aspects of the script can be systematically faded or altered. Reducing or altering the content of the script is intended to result in less dependence on the script's cues and increased flexibility in responding. Because children with ASD are often able to recall material after limited or brief exposure, one attribute of social scripts may be the reliance on memorization (Boutot; Simpson, 2005). Scripts can be used as an antecedent intervention with the intention of being helpful with subsequent peer interactions.

Other methods rely on direct peer involvement during intervention. That is, peer-mediated procedures involve teaching typically developing peers how to model and prompt targeted social skills (Chan et al., 2009). For example, a peer may learn to prompt a classmate with ASD to request a turn on the playground swing and help remind them when to take turns. In this way, peer-mediated interventions may be used to target multiple skills at once, for example, turn-taking and verbal language (e.g., Pierce & Schreibman, 1995). A large number of studies report positive results for peer-mediated interventions when conducted in schools, suggesting that these interventions may be particularly suitable for use in inclusion classrooms (Chan et al., 2009).

Another useful procedure for encouraging peer relationships in school is to develop games and activities that involve the perseverative interests of the child with ASD (Koegel & Koegel, 2006). For example, if the child is fascinated by dinosaurs, then a dinosaur station could be added to center time in an early childhood classroom. Embedding the student's interest in the classroom activities and assignments has been shown to reduce motivation to escape social situations and increase motivation to participate in the activity (Koegel, Singh, & Koegel, 2010). However, it is important that the student with autism be taught how to use the items related to their perseverative interest in an appropriate manner and not simply to use the item as a tool to engage in stereotypy. For example, many children with ASD accumulate vast amounts of knowledge relating to a perseverative interests. Using this information in a socially appropriate manner may result in the student with ASD being considered a valued member of a peer group. More formal activities can be arranged on the playground that involve the child's interests and can only be played with a group of peers also result in improved socialization. For example, a tag game can be developed for a child who is intensely interested in movies by downloading and laminating advertisements of movies then calling out a line or star from the movie where the children can run to be "safe" (Baker, Koegel, & Koegel, 1998). Various types of interventions that incorporate the strengths of the child with autism can improve peer relationships. However, implementation of these procedures relies on a skill base of the school staff. Thus, regular teacher and aide training is of utmost importance.

Teacher Training

Despite the accumulating numbers of peer-reviewed publications demonstrating effective interventions for

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children with ASD, less has been published on teacher training and teacher effectiveness. Further, aides and instructional assistants that often spend the bulk of the day working with children with ASD report that they feel underqualified and undertrained for their position (Koegel & LaZebnik, 2004). However, studies suggest a number of possible ways that effective training can be implemented. For example, because of the rapid increase in numbers of children diagnosed with autism and lack of trained personnel, distance techniques such as desktop videoconferencing can be an effective method for training staff to target challenging behaviors (Boisvert, Lang, Andrianopoulos, & Boscardin, in press; Gibson, Pennington, Stenhoff, & Hopper, 2010; Machalicek et al., 2009; 2010). Brief, focused, and intensive week-long programs in the summer have also been shown to be effective in improving teacher skills across a wide range of areas (Lerman, Tetreault, Hovanetz, Strobel, & Garro, 2007). In addition, short practice with feedback (wherein the trainee is given direct feedback regarding application of intervention techniques) and video-feedback sessions can result in rapid teaching improvement in aides for peer-peer socialization (Robinson, in press). However, training is both expensive and time-consuming, and many public schools experience a high turnover of special education staff members. Preprofessional programs and autism-specific training at the university level have been recommended, so that individuals applying for school jobs begin their jobs already equipped with specialized training for this population (Scheuermann, Webber, Boutot, & Goodwin, 2003). In fact, some states (e.g., California) now have legislation requiring that teachers working with children with severe disabilities have some specialized autism-specific training. However, there is no doubt that training, or lack thereof, continues to be a challenge for school systems, and research is greatly needed to define the most important areas to teach, effective and efficient teacher training methods, and methods for keeping special education staff apprized of the latest research findings.

Obstacles to Implementation

In addition to training issues, there are other obstacles associated with implementing research-based interventions within school settings, and an exhaustive list of potential issues is not possible within the constraints of this article. However, we do discuss two commonly cited obstacles effecting the implementation of research-based interventions in inclusion classrooms—specifically, difficulties with assessments and teacher/classroom-related factors.

Assessment Issues

Standardized tests are often difficult for children with autism who may demonstrate challenging behavior during the assessment. However research shows that standardized test scores can be improved significantly if procedures are implemented that improve the student's motivation to participate in the assessment process (Koegel, Koegel, & Smith, 1997). In addition to standardized tests, criterion-based or observation-based assessments conducted within natural environments often provide additional useful information. However, even during observation-based behavioral assessments, idiosyncratic and contextual variables have been shown to influence results. For example, the amount and nature of attention given to the individual immediately prior to assessment (McComas, Thompson, & Johnson, 2003; O'Reilly, Edrishina, & Sigafoos, 2007; Roantree & Kennedy, 2006), the environment in which the assessment is conducted (Lang et al., 2009), the order of assessment conditions (Hanley et al., 2003), and the person implementing the assessment (Ringdahl & Sellers, 2000) have all been identified as variables that can affect assessment outcome. Some children with autism have difficulty with attention and show improved performance when they are asked to repeat the directions or test item (such as repeating the receptive or expressive vocabulary test item) prior to responding (Koegel, Koegel, & Smith, 1997). Therefore, these variables should be considered when planning assessment, as they may confound results which may then lead to subsequent inappropriate or ineffective assessment-based interventions.

One method to increase the accuracy of assessment is to obtain information from multiple sources and consider multiple contextual factors when developing goals. Research suggests a four-step assessment process that consists of (a) reviewing student records, (b) interviewing caretakers (e.g., teachers and parents), (c) observing in the natural environment (e.g., homes and schools), and (d) testing via standardized test instruments (Barnhill, 2002; Knoff & Batsche, 1991). The omission of one of these sources of information may increase the likelihood of inaccurate or misleading assessment conclusions.

Teacher and Classroom Factors

Boardman and colleagues (2005) surveyed teachers to examine their perceptions of research-based interventions. Findings suggested that teachers did not consider whether an intervention was "research based" as an important criteria. Alternatively, teachers chose interventions based on ease of implementation in the classroom, their own personal beliefs concerning pedagogy, the intervention's perceived appropriateness for a particular student, and the availability of required materials and support staff. For example, teachers are not likely to implement a behavior plan that relies on providing tangible rewards if they believe such a system to be

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"bribery" or the process to be too time consuming for the classroom schedule. Additionally, if an intervention procedure does not fit well with the current practices and expectations of the classroom, the intervention is often adapted by the teacher. These adaptations often detract from the effectiveness of the intervention (Fullan & Miles, 1992; McInerney & Hamilton, 2007). Logically, preprofessional programs will need to address the ability of teachers to better understand the importance of sound research methodology when selecting appropriate procedures for working with children with ASD.

Given the importance of teacher- and classroom-related variables in the successful implementation and maintenance of research-based interventions in classrooms, it seems necessary to provide ongoing training to in-service teachers regarding research-based interventions and, when possible, to involve teachers in meaningful ways in the research process (Horrocks, White, & Robert, 2008; Lang & Page, in press; McConkey & Bhlirgri, 2003; Robertson, Chamberlain, & Kasari, 2003). In regard to training, simply attending a yearly continuing education lecture is unlikely to be sufficient. Procedures such as video modeling, in which teachers observe themselves or another person implementing a particular intervention, coupled with in vivo feedback from expert support staff, are more likely to be effective training procedures (Lang et al., 2009; Robinson, 2008).

Intervention Guidelines

A variety of interventions exist that could be used in classrooms; however, to date there is no "road map" identifying or matching specific student characteristic to specific interventions (Landa, 2007; Ogletree, 2007). As such, it is often unclear what intervention will work best with a particular student (Yoder & Stone, 2006). Moreover, there is a great need for research towards identifying the most effective, efficient, and socially valid classroom interventions (Lang et al., 2010). However, sufficient research does exist to provide some general guidelines to be considered.

1. Despite the challenges, effective interventions for children with ASD can and should be implemented in inclusive school settings where performance is at least as good or better than a self-contained classroom (Ormrod, 2006).
2. Comprehensive interventions that target symptoms of ASD (e.g., disruptive behavior or social behavior) simultaneously are better than interventions with a narrow focus that ignore some area of concern. That is, to date there is no single effective intervention for ASD. Therefore, a variety of interventions, implemented simultaneously, addressing different aspects is recommended (Koegel, Dunlap, & Koegel, 1996).
3. Programs should be individualized based on a comprehensive assessment. What works for one student may not work for another student. Therefore, regular data collection and ongoing assessment for response to intervention is essential to be sure that the intervention is effective for a particular child (Koegel et al., 1996).
4. Identifying and targeting "pivotal areas" (i.e., skills that once learned have a positive effect on other skills not directly targeted for intervention) improves the efficiency and effectiveness of a particular intervention. For example, teaching a student to initiate a request for a preferred item not only improves communication, but also may reduce challenging behavior (as in FCT) and provides increased opportunity for social interactions (Koegel & LaZebnik, 2004).
5. The FBA process should be ongoing and integrated through developing, reviewing, and revising behavioral intervention plans. Challenging behavior should not be considered "aberrant." Instead, the communicative intent of the challenging behavior should be considered (Carr et al., 1994).
6. Schools and families should endeavor to work together. Home-school coordination has been shown to result in more rapid acquisition of target behaviors and increases the likelihood of positive behavior change being maintained over time (Koegel et al., 2003).
7. Opportunities for communication should be provided throughout the day, particularly during times when a student is motivated to communicate. Typically, very few opportunities for communication are provided throughout the school day (Chiang, 2009).
8. Self-management can be helpful in insuring generalization and maintenance of acquired skills. As well, self-management combined with other programs, such as teaching functionally equivalent communication, can be especially effective (Koegel & Koegel, 1990).
9. Many team members will be working together to support students with autism. Assuring that the intervention is implemented in a consistent and constant manner across settings and school staff and throughout the child's waking hours will increase the likelihood of more rapid student progress (Koegel & Koegel, 2006).

Conclusion

Previous research has demonstrated that students with ASD can make progress on educational and behavioral

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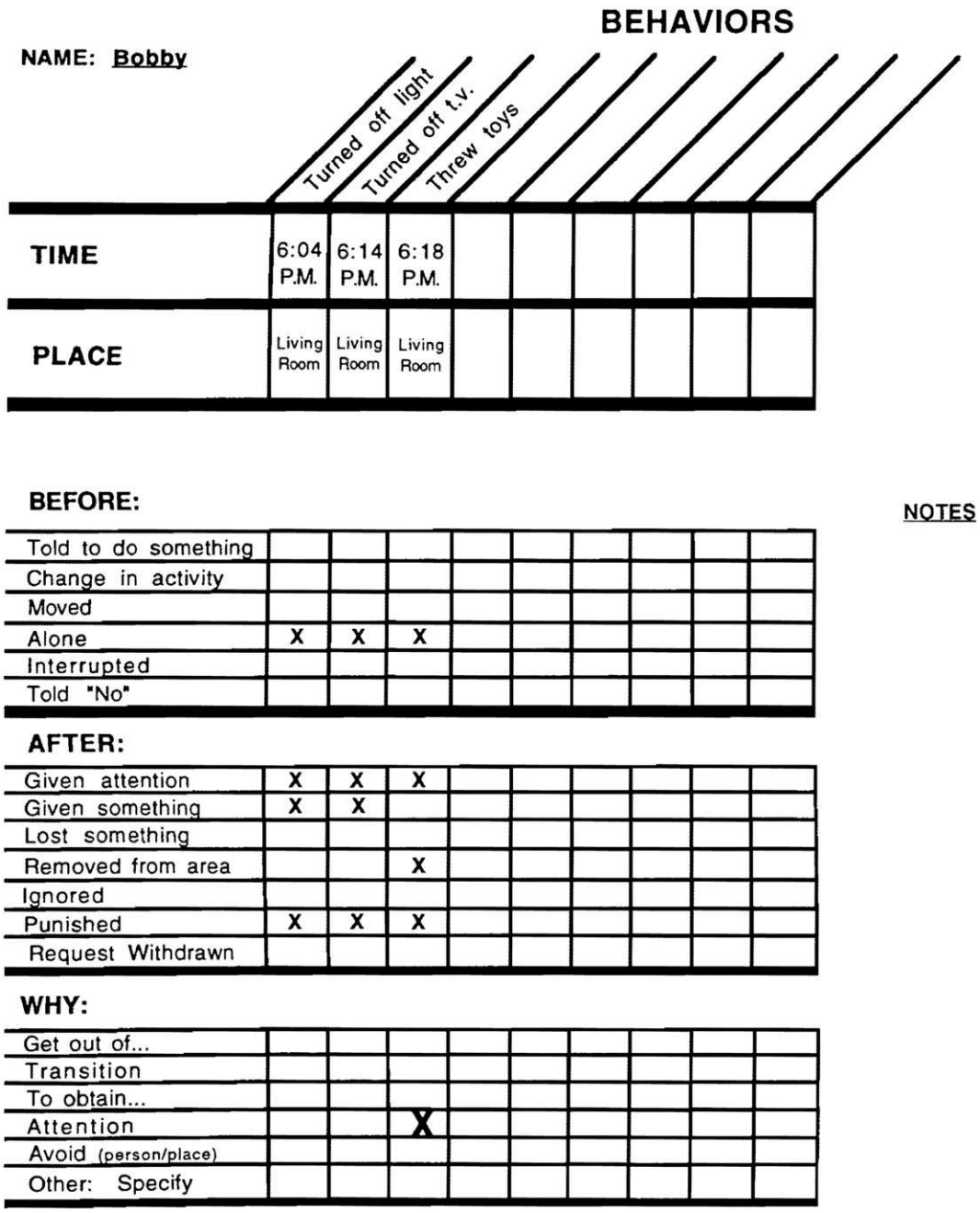
goals within inclusion classrooms. The National Research Council on Autism (2001) recommends that parents be actively involved in the educational process, that children attend a full school day with full-year programming, and that intervention be provided for a minimum of 25 hours per week. This article endeavored to provide a brief overview highlighting promising research-based interventions. At this point, there is no doubt that future research, towards further supporting teachers and their students with ASD in inclusive classrooms, remains warranted. However, given the success of previous research and the societal trend towards accepting and including individuals with ASD, it is reasonable to predict that future research will indeed lead to even more efficient and effective interventions.

Appendix A



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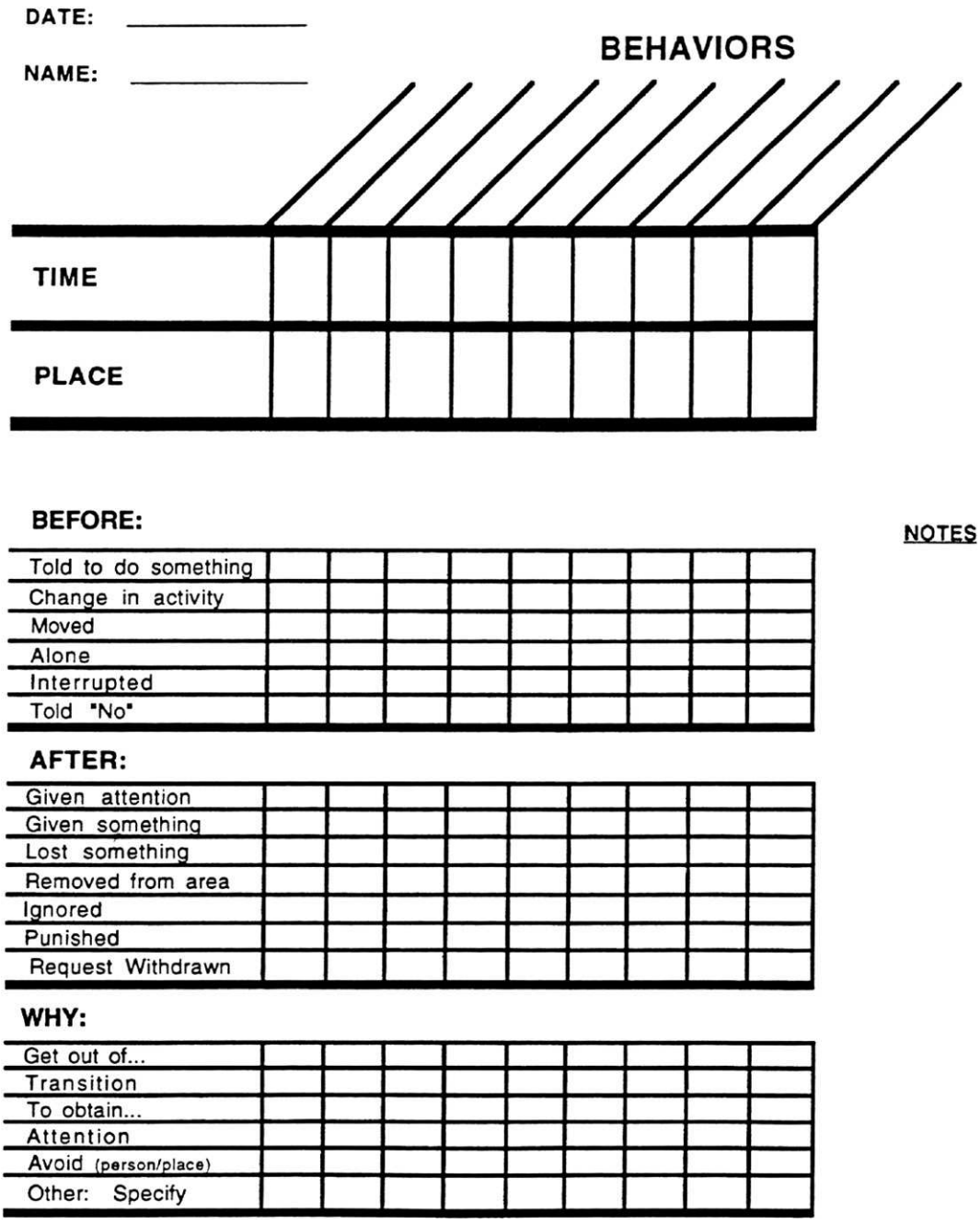
Appendix A (*continued*)



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