UNDERSTANDING THE CONTINUUM OF DISCRETE-TRIAL TRADITIONAL BEHAVIORAL TO SOCIAL-PRAGMATIC DEVELOPMENTAL APPROACHES IN COMMUNICATION ENHANCEMENT FOR YOUNG CHILDREN WITH AUTISM/PDD

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ABSTRACT—Clinicians are faced with the challenge of making informed decisions amidst heated debates over the most effective treatment approaches for young children with autism. This article provides a more specific focus to this debate by considering the practice of enhancing spontaneous language and related social-communicative abilities of young children with autism/pervasive developmental disorder (PPD). First, a historical perspective of the evolution of different approaches for enhancing communication and related abilities is presented, followed by a description of characteristics of the approaches. The approaches are described along a continuum from massed discrete trial, traditional behavioral to social-pragmatic, developmental. The current state of knowledge regarding the effectiveness of early services for children with autism/PDD is examined and conclusions are presented with consideration of the need for more meaningful outcome measures than are currently used for the next generation of outcome research.

KEY WORDS: communication enhancement, autism, pervasive developmental disorder

This article is being written at a time when there are passionate debates regarding the most effective ways to support the development of young children with autism/pervasive developmental disorder (PDD). These debates, involving both professionals and family members, occur in professional peer-reviewed publications and informally in the popular media, at conferences, and online. In some cases, litigation initiated by

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Fourth, in practice, the developmental pragmatics movement emphasized the importance of deriving individualized goals and strategies in communication based on each child’s current communication abilities as well as learning strengths and needs (Prizant & Wetherby, 1989; Wetherby & Prizant, 1992). This was in contrast to programs using the same sequence of goals and teaching curriculum, as was (and is) common in DT-TB approaches, especially in early stages of training (Bricker, 1993). Finally, the pragmatics movement emphasized the need to focus on meaningful language and functional communication abilities at the outset, both preverbal and verbal, rather than building repertoires of speech sounds, words, and sentences largely devoid of conceptual understanding and social impact, other than to elicit predetermined contingent reinforcement, which may not be relevant to the child’s behavior and intent. Based on the research literature in developmental pragmatics for typically developing children and children with autism/PDD (Bates, 1979; Wetherby, 1986; Wetherby & Prutting, 1984), the practice of understanding and documenting children’s “communicative intentions” became central in research and in practical application when working with nonspeaking as well as speaking individuals with autism/PDD (Prizant & Duchan, 1981; Prizant & Wetherby, 1987; Wetherby, 1986; Durand, 1990), a notion inconsistent with the traditional behavioral doctrine of dealing primarily with observable behavior.

Citing the lack of generalization and communicative spontaneity in children who had nonetheless mastered speech goals in discrete trial training, practitioners with expertise in communication and language disorders in autism/PDD began to question seriously the efficacy of DT-TB procedures in enhancing true spontaneous communication and language abilities (Fay & Schuler, 1980; Prizant, 1982). Even Lovaas (1977), who has been credited with introducing discrete trial approaches for children with autism, stated “the training regime . . . its use of “unnatural” reinforcers, and the like may have been responsible for producing the very situation-specific, restricted verbal output which we observed in many of our children” (p. 170). Based on this finding, he spoke of the need for “spontaneity training,” a concept that is an oxymoron in the eyes of specialists in communication development and disorders. That is, the concept of “training” implies establishing teacher or instructional control, a basic tenet of traditional behavioral approaches, whereas initiation and spontaneity in communication is viewed as affect driven, based on internal motivation and internal locus of control by development researchers and clinicians (Green-span, 1992; Prizant & Wetherby, 1999). In a retrospective critique of the use of DT-TB approaches (Lovaas, 1977) in language intervention for children with autism, Koegel (1995) noted that “not only did language fail to be exhibited or generalize to other environments, but most behaviors taught in this highly controlled environment also failed to generalize” (p. 23). Coming from a contemporary ABA orientation, Koegel saw the need to abandon discrete trials in favor of more naturalistic approaches to language intervention based on the contention that “early attempts to teach language, that emphasized repetitive practice, carefully controlled instructions, consistent and artificial reinforcers, highly structured and simple training environments, and so forth might have actually retarded the efforts to achieve generalized intervention effects” (Koegel, 1995, pp. 23). Interestingly, these claims are remarkably consistent with the earlier critiques of Fay and Schuler (1980), Prizant (1982), and Wetherby (1988) from an SP-D orientation.

The pragmatics “revolution” provided new methodologies and taxonomies for studying and documenting communication
and language development in natural social contexts (Lund & Duchan, 1983). Advances in behavioral technology led to functional assessment becoming recommended practice for understanding the variables that influence or motivate problem behaviors (Carr et al., 1994; Donnellan et al., 1984; Horner et al., 1990; Meyer & Evans, 1986; 1993). This confluence of factors led to the emergence of “contemporary” behavioral approaches, which drew from and incorporated behavioral techniques to promote adaptive behavior (e.g., teaching positive, functionally, equivalent alternative behaviors) (Carr & Durand, 1986; Hart, 1985; Koegel & Johnson, 1989; Dunlap et al., 1998; Schreibman & Pierce, 1993), as well as knowledge derived from developmental pragmatics to promote the use of more natural and balanced social transactions in which learning opportunities are initiated by the child. For example, Koegel and colleagues (Koegel & Koegel, 1995; Koegel, Dyer, & Bell, 1987; Schreibman & Pierce, 1993) developed a more child-centered behavioral approach, drawing heavily from social-pragmatic principles, which they refer to as the Natural Language Paradigm. It is noteworthy that some of the leaders of more contemporary behavioral approaches to language and communication in autism had studied and published extensively with Lovaas in his widely cited, early work on language training (e.g., Carr et al., 1975; Lovaas et al., 1975). This shift, along with the increasing influence of attempts to understand the communicative functions of socially unacceptable behavior using taxonomies from the pragmatic literature (Donnellan et al., 1984; Durand, 1990; Reichle & Wacker, 1993), further merged the perspectives of contemporary ABA approaches and developmentally based pragmatic approaches by the late 1980s.

However, in 1993, two publications rekindled interest in DT-TB approaches. The first, Let Me Hear Your Voice (Maurice, 1993), was a parental account of two siblings who “recovered” from autism using a program based on the work of Lovaas (1981) and which utilized discrete trial training as the primary strategy in initial stages of the program. Although the author clearly indicated that there were additional components to her children’s program—some of which, as described, were clearly more developmentally, child-centered, and social-pragmatic—what emerged from her account was the significance of the 1:1 discrete, massed trial portion of her children’s training. The second influential publication (McEachin et al., 1993) was the second follow-up study of 19 children who received at least 2 years of “intensive behavioral intervention,” reported following the programs published in The “Me” Book (Lovaas, 1981), although the specifics of intervention were not presented. The authors concluded that nine of the 19 children had “recovered” from autism based on a variety of follow-up measures that found them to be indistinguishable from peers. This study, along with the Maurice book, had a major impact in launching renewed interest in DT-TB approaches, largely through popular media accounts of “new hope” for a cure or recovery for children with autism and well-publicized claims that this approach was the only one that “worked” for children with autism (Maurice et al., 1996). These claims were made despite the degree of controversy surrounding the study, both within and outside the field of behavioral psychology, including criticisms of its lack of detail regarding the training used (Green, 1996b), its methodology (Gresham & MacMillan, 1997), and interpretation of results (Greenspan & Wieder, 1997b). Additionally, this study has been heralded by some as conclusive evidence of the effectiveness of this approach, despite the fact that most researchers would consider it to be no more than a pilot study due to the small number of participants, the lack of specificity in reporting crucial variables (e.g., child characteristics prior to treatment, family variables, specifics of training), and the fact that fidelity of treatment was never measured.

In riding this new enthusiasm engendered largely by the work of Lovaas and colleagues (Lovaas, 1977; McEachin et al., 1993) and the parental account written by Maur-
rice (1993), DT-TB proponents (Maurice et al., 1996) broadened their claims of the superiority of ABA treatment approaches. However, much of the discussion in both the popular and professional literature regarding the promise of “recovery” from autism clearly focused on the outcome study of Lovaas and his colleagues (McEachin et al., 1993), which was based on the application of the DT-TB model described in the _The “Me” Book_ (Lovaas, 1981) and included the use of physical punishment and procedures to extinguish echolalia, practices that are no longer included in more contemporary versions of “Lovaas therapy” (Leaf, 1998). This begs the question of how communication and language training approaches popularized by Lovaas are similar to or differ from other more contemporary ABA approaches.

It is our contention that most contemporary ABA approaches to language and communication enhancement are more similar to SP-D approaches than to DT-TB approaches. Therefore, we believe that it is more constructive to focus on the specific elements that are definitive of different approaches, especially those that fall under the label ABA, rather than making global statements about treatment “types.” This may provide a context for more thoughtful and reflective discussion about what actually happens in teaching interactions with young children. Ultimately, by focusing on the definitive elements of practice, efforts to determine treatment effectiveness will be more open to individualized and eclectic approaches than to comparisons of philosophically constrained and narrowly defined treatment “packages.” Progress has been made recently toward this goal (Dawson & Osterling, 1997; Rogers, 1996), but much more work is needed.

**DEFINING THE CONTINUUM OF APPROACHES**

We believe it is best to conceptualize approaches to enhancing language and communicative abilities along a continuum with traditional behavioral approaches at one end (Lovaas, 1977, 1981) and developmental social pragmatic approaches at the other end, which include “relationship-based” approaches that are individualized and grounded in a developmental model (MacDonald, 1989; Wetherby et al., 1997; Schuler et al., 1997; Prizant, Schuler, Wetherby, & Rydell, 1997; Greenspan, 1992, 1997; Greenspan & Wieder, 1997a). Contemporary behavioral approaches fall between the extremes of this continuum and incorporate aspects of each (Warren, 1993). We first present descriptions and definitions of each end of the continuum, then offer an analysis of the crucial dimensions that position approaches along the continuum.

**DISCRETE TRIAL OR TRADITIONAL BEHAVIORAL APPROACHES**

Discrete trial training has been defined as a strategy to teach new skills to children and one of “several methods that increase the likelihood that a child will give the desired response so that it can be reinforced . . .” (Anderson et al., 1996, p. 187). A trial is considered to be a “single teaching unit” (Lovaas, 1981) that begins with the presentation of a stimulus (teacher’s instruction), the child’s response, the consequence, and a pause (between-trial interval) before presentation of the next stimulus by the teacher (Anderson et al., 1996). Teacher instructions are given just once, and the child’s response is evaluated as correct, incorrect, or no response and followed by a consequence that is based on the correctness of the child’s response relative to a predetermined criterion. Correct responses are reinforced with praise or primary reinforcers (e.g., food), whereas incorrect responses are consequated with verbal feedback, such as “no” or “wrong,” and followed by physically guiding the child to a correct response, which is referred to as a correction trial (Anderson et al., 1996). The purpose is to delineate each teaching episode clearly, which
also provides an opportunity for the teacher to record data on each response. Schriebman et al. (1991) offered this description of DT-TB approaches: “In discrete trial training, the therapist chooses the stimuli to be used in training and the nature of the interaction, only correct responses are reinforced, indirect reinforcers (e.g., tokens, food) are typically used, several consecutive trials on a new task are presented, and the therapist initiates trials” (p. 480).

Proponents of DT-TB indicate that it is but one strategy for teaching new skills (Lovaas, 1995; Anderson et al., 1996). In fact, Lovaas (1981) stated that it should be used only for short-term periods at the beginning of a child’s program. However, the most frequently cited and recommended volumes published by proponents of DT-TB (Lovaas, 1981; Maurice, et al., 1996) focus on discrete trial programs as the initial and predominant strategy for teaching children with autism/PDD. In the DT-TB format, the role of the teacher is to initiate teaching interactions, maintain instructional control (Anderson et al., 1996; Lovaas, 1981), and reliably follow programs of instruction delineated ahead of time. The primary elements of DT-TB approaches include the following:

1. The teaching structure is highly prescribed, including choice of the stimuli presented, the responses targeted, and the consequences provided. Physical arrangements, such as seating, are often predetermined and are adhered to faithfully.
2. There is a focus on teaching discrete and objectively defined behaviors. Traditionally, speech has been the primary communicative mode, beginning with vocal imitation, followed by word imitation. Nonspeech communication systems are introduced only after a child has not succeeded in achieving criteria during training for vocal imitation.
3. The learning context involves a 1:1 child:teacher ratio, with the teacher determining the activity and focus of attention, often following a prescribed, sequenced curriculum.
4. Predetermined criteria are provided for correctness of response. Each response is evaluated as correct or incorrect, with predetermined consequences following the response. “Off-task” responses, even if communicative or relevant to some aspect of the training context, may be ignored or the child’s behavior redirected.
5. Initial focus is on adult control and child compliance. In a section of The “Me” Book entitled “Adult is boss,” Lovaas (1981) outlines his rationale for initially providing “structured and authoritative” environments, followed by a lessening of adult control.
6. Curricula used in discrete trial programs may not be informed by the literature on sequences or processes in child language and communication development unless the curriculum chosen is developmentally based.
7. There is minimal use of contextual supports by the clinician/educator, and teaching is largely organized and directed through oral language.

Proponents of DT-TB approaches cite a number of contributions that these approaches have made to the education of young children with autism/PDD: (1) an emphasis on the need for intensive services; (2) provision of strategies for breaking down activities in small steps (task analysis); (3) demonstration of the value of utilizing highly structured and routinized teaching episodes; (4) focus on early attentional skills; (5) systematic data collection; (6) and a clear prescription for teaching. However, many of these contributions need to be considered carefully, especially from the perspective of enhancing social-communication and language abilities. For example, is intensity to be defined only in reference to hours of discrete trial training per week or number of teaching trials presented? Could intensity also be defined relative to the qualities of interactions (e.g., reciprocity, contingency, affective involvement) between children and
their communicative partners? For example, proponents of an SP-D perspective advocate intensive services of a very different nature. In Greenspan’s (1992) paradigm, the number of hours in his “floor-time,” play-based treatment is one dimension of intensity. However, intensity of treatment is also defined by the degree to which a caregiver’s expression of affect and affective range and attunement are used to support and motivate children to interact, with the goal of building relationships and supporting a child’s mastery of increasingly more complex stages of socioemotional development. Prizant, Wetherby, and Schuler and colleagues (Prizant et al., 1997; Schuler et al., 1997; Wetherby et al., 1997) regard intensity from the perspective of providing multiple opportunities, natural needs, and motivations to communicate for a wide variety of purposes and to relate to others within the context of a range of experiences, with a strong preference toward the use of more natural routines and balanced interactions. The transactional and reciprocal nature of social interaction and communication is seen as the essence of enhancing social and communicative abilities (Prizant, 1982; Prizant & Wetherby, 1989).

DT-TB approaches have pioneered the use of task analysis for breaking down activities into small steps; however, does this result in fragmented teaching interactions and activities that lose their meaningfulness? Training early attentional skills is also a basic tenet of DT-TB approaches; however, is it detrimental to focus solely on adult control of a child’s attention rather than facilitating a shared attentional capacity by considering and following a child’s attentional focus and interests? Documentation of progress is important; however, does online data collection interfere with the need to remain acutely attuned and responsive to the often subtle communicative or interactional behaviors of young children? Furthermore, do the data collected result only in quantitative information (i.e., frequency counts about correctness of responses) instead of qualitative and qualitative information about developmental shifts in communicative abilities, success in reciprocal exchange, or affective involvement with others?

Finally, having a clear prescription for teaching may be comforting and even necessary for some professionals and parents and may provide a starting place for some children; however, are there risks in following prescriptions (i.e., teaching programs) too rigidly, ignoring opportunities for building child-initiated, spontaneous interaction, communication, and play? Related to these concerns, the following limitations of DT-TB approaches relative to social-communicative abilities have been noted (Elliott et al., 1991; Prizant, 1982; Fay & Schuler, 1980; Wetherby, 1986; Wetherby et al., 1997):

1. There tends to be a narrow focus on speech and grammatical structure in lieu of multimodal communication that serves a range of communicative functions.
2. The expression of communicative intentions through unconventional communicative means may not be acknowledged, and procedures for decreasing these behaviors without consideration of their communicative or socioemotional underpinnings may be implemented.
3. Treatment activities may be characterized by a fragmented, unnaturalistic structure, without a logical sequence of events that relate to children’s everyday experiences and interactions.
4. The teacher has primary control of how learning is to proceed, with the child placed in a respondent role, which may result in passivity. Internal control involving initiation and spontaneity are not goals until later in the teaching program.
5. Children may become extremely prompt dependent or cue dependent due to inflexible teaching interactions.
6. There may be minimal inclusion of typical peers or opportunities to learn from and interact with other children until later stages of training.
7. DT-TB approaches attempt to teach clearly defined skills; however, such ap-
proaches may not address or may deemphasize the core deficits observed in autism/PDD. These include problems in shared (joint) attention, spontaneous and initiated preverbal and verbal communication, emotional expression and relatedness, and imaginative play.

**Social-Pragmatic Developmental Approaches**

On the other end of the continuum are approaches that emphasize initiation and spontaneity from the outset and follow the child’s attentional focus and motivations to the extent possible. SP-D approaches build on a child’s current communicative repertoire, even if a child uses unconventional means to communicate, and use more natural activities and events as contexts to support the development of children’s social-communication abilities. The elements and justifications for SP-D approaches involve a number of strategies (Wetherby et al., 1997).

**Use of Interactive-Facilitative Strategies**

Interactive-facilitative strategies refer to the ways in which communicative partners spontaneously interact with and respond to young children so that their social and communicative growth is supported. The importance of this dimension of intervention is underscored by the fact that (1) opportunities for communicative growth occur naturally throughout the day; therefore, primary reliance on scheduled “lessons” or “programs” do not take advantage of multiple opportunities for communication enhancement; (2) research has demonstrated that caregivers’ style of interaction has an important influence on language and communication development; and (3) the transactional nature of communication development suggests that appropriate modifications of caregivers’ interactive style helps children to develop a sense of efficacy and competence in communication. Their growing sense of efficacy results in greater active participation and increased motivation in social exchange, which in turn reinforces caregivers’ sense of efficacy and competence (Dunst et al., 1990). The role of the partner is to build upon children’s initiations and to provide models and responses that convey to the child that their behavioral responses are meaningful and accepted. The goal is to have children construct a self-generated (self-constructed) knowledge base of communicative routines and communicative means and functions. The purpose of a child’s interactions and communications should be under a child’s internal control, rather than under external (i.e., stimulus/instructional) control.

Interactive facilitative strategies encompass aspects of verbal as well as nonverbal behavior. Decisions are made by educators, clinicians, and caregivers about which interactive styles and strategies will best support a child’s social-communicative development and enable the child to communicate intentions as independently as possible. The following non-mutually exclusive dimensions of interactive-facilitative strategies are adapted, in part, from Duchan (1989, 1986), MacDonald (1989), MacDonald and Gillette (1988), and McCormick (1990).

**Degree of Acceptance of Children’s Communicative Bids**

Duchan (1989) noted that communicative partners provide differential feedback to young children, which may include rejection, conditional acceptance, or unqualified acceptance of communicative attempts. In general, conditional and unqualified acceptance have been found to be more facilitative of communicative success and growth in children (Chapman et al., 1986; Duchan, 1989). Conditional acceptance includes corrections that accept and acknowledge a child’s attempt and provides positive corrective feedback. Conditional acceptance also may include corrections with explanations. In both cases, although corrective feedback is given, the child’s meaning and intent is acknowledged, and further information is
provided in a nonjudgmental and positive manner. Unqualified or unconditional acceptance includes positive feedback, including attention, verbal and nonverbal expressions of acceptance (e.g., head nods, "yeah, uh-huh," exact imitations), and expressions of positive affect. Unconditional acceptance is characteristic of very early caregiver-child interactions, which helps young children to learn about the reciprocal nature of communicative exchange.

**Degree of Directiveness**

Marfo (1990) discussed the degree of directiveness or facilitativeness of a partner's style. A highly directive style, which is characteristic of DT-TB approaches, is characterized by adult-selected topics and activities, frequent use of imperatives (commands) and test questions (i.e., asking questions when the answer is known to test a child's knowledge), and intrusions on a child's behavior through a reliance on physical prompts of appropriate responses (Clark & Seifer, 1985). A directive style has been found to result in fewer child initiations, less elaborate responses, a limited range of communicative functions expressed, and conversational reticence or passivity (Duchan, 1989). A facilitative style, which is advocated by SP-D and contemporary behavioral literature, is characterized by following the child's attentional focus, offering choices and alternatives within activities, responding to and acknowledging a child's intent, modeling a variety of communicative functions including commenting on a child's activities, and expanding and elaborating upon the topic of a child's verbal and nonverbal communication. The benefits of a more facilitative style include (1) providing a child with some sense of social control and communicative power, which has been found to result in increased initiations and more elaborate communicative attempts (Mirenda & Donnellan, 1986; Peck, 1985); (2) following a child's attentional focus and motivations, which reduces problems of compliance and may result in increased learning due to motivation and affective involvement; and (3) providing elaborated information and feedback appropriate to a child's level, which supports a child's communicative and language development through modeling of vocabulary and more varied language forms and functions. Mirenda and Donnellan (1986) found that using a facilitative style resulted in higher rates of student-initiated interactions, question asking, and conversational initiation in students with autism, when compared with a directive style. Facilitative strategies have also been found to increase communicative initiation and social-affective signaling of children with autism who have limited or no language abilities (Dawson & Adams, 1984; Peck, 1985; Tiegerman & Primavera, 1981, 1984).

Appropriateness of style along a continuum from facilitative to directive is a child-specific issue that can be determined only by observing the effect of a partner's style on interactions. Relative to a child's typical abilities, a good stylistic match should result in (1) increased self-regulation of attention (i.e., ability to maintain a mutual focus of attention with minimal prompting); (2) active involvement in selecting and participating in activities; (3) frequent verbal and nonverbal communicative initiations; (4) more elaborate communicative initiations; and (5) positive affective involvement with the partner. A style is facilitative when these characteristics are observed in children's behavior. For example, for a highly active and distractible child, a style that promotes a mutual attentional focus and more active involvement, even though it may have some directive qualities (e.g., physical prompting and limit setting), must be viewed as facilitative for that child. This same style, however, may have detrimental effects for a child who has a lower activity level and greater attentional regulation. As Marfo (1990) noted, the function of adult directiveness in supporting interactions is the overriding concern, not the presence or absence of features thought to be directive. However, in SP-D approaches, educators and clinicians attempt to incorporate facilitative features.
in their interactions and gradually modify their style along the facilitative-directive continuum until an optimal match is found.

**Adjusting Language and Social Input**

The timing and complexity of language and social input to a young child may have a dramatic impact on a child's ability to sustain attention on others, to take turns in interactions, and to comprehend others' intentions expressed through language and gestures. Features of language input that support children's communicative growth have been documented in the literature on mother-child interactions (Snow & Ferguson, 1977). The specific adjustments that have been shown to facilitate and support interactions and communicative growth include (1) simplified vocabulary and reduced sentence length; (2) exaggerated intonation, slower rate, and clear segmentation of speech; (3) contingent responding and scaffolding.

**A Focus on Communicative Events**

Communication enhancement efforts that follow an SP-D approach are concerned with all dimensions of communication, from enhancing communicative means or behaviors to providing a better understanding of the function of communicative behavior and of the dyadic and reciprocal nature of communicative events. This focus is seen as essential because individuals at all ability levels of autism and PDD are so challenged in their understanding of communicative events in social contexts. Communicative events are defined by two or more participants engaging in social interactions cooperatively to accomplish particular goals (e.g., sharing information, solving a problem, playing a game, etc.). The structure of such events involves reciprocal exchanges with the goal of developing an understanding on the part of all participants that each has a role and a responsibility to fulfill in achieving a shared goal. Thus, intervention must support children in "making sense" of communicative transactions (Duchan, 1986).

The use of "activity-based interventions" and "joint action routines" provides the context for learning how to communicate meaningfully (Bricker & Crepe, 1992; Wetherby et al., 1997; Snyder-McLean et al., 1984). Efforts to enhance communication development are therefore not so much a matter of specifying desirable response topographies, but of providing motivating contexts, including the opportunities and need to communicate (McLean & Snyder-McLean, 1978).

**Learning is Transactional and Affectively Based**

The SP-D approach is transactional in nature, meaning that it addresses the interdependent and reciprocal influences between a child with autism/PDD, the child's social environment, and the interaction between the child and the environment (Sameroff & Fiese, 1990). Within this model, it is believed that if newly acquired skills are to be integrated within a child's current behavioral repertoire and cognitive understanding, teaching should extend current knowledge and incorporate self-generated behaviors. The focus is on helping children communicate about things they know or emotions they feel. Similarly, language should be taught as a tool to help organize experiences and plan and regulate behavior, allowing for the integration of experiences across environments and times of occurrence. Thus, language experience is used to mediate thinking and problem solving and serves to support emotional regulation (Wertsch, 1985; Prizant & Meyer, 1993).

SP-D approaches use rich, affectively charged social interactions as the contexts of language learning (Greenspan, 1992; Greenspan & Wieder, 1998; MacDonald, 1989; Prizant & Wetherby, 1990a). The natural reactions of others in reciprocal interactions refine and reinforce a child's communicative behaviors in terms of both function and structure. Through their social interactions, children experience and come to understand the impact of their commu-
nicative attempts on the environment (Snow et al., 1984). Through affective exchange and attunement, children learn to build trusting relationships with others, which provides the foundation for their social, cognitive, and communicative growth (Greenspan, 1997). This underscores the need for partners to provide consistent and clear responses in their interactions with children with autism/PDD, allowing them to form hypotheses about the behaviors and intentions of others, to perceive the structure of social interaction, and to participate in interactive "scripts" (Prizant et al., 1997; Quill, 1995). Thus, SP-D approaches include the following characteristics:

1. The focus is on teaching spontaneous social communication within a flexible structure, having varied and motivating activities.
2. There is an emphasis on building multimodal communicative repertoires (speech, gestures, augmentative and communication systems (AAC)) so that children have a range of strategies to express intentions.
3. Interactions are characterized by shared control, turn-taking, and reciprocity whenever possible.
4. Learning contexts involve meaningful activities and events, chosen for their interest, motivation, and functionality.
5. The relevance of a child's response is considered relative to the ongoing context and activities, including acknowledgment of unconventional means to communicate.
6. Use of a variety of social groupings is desirable because children's life experiences involve complex social experiences.
7. Information about the sequences and processes of child development is used to frame the sequence of treatment goals and to measure progress in a broader developmental context.
8. Contextual (visual, gestural) supports are seen as essential to help children "make sense" of activities and interactions.
9. There is a focus on helping children acquire socially acceptable means for social control (e.g., means to protest, make choices, etc.) to preclude behavioral difficulties.
10. Emotional expression and affect sharing are seen as central to the interactive and learning process.

Nevertheless, SP-D approaches may include the following limitations:

1. The intensity of learning opportunities may be inconsistent, depending on the skills of communicative partners in developing facilitative contexts and in reacting and responding in a growth-inducing manner to a child's attentional focus and communicative bids.
2. Social reinforcement (i.e., adult responsiveness) may not be consistent or strong enough for some children to maintain attention.
3. The lack of a highly repetitive, minimally distractible learning environment may be difficult for children with extreme attentional problems.
4. Documentation of progress may be inconsistent or lacking in specificity.
5. An approach may not be prescribed enough for parents or professionals who require a clear delineation of the sequence of teaching procedures used to enhance communication abilities.

It is important to note that different goals may be emphasized for different approaches at the SP-D end of the continuum, despite clear similarities in philosophy and practice. For example, Greenspan and Wieder (1997a, 1998) describe their primary goals in terms of children mastering increasingly complex levels of socioemotional growth, which they see as the foundation and impetus for communicative and language development. In contrast, Prizant and colleagues (Prizant et al., 1997; Schuler et al., 1997; Wetherby et al., 1997) focus on more specific social-communication goals in enhancing children's abilities to express communicative intentions and emotions in increasingly more conventional and sophis-
ticated ways, resulting in a growing sense of social competence and increased capacities in emotional regulation.

**The Middle Ground**

In response to persistent concerns about a lack of generalization of trained skills, which was "noted time and time again" in the behavioral literature (Schreibman & Pierce, 1993, p. 184), behaviorally oriented researchers introduced teaching strategies in the 1980s that diverged significantly from earlier DT-TB approaches (Charlop & Haynes, 1994). Among the better known strategies discussed in the contemporary ABA literature are "incidental language teaching" (Hart, 1985); the "Natural Language Paradigm" (NLP), including "pivotal response training" (Koegel, O'Dell, & Koegel, 1989; Schreibman & Pierce, 1993); and "enhanced milieu approaches" (Kaiser et al., 1985). These approaches were developed as methods for achieving a more naturalistic approach of enhancing the language and communication development of children with autism/PDD and other childhood communication disabilities. All were based, in part, on principles and interactive processes drawn from the literature on caregiver-child interaction (Snow & Ferguson, 1977), developmental pragmatics (Bates, 1978; Bates et al., 1987), and applied behavior analysis.

There are a number of striking and significant distinctions between these contemporary ABA approaches and traditional DT approaches. First, "control" of the teaching interaction is either shared (Schreibman & Pierce, 1993) or shifted from "trainers" to children. Teachers are encouraged to "follow the child's lead" to encourage initiation and spontaneity in communication. Second, child-preferred and selected activities provide the primary contexts and topics for communicative exchange (Schreibman & Pierce, 1993). Choice-making and decision-making opportunities are provided, rather than the trainer selecting and imposing teaching tasks. Third, because a child's attentional focus and preferences are followed, natural reinforcers are utilized and interactions are more natural and "loosely structured" than the proscribed training protocols followed in a contrived 1:1 teaching setting. A fourth major distinction involves the specifics of how adults interact with children. As noted earlier, many interactive-facilitative strategies (Prizant & Bailey, 1992) used by "middle-ground" approaches are shared by SP-D approaches, which are based on the normal language and communication development literature (Bates et al., 1987). Adults play more of a role as communicative partner in supporting successful communicative exchanges and interactions, regardless of whether responses are correct or even contingent to the trainer's "topic." In incidental teaching, the NLP, or milieu teaching, it is preferable for communicative exchanges to be initiated by the child, with the adult being highly responsive to children's spontaneous communication (whether verbal, vocal, or gestural). For example, in the NLP, any goal-directed attempt at communication is reinforced (i.e., accepted); thus, there is no requirement that the child produce a predetermined, targeted behavior to receive reinforcement. Similar to SP-D approaches, the focus and ultimate goal of contemporary ABA approaches is to facilitate spontaneous communication and interaction. Incidental teaching, the NLP, and milieu strategies have been found to enhance generalization of language and communicative skills that are taught to children with disabilities, including those with autism (see Hart, 1985; Kaiser & Hester, 1994; and Schreibman & Pierce, 1993, for reviews).

Numerous strategies are described in the literature for designing the environment to encourage the initiation of communication (Wetherby & Prizant, 1993). The developmental literature emphasizes the importance of "engineering" the environment to enhance a child's motivation (i.e., internal drive) to communicate by providing opportunities and reasons for the child to initiate communication. The contemporary behavioral literature also describes specific strategies for encouraging language
use, such as pausing at critical moments in natural routines and interrupting chains of behavior by removing an object needed to complete the task (Halle, 1987; Kaiser et al., 1992). By making the initiation of communication a priority, natural opportunities for communicating can be seized in all settings.

Despite these shared characteristics, contemporary ABA and SP-D approaches differ in a number of important ways. First, some hybrid approaches do not draw as much from the research on sequences of language development in normally developing children and in children with autism/PDD as do SP-D approaches. Second, in SP-D approaches, there is less emphasis on eliciting and measuring discrete behavioral responses as primary measures of success and more emphasis on children’s successful participation in extended interactive sequences and episodes. Third, in hybrid approaches, more intensive online data collection of frequency counts of isolated behaviors (e.g., words, vocalizations) is used to measure behavioral change, which is consistent with their behavioral tradition. In contrast, SP-D approaches place greater emphasis on multimodal communication and more natural teaching so that multiple goals are often targeted within a particular activity (e.g., communication, social-affective signaling, and play goals), and multilevel analyses of functional communicative acts involving verbal, vocal, and nonverbal components are often performed (Prizant & Duchan, 1981; Prizant & Rydell, 1984; Wetherby et al., 1998). Such analyses may be more informative of developmental progress and more reflective of true communicative behavior in daily activities; however, they clearly are more challenging to perform than are counts of specific behaviors. As a result, online data collection tends to be less intensive in SP-D approaches, with the goal of allowing clinicians to be free to participate more fully in and support a child’s success in social interactions. Often videotaping is used for data collection and time-sampling procedures to measure change over time. Other methods for measuring developmental progress and shifts, such as the collection and analysis of language and communication samples, also may be used in lieu of frequency counts of behavior.

Fourth, SP-D approaches are driven by an understanding of the interdependency of different aspects of development, such as the interrelations between communication and socioemotional development (Prizant & Wetherby, 1990a; Greenspan & Weider, 1998) and between language and play development (Westby, 1988). Thus, in addition to measuring developmental progress based on a child’s acquisition of new communicative skills (e.g., words, gestures), progress is also conceptualized in reference to developmental shifts and a progression through developmental stages, thereby informing future goal setting. Fifth, SP-D interventions place greater emphasis on enhancing a child’s communication abilities within meaningful events and routines, with clear beginnings, a sequence of logical steps, and a sense of completion, in order to enhance the child’s cognitive grasp of the structure of events that occur in everyday life (Duchan, 1995; Quill, 1995). Finally, with few exceptions (e.g., Schreibman et al., 1991), SP-D approaches give more emphasis, compared with most contemporary ABA approaches, to addressing a child’s communication development within the context of developing relationships and socioemotional growth. Such goals include understanding and expressing emotions and mastering increasingly complex stages of emotional and social-cognitive development (Greenspan & Weider, 1998; MacDonald, 1989; Prizant & Wetherby, 1990b). Prizant and Wetherby (1990a, 1990b) and Wetherby and Prizant (1992) argue that children’s ability to share emotions with others and express positive affect has a central role in understanding the interrelationships between their communication and socioemotional development and in targeting goals and measuring their treatment outcomes. In contrast, the role of affect and emotional expression in children’s motivation and learning is minimized in both the contemporary behavioral and the DT-TB literature. For example, Green
UNDERSTANDING THE CONTINUUM OF INTERVENTION APPROACHES—Prizant, Wetherby

(1996a), in her argument for using DT-TB approaches as the treatment of choice, stated, "Might we also arrange for the child to have as many enjoyable experiences as possible? ... Sure. But if any of these adjunct therapies jeopardized the chances for the main treatment to work, even if only by taking time away from it, would we subject the child to the adjunct therapy? Hopefully not" (p. 27). If given any attention in the literature, the role of positive affect and spontaneous emotional expression in ABA approaches is relegated to the labeling of emotions of others in repetitive practice drills or as a strategy for providing positive reinforcement for correct child responses by caregivers (Lovaas, 1981). This position contrasts with the central role of shared positive affect and emotional expression by children and caregivers in the naturalistic approaches derived from SP-D traditions. Table 1 contrasts the characteristics of the extreme ends of the DT-TB and social-pragmatic continuum (adapted from Prizant, 1994; Wetherby et al., 1997). It should be remembered, however, that many current approaches for improving the development of language and social-communicative abilities of children with communication and socioemotional difficulties borrow from both traditions and may be thought of as falling somewhere along the middle ground of this continuum.

**DIRECT RESEARCH COMPARISONS OF DIFFERENT APPROACHES**

There are few comparisons between different approaches falling along the continuum of DT-TB to SP-D approaches. Elliott et al. (1991) compared characteristics of analog (i.e., discrete trial) versus "naturalistic" approaches in language training. They noted that analog approaches to language training emphasize discrimination and labeling of materials, with typical tasks involving the naming of stimulus items or identifying items from alternatives. Natural language approaches involve "language teaching as an incidental part of interactions ... in functional tasks and contexts ... based on student interests" (p. 435). Elliott et al. noted that instructors serve a modeling function in natural language approaches, in contrast to the directive function in analog approaches. Based on the results of their study, which compared the use of analog versus natural language procedures in the acquisition of vocabulary among 25 adults with autism and mental retardation, they concluded that "natural language teaching is strongly supported as preferable for people with autism and mental retardation" (p. 444). Although there was no significant difference in learning and retention between the two approaches for this older group of individuals, the many advantages and few disadvantages of natural language procedures led the authors to recommend more naturalistic approaches.

Two studies have addressed differences in the expression of positive affect between DT-TB and more naturalistic paradigms. Koegel et al. (1988) found that children expressed more positive affect using the NLP compared with DT-TB procedures. They also found that children exhibited fewer avoidance and off-task behaviors and more positive behaviors, presumably due to greater motivation to engage in learning activities. Schreibman et al. (1991) looked for differences in positive affect between two groups of parents; one group was trained to use DT-TB procedures, the other group, pivotal response training, which is based on more child-centered, naturalistic teaching strategies. The results of this study indicated that parents using the more naturalistic procedures demonstrated significantly more positive affect than did those using DT-TB procedures. Schreibman et al. (1991) noted that these results support the hypothesis that pivotal response training procedures "may represent more naturalistic parent-child interactions and may be more pleasant for parents to conduct as compared to the more highly structured interactions associated with the more traditional discrete trial form of treatment" (p. 488). They added that "it is tempting to believe that there is a direct causal relationship between positive affect and more child improvement re-
<table>
<thead>
<tr>
<th>TABLE 1. Comparison of DT-TB and SP-D Approaches for Enhancing Social Communication</th>
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<tbody>
<tr>
<td><strong>Degree of Prescription versus Flexibility in Teaching</strong></td>
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<tr>
<td>DT-TB: Highly prescribed—content and procedures determined on an a priori basis as part of program; variation must be minimal</td>
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<td>SP-D: Strategies applied systematically but flexibly; capitalize on opportunities as they appear or are created</td>
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<td><strong>Adult versus Child Centered Procedures</strong></td>
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<tr>
<td>DT-TB: Adult initiates &quot;topic,&quot; determines/maintains focus of attention; adult control reduced over time</td>
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<td>SP-D: Content influenced by child's level of development; whenever possible, follow child's lead and attentional focus</td>
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<td><strong>Child Role—Initiate versus Respond</strong></td>
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<tr>
<td>DT-TB: Initially train responding; train &quot;spontaneity&quot; later</td>
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<tr>
<td>SP-D: Priority placed on child initiation, in appropriate balance to responding</td>
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<tr>
<td><strong>Response in Child's Behavior</strong></td>
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<tr>
<td>DT-TB: Consequences depend on predetermined procedures of program</td>
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<tr>
<td>SP-D: Consequences depend on predetermined procedures with some flexibility depending on circumstances and situation</td>
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<tr>
<td><strong>Naturalness of Learning Context</strong></td>
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<td>DT-TB: Initially contrived, discrete trial training in isolated context; eventual movement to &quot;embedded trials&quot; in more natural situations</td>
</tr>
<tr>
<td>SP-D: Learning contexts reflect naturalistic but &quot;engineered&quot; interactions and events</td>
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<td><strong>Relevance of Information on Child Development</strong></td>
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<tr>
<td>DT-TB: Not a primary relevance; goals and procedures based on predetermined program or child's perceived needs</td>
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<tr>
<td>SP-D: Information used to select goals and teaching procedures. Child's learning needs also a factor</td>
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<td><strong>Social Content of Intervention</strong></td>
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<tr>
<td>DT-TB: Primarily one-to-one, especially in early stages; movement to more complex social groupings</td>
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<tr>
<td>SP-D: Groups of different social complexity depending on child's ability, one-to-one and in groups</td>
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<td><strong>Carrerway and Generalization to Other Environments</strong></td>
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<tr>
<td>DT-TB: Generalization programmed for after child reaches criterion in initial training context</td>
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<td>SP-D: Skills taught across environments and persons from early in program</td>
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<tr>
<td><strong>Intensity—Extent and Frequency of Direct Teaching</strong></td>
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<tr>
<td>DT-TB: Intensity is determined by nature of specific program; focus on one-to-one direct teaching</td>
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<td>SP-D: Varies greatly according to child-staff ratio; skill of staff in programming learning opportunities in natural environments</td>
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<tr>
<td><strong>Utilization of Child Strengths</strong></td>
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<tr>
<td>DT-TB: Reinforcers selected on basis of child preferences; activities may not be when curriculum is used</td>
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<tr>
<td>SP-D: Activities based on child preferences and strengths; to the extent possible, follow child's interests</td>
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<td><strong>Type of Reinforcement</strong></td>
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<td>DT-TB: Initial use of artificial reinforcers, with pairing of social, and movement to social</td>
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<tr>
<td>SP-D: Focus on natural reinforcers including responding to child's intents, social reinforcement</td>
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<td><strong>Treatment of Challenging Behavior</strong></td>
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<tr>
<td>DT-TB: Understand behavior from identifying maintaining variables; ignore (extinguish) or punish challenging behavior; if functional analysis is performed, replace with socially acceptable form</td>
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<tr>
<td>SP-D: Understand behavior from developmental perspective and child's intent; if communicative intent can be determined, modify environment/task and/or replace with socially acceptable form; if preintentional, reaction to sensory &quot;overload&quot; or aversive conditions, provide strategies for emotional regulation/calming</td>
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<tr>
<td><strong>Type and Intensity of Data Collection—Documentation of Progress</strong></td>
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<tr>
<td>DT-TB: Typically intensive, ongoing, online data collection, or time sampling; focus on frequency counts of discrete behaviors; looking for increases or decreases in target behaviors</td>
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<tr>
<td>SP-D: Varies greatly, from informal impressions to on-line time-sampling; may use language—communication sampling/analysis to determine changes in level of functioning; looking for changes in developmental patterns in documenting progress</td>
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<tr>
<td><strong>Recognition and Utilization of Individual Differences in Learning</strong></td>
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<tr>
<td>DT-TB: Individual differences taken into account in selecting reinforcers; however, program and child needs determine program content and procedures</td>
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<td>SP-D: Attempts made to determine differences in learning style, with program modifications made according to differences</td>
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<tr>
<td><strong>Role of Typical or Developmentally Advanced Peers</strong></td>
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<tr>
<td>DT-TB: Initially peers play minimal if any role; eventually peers may be trained to play role in structured teaching</td>
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<tr>
<td>SP-D: Peers seen as positive developmental influence; more focus on natural or semi-structured play</td>
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ported in the literature" (p. 488). These findings may be viewed as supporting Greenspan's (1997) contention that affect plays a major organizational role in the cognitive and social development of children both with and without disabilities.

CLAIMS OF EFFECTIVENESS WHEN COMPARING APPROACHES: WHAT DO WE KNOW ABOUT WHAT WORKS?

Although not a primary goal of this article, we decided to explore claims of effectiveness of DT-TB and SP-D approaches in light of the recent claims of superiority of DT-TB approaches in published reviews (Green, 1996b; Smith, 1996). We believe it is premature and misleading to claim that one approach is more effective than other approaches for a number of reasons:

1. Research has supported the effectiveness of a range of approaches that differ in both underlying philosophy and practice along the continuum of DT-TB to SP-D (see Dawson & Osterling, 1997; Rogers, 1996, for reviews). Long-term outcome studies (McEachin et al., 1993; Greenspan & Wieder, 1997b), as well as shorter term treatment efficacy research (Ozonoff & Cathcart, 1998; Rogers & Lewis, 1989; Sheinkopf & Siegel, 1998), demonstrate the effectiveness of approaches along the full continuum. Of course, outcome measures and research procedures vary greatly across studies, which is partially an artifact of the differences between behavioral and developmental research traditions.

2. There is no evidence that any one approach is more effective than others (Dawson & Osterling, 1997; Sheinkopf & Siegel, 1998). There are no studies that have directly compared the effectiveness of two or more approaches using randomly assigned, matched control samples. However, research that compares specific aspects of different approaches has found greater positive affect among the parents and young children enrolled in more naturalistic than those in DT-TB approaches (Schreibman et al., 1991), and no differences were found in the acquisition of vocabulary of adolescents in a DT-TB (analog) approach and those in the NLP (Elliott et al., 1991).

3. No one approach is equally effective for all children. Children in outcome studies do not benefit to the same degree (see Dawson & Osterling, 1997; Rogers, 1996). The two studies receiving the greatest attention in recent years (i.e., Greenspan & Wieder, 1997b; McEachin et al., 1993) have reported the most positive outcomes, 58% and 47% of children, respectively.

4. Available research suffers from methodologic shortcomings. Studies in this area have been criticized for significant problems in such areas as experimental design, subject selection, outcome measures, treatment fidelity measures, and interpretation of results (Green, 1996b; Greenspan & Wieder, 1997; Gresham & MacMillan, 1997, 1998).

5. Studies have focused solely on child variables and child outcome. Family variables, often considered to be critical in early intervention outcome research, have not been addressed in studies of intervention outcome in this area (Gresham & MacMillan, 1997). Seminal research on the efficacy of early intervention for children with a range of disabilities (Shonkoff et al., 1992) has demonstrated that family variables are the
best predictors of outcome, yet such variables have not been examined in research on children with autism/PDD (McEachin et al., 1993; Greenspan & Wieder, 1997b).

6. There is no consensus on how "intensity of treatment" is to be defined. Better outcomes are associated with earlier and more "intensive" interventions (Greenspan & Wieder, 1997a; Green, 1996b); however, there is no consensus and there has been little discussion on how intensity is to be defined, or whether there is a "critical period" for onset of intervention. Regarding efficacy of treatment, researchers have questioned whether "intensity" of services is the crucial variable that accounts for more positive outcomes regardless of the type of intervention provided (Dawson & Osterling, 1997; Greenspan & Wieder, 1997b). It is our contention that defining intensity solely in terms of hours per week of treatment, without examining the quality and nature of "teaching" interactions, will provide little further insight regarding the crucial variables likely to account for the different treatment effects in different children.

7. There is much overlap in approaches that are identified as having different underlying philosophies and practical applications. Although there have been attempts to analyze the elements distinguishing DT-TB and SP-D approaches (Duchan, 1995; Prizant, 1994; Wetherby et al., 1997; Koegel, 1995) (Table 1), there has been more "lumping" of ABA approaches in claims of their superiority, even though many contemporary ABA procedures are closer on the continuum to SP-D approaches than to DT-TB approaches when their critical elements are analyzed.

8. The fidelity of treatment has typically not been measured. When comparing two or more approaches, it is essential to define the specific characteristics and procedures of each approach, the percentage of treatment time used for critical treatment procedures, and whether these procedures are followed faithfully and reliably (i.e., the fidelity of treatment). The latter is especially crucial because attributing meaningful change to specific aspects of treatment and not to other variables is central to discussions of the efficacy of treatment. Furthermore, treatment fidelity is a highly complicated issue. For example, in recent presentations of the most current versions of the Lovaas method, McEachin (1997) and Leaf (1998), both of whom are long-time collaborators of Lovaas, discussed new goals and elements of this approach, which supplement the use of discrete trials. A review of these new elements clearly reveals the influence of SP-D approaches. They include the use of "communicative temptations" (Wetherby & Prizant, 1989) to entice spontaneous communication, working on reciprocal turn-taking, teaching the "power of communication," using play as an important treatment modality rather than just as "breaks" from discrete trials, making therapy "natural and fun," and placing a priority on reducing structure as much as possible (Leaf, 1998; McEachin, 1997). However, DT-TB approaches that rely strictly on Lovaas' early work and are also referred to as the Lovaas method remain quite prevalent, even though practitioners of both the earlier and later Lovaas approaches may refer to their treatment as Lovaas therapy or the Lovaas method. The complication caused by this lack of definition was captured recently by Leaf (1998) in his statement that some current research programs claiming to be studying the efficacy of Lovaas therapy are using procedures that have been abandoned by Lovaas and his colleagues. According to Leaf, "Dr. Lovaas doesn't do Lovaas therapy any more." It is our observation that attributing a particular label to an approach (e.g., ABA versus developmental) may be more reflective of the "school of thought" or influence that a program administrator, researcher, or clinician affiliates him- or herself with, than what goes on in treatment with children. Thus, the issue of treatment fidelity becomes extremely complex, both conceptually and methodologically, as approaches become more eclectic and individualized, a trend that we and others have advocated (Greenspan & Wieder, 1997b; Prizant & Wetherby, 1989).

9. Studies have not documented or accounted for other variables outside of the treat-
ment package that is the object of study. Outcome research must document, rather than ignore, the quality and nature of learning experiences that occur outside the “treatment package” being studied, as well as their possible role in accounting for developmental change. For example, we speak to families from around the country who attribute their child’s progress to a particular therapy (e.g., traditional Lovaas [1981] therapy), yet their child is also participating in regularly scheduled activities such as play-based, social-pragmatic language therapy groups, sensory integration therapy, swimming, play dates, play with siblings, and so forth. In fact, it is our impression that it is more common for these children to receive multiple treatments and activities that reflect a variety of approaches and offer a variety of learning opportunities and social partners than for them to be receiving only one type of treatment. In these circumstances, it is not possible to determine whether change is due to a specific treatment, to other life events, or to the interactions among these possible influences. This problem is a major shortcoming of available outcome research and needs to be addressed in future studies.

Until these issues are resolved in current and future research, claims of superiority for any one approach must be put aside. Realistically, future research may better address such questions as, “Which combinations of treatment elements are most effective in developing individualized approaches for individual children and families?” We have long advocated eclectic and individually designed treatment approaches that are informed by knowledge of developmental as well as behavioral principles (Prizant, 1982; Prizant & Wetherby, 1989), a position that is consistent with both developmentally based clinician/researchers (Greenspan & Wieder, 1997a; MacDonald, 1989) and contemporary behavioral researchers (Strain et al., 1992). Strain et al. (1992) argued for the integration of behavioral approaches as one component of early childhood special education: “Our purpose in coming to the defense of behaviorism is not to assert its supremacy, real or potential over other conceptualizations...we see an integration of perspectives as offering the most promise for research and practice...” (p. 136).

Strain et al. expressed the belief that only through the integration of different perspectives, including ecological, developmental, systems theory, as well as behavioral approaches, can “new and more robust interventions” be developed for children and families.

DEFINING MEANINGFUL OUTCOME MEASURES

It is illuminating to examine the state of the art of intervention research in autism relative to that in the broader field of early intervention. Early intervention has been grappling for years with questions about the efficacy of intervention programs and their long-term effects on children, families, and communities (Shonkoff, 1996; Shonkoff et al., 1988). Two important themes emerge that have important implications for the field of autism. First, outcome measures need to go beyond child outcomes to include family-oriented outcomes (Shonkoff et al., 1988, 1992). Early intervention research has demonstrated that family characteristics (such as socioeconomic level, stress, and supports available) and parent involvement in a child’s development are strong predictors of the child’s outcome. Second, research needs to go beyond traditional measures of these children’s psychomotor, cognitive, and language skills and include “ecologically compelling child characteristics” in measures of such broader characteristics as emotional development, motivation, social competence, peer relationships, and the child’s competence in natural environments (Shonkoff et al., 1988).

Intervention research on children with autism has been negligent in developing a range of meaningful outcome measures. Therefore, extreme caution is advised in drawing conclusions about the efficacy of a particular intervention approach, particularly when making decisions that dramatically affect the cost of services for families.
and school districts and the time commitments of young children. Future research should strive to assess meaningful changes (Meyer & Evans, 1993) that reflect the core domains associated with autism as well as measure family functioning. Intervention research is needed to document the relationship between specific treatment procedures and specific outcomes so that consumers can determine what goals are important and select the procedures that best meet these goals.

CONCLUSIONS

Although there are significant differences in schools of thought and practice at the ends of the DT-TB to SP-D continuum, a few points are not in dispute. For example, when possible, learning in the most natural activities, events, and routines is the most desirable approach to working with young children with autism/PDD; spontaneous and initiated language and communicative behavior are of greater value than is cue-dependent responding; and ideally children should learn and live in the most inclusive environments. In comparing DT-TB with SP-D approaches, the major differences in their philosophy and practice concern when children with autism/PDD should be exposed to more natural interactions and learning opportunities: the extent to which adult control is necessary in fostering these children's development of social, communicative, and other abilities; and how the major goals of treatment are prioritized.

Is there the potential for integrating these different philosophies and arriving at a "higher middle-ground?" We have argued elsewhere (Prizant, 1982; Prizant & Wetherby, 1989; Wetherby et al., 1997) that different treatment approaches need not be viewed as mutually exclusive and have reviewed treatments in this article that borrow aspects of each approach. In our experience, however, some agencies, educators, clinicians, and parents tend to favor either SP-D or DT-TB approaches to the virtual exclusion of the other, thereby ignoring other best practices from the continuum of approaches, even when it may be helpful to integrate them for a particular child. Nevertheless, we believe it is not only possible but even desirable to be "eclectic." For example, ABA approaches are being guided increasingly by a growing appreciation of social-pragmatic, socioemotional, and developmental aspects of communicative competence. Similarly, SP-D approaches are becoming more interested in obtaining systematic measures of progress and treatment outcomes and the judicious use of behavioral teaching strategies. We are encouraged by these increased efforts and the progress made in incorporating aspects of different intervention practices and traditions, which should result in better individualized treatment approaches for children with autism/PDD and their families.

REFERENCES


Brown et al. (1983).


ARTICLE ONE

SELF-ASSESSMENT QUESTIONS

1. Which statement about the effectiveness of early intervention for young children with autism is not true?
   (a) There is evidence that only traditional behavioral approaches produce meaningful progress.
   (b) All children do not necessarily benefit equally from different treatment approaches.
   (c) Effectiveness of intervention appears to be related to intensity of services.
   (d) Different research studies use very different measures of treatment outcome.

2. Which is not a valid criticism of currently available outcome research?
   (a) Other co-occurring variables and treatments are seldom taken into account.
   (b) Family measures are not addressed.
   (c) Long-term outcome studies have not been completed.
   (d) Treatment fidelity is not measured.

3. Which is a characteristic of social–pragmatic, developmental approaches?
   (a) The focus is on teaching spontaneous social communication within a more flexible structure, as well as more varied and motivating activities.
   (b) There is an emphasis on building multimodal communicative repertoires (speech, gestures, AAC) to enable children to have a range of strategies to express intentions.
   (c) Learning contexts involve meaningful activities or events, chosen for interest and motivation.
   (d) All of the above.

4. Which is not a characteristic of discrete-trial, traditional behavioral approaches?
   (a) The teaching structure is highly prescribed, in regards to the stimuli presented, responses targeted, and the consequences provided. Physical arrangements such as seating are often predetermined, and adhered to faithfully.
   (b) There is a focus on teaching discrete behaviors and objectively defined behaviors, with a focus on speech as a primary communicative mode.
   (c) Predetermined criteria are provided for correctness of response. Each response is evaluated as correct or incorrect, with predetermined consequences following the response.
   (d) To the extent possible, interactions are characterized by shared control, turn-taking, and reciprocity.

5. Which statement about the effectiveness of discrete-trial, traditional behavioral versus social–pragmatic, developmental approaches is the most accurate?
   (a) Research has supported the effectiveness of a range of approaches that differ in philosophy and practice along the continuum of DT-TB to SP-D.
   (b) There is evidence that only one approach is the most effective.
   (c) Both approaches have been found to be equally effective for all children with autism.
   (d) Intensity of treatment has been clearly defined and documented in research.