related 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 & Haymes, 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., 1992). 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, 1979; 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

(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 23 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 1. Comparison of DT-TB and SP-D Approaches for Enhancing Social Communication

	Degree of Prescription versus Flexibility in Teaching
DT-TB:	Highly prescribed—content and procedures determined on an a priori basis as part of program; variation must be minimal
SP-D:	Strategies applied systematically but flexibly; capitalize on opportunities as they appear or are created
	Adult versus Child Centered Procedures
DT-TB:	Adult initiates "topic," determines/maintains focus of attention; adult control reduced over time
SP-D:	Content influenced by child's level of development; whenever possible, follow child's lead and attentional focus
	Child Role—Initiate versus Respond
DT-TB:	Initially train responding; train "spontaneity" later
SP-D:	Priority placed on child initiation, in appropriate balance to responding
	Response to Child's Behavior
DT-TB:	Consequences depend on predetermined procedures of program
SP-D:	Consequences depend on predetermined procedures with some flexibility depending on circumstances and situation
	Naturalness of Learning Context
DT-TB:	Initially contrived, discrete trial training in isolated context; eventual movement to "embedded trials" in more natural situations
SP-D:	Learning contexts reflect naturalistic but "engineered" interactions and events
	Relevance of Information on Child Development
DT-TB:	Not a primary relevance; goals and procedures based on predetermined program or child's perceived needs
SP-D:	Information used to select goals and teaching procedures. Child's learning needs also a factor
	Social Context of Intervention
DT-TB:	Primarily one-to-one, especially in early stages; movement to more complex social groupings
SP-D:	Groups of different social complexity depending on child's ability, one-to-one and in groups
	Carryover and Generalization to Other Environments
DT-TB:	Generalization programmed for after child reaches criterion in initial training context
SP-D:	Skills taught across environments and persons from early in program
	Intensity–Extent and Frequency of Direct Teaching
DT-TB:	Intensity is determined by nature of specific program; focus on one-to-one direct teaching
SP-D:	Varies greatly according to child-staff ratio; skill of staff in programming learning opportunities in natural environments
	Utilization of Child Strengths
DT-TB:	Reinforcers selected on basis of child preferences; activities may not be when curriculum is used
SP-D:	Activities based on child preferences and strengths; to the extent possible, follow child's interests
	Type of Reinforcement
DT-TB:	Initial use of artificial reinforcers, with pairing of social, and movement to social
SP-D:	Focus on natural reinforcers including responding to child's intent, social reinforcement
	Treatment of Challenging Behavior
DT-TB:	Understand behavior from identifying maintaining variables; ignore (extinguish) or punish challenging behavior; if functional analysis is performed, replace with socially acceptable form
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 "overload" or aversive conditions, provide strategies for emotional regulation/calming
	Type and Intensity of Data Collection—Documentation of Progress
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
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
	Recognition and Utilization of Individual Differences in Learning
DT-TB:	Individual differences taken into account in selecting reinforcers; however, program and child needs determine program content and procedures
SP-D:	Attempts made to determine differences in learning style, with program modifications made according to differences
	Role of Typical or Developmentally Advanced Peers
DT-TB:	Initially peers play minimal if any role; eventually peers may be trained to play role in structured teaching
SP-D:	Peers seen as positive developmental influence; more focus on natural or semi-structured play

TABLE 1. *Continued*

	Role of Affect and Emotional Expression in Teaching Interactions, and in Measuring Progress
DT-TB:	Trainer's expression of positive affect seen as strategy for providing positive reinforcement; no significant role given in children's learning or in goal setting (other than labeling emotions)
SP-D:	Viewed as central in organizing and motivating children's social participation and learning, in developing relationships with caregivers, and in measuring progress and the quality of interactions
	Parent Involvement
DT-TB:	Parents taught principles of behavior modification and may be encouraged to carry out prescribed teaching program
SP-D:	Parents taught to understand child's developmental patterns and to use natural routines and developmentally based, facilitative strategies

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

Anderson, S., Taras, M., & Cannon, B. (1996). Teaching new skills to young children with autism. In Maurice, C., Green, G., & Luce, S. (Eds.). *Behavioral interventions for young children with autism* (pp. 181–194). Austin, TX: Pro-Ed.

Bates, E. (1976). *Language and context.* New York: Academic Press.

Bates, E. (1979). *The emergence of symbols: Cognition and communication in infancy.* New York: Academic Press.

Bates, E., O'Connell, B., & Shore, C. (1987). Language and communication in infancy. In Osofsky, J. (Ed.). *Handbook of infant development* (pp. 149–203). New York: Wiley.

Bricker, D. (1993). Then, now, and the path between: A brief history of language intervention. In Kaiser, A., & Gray, D. (Eds.). *Enhancing children's communication: Research foundations for intervention* (pp. 11–31). Baltimore, MD: Paul H. Brookes Publishing.

Bricker, D., & Cripe, J. (1992). *An activity-based approach to early intervention.* Baltimore, MD: Paul H. Brookes Publishing.

Brown, R. (1973). *A first language.* Cambridge, MA: Harvard University Press.

Brown et al. (1983).

Bruner, J. (1981). The social context of language acquisition. *Language and Communication, 1,* 155–178.

Carr, E.G., & Durand, V. (1986). The social-communicative basis of severe behavior problems in children. In Reiss, S., & Bootzin, R. (Eds.). *Theoretical issues in behavior therapy* (pp. 219–254). New York, NY: Academic Press.

Carr, E.G., Levin, L., McConnachie, G., Carlson, J., Kemp, D., & Smith, C. (1994). *Communication-based intervention for problem behavior: A user's guide for producing positive change.* Baltimore, MD: Paul H. Brookes Publishing.

Carr, E., Schreibman, L., & Lovaas, O. (1975). Control of echolalic speech in psychotic children. *Journal of Abnormal Child Psychology, 3,* 331–351.

Chapman, K., Leonard, L., & Mervis, C. (1986). The effects of feedback on young children's inappropriate word use. *Journal of Child Language, 13,* 101–117.

Charlop, M.H., & Haymes, L.K. (1994). Speech and language acquisition and intervention: Behavioral approaches. In Matson, J. (Ed.). *Autism in children and adults: Etiology, assessment, and intervention* (pp. 213–240). Pacific Grove, CA: Brooks/Cole.

Clark, G., & Seifer, R. (1985). Asessment of parents' interactions with their developmentally delayed infants. *Infant Mental Health Journal, 6,* 214–225.

Dawson, G., & Adams, A. (1984). Imitation and social responsiveness in autistic children. *Journal of Abnormal Child Psychology, 12,* 209–226.

Dawson, G., & Galpert, L. (1986). A developmental model for facilitating the social behavior of autistic children. In Schopler, E., & Mesibov, G.B. (Eds.). *Social behavior in autism (pp. 237–261). New York: Plenum Press.*

Dawson, G., & Osterling, J. (1997). Early intervention in autism. In Guralnick, M. (Ed.). *The effectiveness of early intervention.* Baltimore, MD: Paul H. Brookes Publishing.

Donnellan, A., Mirenda, P., Mesaros, R., & Fassbender, L. (1984). Analyzing the communicative functions of aberrant behavior. *Journal of the Association for Persons with Severe Handicaps, 9,* 201–212.

Duchan, J. (1989). Evaluating adults' talk to children: Assessing adult attunement. *Seminars in Speech and Language, 10,* 17–27.

Duchan, J. (1995). *Supporting language learning in everyday life.* San Diego, CA: Singular Press.

Duchan, J.F. (1986). Language intervention through sensemaking and fine-tuning. In Schiefelbusch, R. (Ed.). *Communicative competence: Assessment and language intervention.* Baltimore, MD: University Park Press.

Dunlap, G., Vaughn, B., & O'Neill, R. (1998). Comprehensive behavioral support: Application and intervention (pp. 343–364). In Wetherby, A., Warren, S., & Reichle, J. (Eds.). *Transitions in prelinguistic communication.* Baltimore, MD: Paul H. Brookes Publishing.

Dunst, C., Lowe, E., & Bartholomew, P. (1990). Contingent social responsiveness, family ecology, and infant communicative competence. *National Student Speech Language Hearing Association, 17,* 39–49.

Durand, V.M. (1990). *Severe behavior problems: A functional communication training approach.* New York: Guilford.

Elliott, R., Hall, K., & Soper, H. (1991). Analog language teaching vs. natural language teaching: Generalization and retention of language learning for adults with autism and mental retardation. *Journal of Autism and Developmental Disorders, 21,* 433–447.

Fallon, M., Mauer, D., & Neukirch, M. (1994). The effectiveness of sensory integration activities on language processing in preschoolers who are sensory and language impaired. *Infant-Toddler Intervention, 4,* 235–243.

Fay, W.H., & Schuler, A.L. (1980). *Emerging language in autistic children.* Baltimore, MD: University Park Press.

Goldstein, H., & Hockenberger, E.H. (1991). Significant progress in child language intervention: An 11-year retrospective. *Research in Developmental Disabilities, 12,* 401–424.

Green, G. (1996a). Evaluating claims about treatments for autism. In Maurice, C., Green, G., & Luce, S. (Eds.). *Behavioral interventions for young children with autism* (pp. 15–28). Austin, TX: Pro-Ed.

Green, G. (1996b). Early behavioral intervention for children with autism: What does research tell us? In Maurice, C., Green, G., & Luce, S. (Eds.). *Behavioral interventions for young children with autism* (pp. 29–44). Austin, TX: Pro-Ed.

Greenspan, S. (1992). *Infancy and early childhood: The practice of clinical assessment and intervention with emotional and developmental challenges.* Madison, CT: International Universities Press.

Greenspan, S. (1997). *The growth of the mind and the endangered origins of intelligence.* New York: Addison-Wesley.

Greenspan, S.I., & Wieder, S. (1997a). An integrated developmental approach to interventions for young children with severe difficulties in relating and communicating. *Zero to Three,* 18, 5–17.

Greenspan, S.I., & Wieder, S. (1997b). Developmental patterns and outcomes in infants and children with disorders in relating and communicating: A chart review of 200 cases of children with autistic spectrum diagnoses. *Journal of Developmental and Learning Disorders, 1,* 87–141.

Greenspan, S.I., & Wieder, S. (1998). *The child with special needs: Encouraging intellectual and emotional growth.* New York: Addison-Wesley.

Gresham, F., & MacMillan, D. (1997). Autistic recovery? An analysis and critique of the empirical evidence on the early intervention project. *Behavior Disorders, 22,* 185–201.

Gresham, F., & MacMillan, D. (1998). Early intervention project: Can its claims be substantiated and its effects replicated? *Journal of Autism and Developmental Disorders, 28,* 5–13.

Halle, J. Teaching language and in the natural environment: An analysis of spontaneity. *Journal of the Association of Persons with Severe Handicaps, 12,* 28–37.

Hart, B. (1985). Naturalistic language training techniques. In Warren, S., & Rogers-Warren, A.K. (Eds.). *Teaching functional language: Generalization and maintenance of language skills* (pp. 63–88). Baltimore, MD: University Park Press.

Horner, R., Dunlap, G., Koegel, R., Carr, E., Sailor, W., Anderson, J., Albin, R., & O'Neill, R. (1990). Toward a technology of "nonaversive" behavioral support. *Journal of the Association for Persons with Severe Handicaps, 15,* 125–147.

Kaiser, A., Yoder, P. & Keetz, A. (1992). Evaluating milieu teaching. In S. Warren & J. Reichle (Eds.), *Causes and effects in communication and language intervention.* Baltimore, MD: Paul H. Brookes Publishing.

Kaiser, A., & Hester, P. (1994). Generalized effects of enhanced milieu teaching. *Journal of Speech and Hearing Research, 37,* 63–92.

Kaiser, A., Yoder, P., & Keetz, A. (1992). Evaluating milieu teaching. In Warren, S., & Reichle, J. (Eds.). *Causes and effects in communication and language intervention* (pp. 9–47). Baltimore, MD: Paul H. Brookes Publishing.

Klinger, L., & Dawson, G. (1992). Facilitating early social and communicative development in children with autism. In Warren, S., & Reichle, J. (Eds.). *Causes and effects in communication and language intervention.* Baltimore, MD: Paul H. Brookes Publishing.

Koegel, L. (1995). Communication and language intervention. In Koegel, R., & Koegel, L. (Eds.). *Teaching children with autism* (pp. 17–32). Baltimore, MD: Paul H. Brookes Publishing.

Koegel, R., & Koegel, L. (Eds.). (1995). *Teaching children with autism.* Baltimore, MD: Paul H. Brookes Publishing.

Koegel, R., & Johnson, J. (1989). Motivating language use in autistic children. In Dawson, G. (Ed.). *Autism: New perspectives on diagnosis, nature and treatment.* New York: Guilford Press.

Koegel, R., O'Dell, N., & Dunlap, G. (1988). Producing speech use in nonverbal autistic children by reinforcing attempts. *Journal of Autism and Development Disorders, 18,* 525–538.

Koegel, R., O'Dell, M.C., & Koegel, L.K. (1987). A natural language paradigm for teaching nonverbal autistic children. *Journal of Autism & Developmental Disorders, 17,* 187–199.

Leaf, R. (1998). Evolution of behavioral treatment. Seminar presented at the Indiana Resource Center Symposium, "Educational Choices for Young Children with Autism," Indianapolis, IN, February, 26, 1998.

Lovaas, O.I. (1977). *The autistic child: Language development through behavior modification.* New York: Irvington Press.

Lovaas, O.I. (1981). *Teaching developmentally disabled children. The "me" book.* Baltimore, MD: University Park Press.

Lovaas, O.I., Varni, J., Koegel, R., & Lorsch, N.L. (1975). Some observations on the nonextinguishability of children's speech. *Child Development, 48,* 1121–1127.

MacDonald, J. (1989). *Becoming partners with children.* San Antonio, TX: Special Press.

Marfo, K. (1990). Maternal directiveness in interactions with mentally handicapped children: An analytical commentary. *Journal of Child Psychology and Psychiatry, 31,* 531–549.

Maurice, C. (1993). *Let me hear your voice.* New York: Knopf.

Maurice, C., Green, G., & Luce, S. (1996). *Behavioral intervention for young children with autism.* Austin, TX: Pro-Ed.

McCormick, L. (1990). Intervention processes and procedures. In McCormick, L., & Schiefelbusch, R. (Eds.). *Early language intervention.* Columbus, OH: Merrill.

McEachin, J.J. (1997). ABA—From the research clinic to your neighborhood school. Seminar presented for the Families for Early Autism Treatment–Rhode Island (FEAT-RI). Warwick, RI, November 23, 1997.

McEachin, J.J., Smith, T., & Lovaas, O.I. (1993). Long-term outcome for children with autism who received early intensive behavioral treatment. *American Journal of Mental Retardation, 97,* 359–372.

McLean, J., & Snyder-McLean, L. (1978). *A transactional approach to early language training: Derivation of a model system.* Columbus, OH: Charles Merrill.

McLean, L. (1990). Communication development in the first two years of life: A transitional process. *Zero to Three, 11*(1), 13–19.

McLean, L., & Cripe, J. (1997). The effectiveness of early intervention for children with communication disorders. In Guralnick, M. (Ed.). *The effectiveness of early intervention* (pp. 349–428). Baltimore, MD: Paul H. Brookes Publishing.

Meyer, L., & Evans, I. (1986). Modification of excess behavior: An adaptive and functional approach for educational and community contexts. In Horner, R., Meyer, L., & Fredericks, H. (Eds.). *Education of learners with severe handicaps: Exemplary service strategies* (pp. 315–350). Baltimore, MD: Paul H. Brookes Publishing.

Meyer, L., & Evans, I. (1993). Meaningful outcomes in behavioral intervention: Evaluating positive approaches to the remediation of challenging behaviors. In Reichle, J., & Wacker, D.P. (Eds.). *Communicative alternative to challenging behavior—Integrating functional assessment and intervention strategies* (pp. 407–428). Baltimore, MD: Paul H. Brookes Publishing.

Miller, A., & Miller, E. (1989). *From ritual to repertoire: A cognitive–developmental systems approach with behavior disordered children.* New York, NY: Wiley.

Mirenda, P., & Donnellan, A. (1986). Effects of adult interaction style on conversational behavior in students with severe communication problems. *Language, Speech, and Hearing Services in Schools, 17,* 126–141.

Ozonoff, S., & Cathcart, K. (1988). Effectiveness of a home program intervention for young children with autism. *Journal of Autism and Developmental Disorders, 28,* 31–32.

Peck, C. (1985). Increasing opportunities for social control by children with autism and severe handicaps: Effects on student behavior and perceived classroom climate. *Journal of the Association for Persons with Severe Handicaps, 4,* 183–193.

Prizant, B. (1982). Speech-language pathologists and autistic children: What is our role? Part I. *ASHA, 24,* 463–468; Part II, 531–537.

Prizant, B., & Bailey, D. (1992). Facilitating the acquisition and use of communication skills. In Bailey, D., & Wolery, D. (Eds.). *Teaching infants and preschoolers with disabilities.* Columbus, OH: Merrill.

Prizant, B., & Wetherby, A. (1988). Providing services to children with autism (0 to 2 years) and their families. *Topics in Language Disorders, 9,* 1–23.

Prizant, B., & Wetherby, A. (1989). Enhancing language and communication in autism: From theory to practice. In Dawson, G. (Ed.). *Autism: Nature, diagnosis, and treatment* (pp. 282–309). New York: Guilford Press.

Prizant, B., & Wetherby, A. (1990a). Toward an integrated view of early language and communication development and socioemotional development. *Topics of Language Disorders, 10,* 1–16.

Prizant, B.M. (1994). Dimensions to consider in planning and implementing communication and language programs for individuals with autism and PDD. Seminar presented for State of Connecticut Special Education Directors, October 1994.

Prizant, B.M., & Duchan, J.F. (1981). The functions of immediate echolalia in autistic children. *Journal of Speech and Hearing Disorders, 46,* 241–249.

Prizant, B.M., & Meyer, E.C. (1993). Socioemotional aspects of communication disorders in young children and their families. *American Journal of Speech-Language Pathology, 2,* 56–71.

Prizant, B.M., & Rydell, P.J. (1984). An analysis of the functions of delayed echolalia in autistic children. *Journal of Speech and Hearing Research, 27,* 183–192.

Prizant, B.M., Schuler, A.L., Wetherby, A.M. & Rydell, P.J. (1997). Enhancing language and communication: Language approaches. In Cohen, D., & Volkmar, F. (Eds.). *Handbook of autism and pervasive developmental disorders (2nd ed.). New York, NY: Wiley.*

Prizant, B.M., & Wetherby, A.M. (1987). Communicative intent: A framework for understanding social-communicative behavior in autism. *Journal of the American Academy of Child Psychiatry, 26,* 472–479.

Prizant, B.M., & Wetherby, A.M. (1990b). Incorporating a socioemotional perspective in early communication assessment. *Zero to Three, 11,* 1–12.

Quill, K. (Ed.). (1995). *Teaching children with autism: Methods to enhance communication and socialization.* Albany, NY: Delmar Publishers.

Reichle, J., & Wacker, D.P. (Eds.). (1993). *Communicative alternative to challenging behavior—Integrating functional assessment and intervention strategies.* Baltimore, MD: Paul H. Brookes Publishing.

Rogers, S. (1996). Brief report: Early intervention in autism. *Journal of Autism and Developmental Disorders, 26,* 243–246.

Rogers, S., & Lewis, H. (1989). An effective day treatment model for young children with pervasive developmental disorders. *Journal of the American Academy of Child and Adolescent Psychiatry, 28,* 207–214.

Sameroff, A., & Fiese, B. (1990). Transactional regulation and early intervention. In Meisels, S., & Shonkoff, J. (Eds.). *Handbook of early childhood intervention.* Cambridge, MA: Cambridge University Press.

Schreibman, L., Kaneko, W., & Koegel, R. (1991). Positive affect of parents of autistic children: A comparison across two teaching techniques. *Behavior Therapy, 22,* 479–490.

Schreibman, L., & Pierce, K. (1993). Achieving greater generalization of treatment effects in children with autism: Pivotal response

training and self-management. *The Clinical Psychologist, 46,* 184–191.

Schuler, A.L., Gonsier-Gerdin, J., & Wolfberg, P. (1990). The efficacy of speech and language intervention. Autism. *Seminars in Speech and Language, 11,* 242–251.

Schuler, A.L., Wetherby, A.M., & Prizant, B.M. (1997). Enhancing language and communication: Prelanguage approaches. In Cohen, D., & Volkmar, F. (Eds.). *Handbook of autism and pervasive developmental disorders* (2nd ed.).

Sheinkopf, S., & Siegel, B. (1998). Home-based behavioral treatment of young children with autism. *Journal of Autism and Developmental Disorders, 28,* 15–23.

Shonkoff, J. (1996). Some thoughts on the effectiveness of early intervention. Paper presented at the Emerson College Symposium on Autism and PDD, Boston, MA.

Shonkoff, J., Hauser-Cram, P., Krauss, M., & Upshur, C. (1988). Early intervention efficacy research: What have we learned and where do we go from here? *Topics in Early Childhood Special Education, 8,* 81–93.

Shonkoff, J., Hauser-Cram, P., Krauss, M., & Upshur, C. (1992). Development of infants with disabilities and their families—Implications for theory and service delivery. *Monographs of the Society for Research in Child Development, 57* (6), Serial Number 230.

Smith, T. (1996). Are other treatments effective? In Maurice, C., Green, G., & Luce, S. (Eds.). *Behavioral interventions for young children with autism* (pp. 45–59). Austin, TX: Pro-Ed.

Snow, C., & Ferguson, C. (1977). *Talking to children: Language input and acquisition.* Cambridge: Cambridge University Press.

Snow, C., Midkiff-Borunda, S., Small, A., & Proctor, A. (1984). Therapy as social interaction: Analyzing the context for language remediation. *Topics in Language Disorders, 3,* 72–85.

Snyder-McLean, L., Solomonson, B., McLean, J., & Sack, S. (1984). Structuring joint action routines: A strategy for facilitating communication and language development in the classroom. *Seminars in Speech and Language, 5,* 213–228.

Strain, P., McConnell S., Carta J., Fowler S., Neisworth J., & Wolery M. (1992). Behaviorism in early intervention. *Topics in Early Childhood Special Education, 12,* 121–141.

Tiegerman, E., & Primavera L. (1981). Object manipulation: An interactional strategy and autistic children. *Journal of Autism and Developmental Disorders, 11,* 427–438.

Tiegerman, E., & Primavera L. (1984). Imitating the autistic child: Facilitating communicative gaze behavior. *Journal of Autism and Developmental Disorders, 14,* 27–38.

Warren, S. (1993). Early communication and language intervention: Challenges for the 1990's and beyond. In Kaiser, A., & Gray, D. (Eds.). *Enhancing children's communication: Research foundations for intervention* (pp. 375–395). Baltimore: Paul H. Brookes Publishing.

Wertsch, J. (Ed.). (1985). *Culture, communication and cognition: Vygotskian perspectives.* New York: Cambridge University Press.

Wetherby, A. (1986). The ontogeny of communicative functions in autism. *Journal of Autism and Developmental Disorders, 16,* 295–316.

Wetherby, A., & Prizant, B. (1989). The expression of communicative intent: Assessment guidelines. *Seminars in Speech and Language, 10,* 77–91.

Wetherby, A., & Prizant, B. (in press). Facilitating language and communication development in autism: Assessment and intervention guidelines. In Berkell, D. (Ed.). *Autism: Identification, education, and treatment* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum.

Wetherby, A., & Prizant, B. (1993). Profiling communication and symbolic abilities in young children. *Journal of Childhood Communication Disorders, 15,* 23–32.

Wetherby, A., & Prizant, B. (1992). Profiling young children's communicative competence. In Warren, S., & Reichle, J. (Eds.). *Causes and effects in language disorders and intervention.* Baltimore, MD: Paul H. Brookes Publishing.

Wetherby, A.M., Prizant, B.M., & Hutchinson, T. (1998). Communicative, social-affective, and symbolic profiles of young children with autism and pervasive developmental disorder. *American Journal of Speech-Language Pathology, 7,* 79–91.

Wetherby, A.M., Prizant, B.M., & Schuler, A.L. (1997). Enhancing language and communication: Theoretical foundations. In Cohen, D., & Volkmar, F. (Eds.). *Handbook of autism and pervasive developmental disorders* (2nd ed.). New York: Wiley.

Wetherby, A.M., & Prutting, C. (1984). Profiles of communicative and cognitive-social abilities in autistic children. *Journal of Speech and Hearing Research, 27,* 364–377.

Wieder, S. (1997). Creating connections: Intervention guidelines for increasing interaction with children with Multisystem Developmental Disorder (MSDD). *Zero to Three, 18,* 19–27.

Wolfberg, P.J., & Schuler, A.L. (1993). Integrated play groups: A model for promoting the social and cognitive dimensions of play in children with autism. *Journal of Autism and Development Disorders, 23,* 467–489.