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AUTISM

Nature, Diagnosis, and Treatment

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CHAPTER 12

Enhancing Language and Communication in Autism

From Theory to Practice

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INTRODUCTION

Most educational and treatment programs currently serving individuals with autism cite the development of language and social communication as a major objective (Rutter, 1985). For persons with autism, the level of communicative competence achieved is closely related to the development of social behavior (Garfin & Lord, 1986) and measures of outcome (Lotter, 1978). Furthermore, there is preliminary evidence that the development of communicative abilities is directly related to the reduction of socially unacceptable and aberrant behavior (Carr & Durand, 1985; Smith, 1985), a significant problem for many persons with autism. Thus, communicative competence may be a primary determinant of the extent to which an individual with autism may be able to participate in daily activities and routines in his or her school, home, and community.

Although few would argue about the importance of the goal of enhancing communication, approaches to working toward this general goal have varied greatly. In some instances, different approaches appear to be diametrically opposed in reference to the selection of specific objectives (e.g., compliance vs. active initiation) and the application of procedures to reach stated objectives. Differences in the practice of communication enhancement appear to derive from or reflect differences in underlying theories, beliefs, and/or philosophies regarding the nature of autism, the nature of language and communication, the developmental process of learning to communicate, and the role played by all individuals involved in the process (e.g., the person with autism, teachers, clinicians, caregivers, siblings, etc.).

In this chapter, we scrutinize the relationship between theory and practice in enhancing communication for autistic individuals. We support the position that

approaches to communication enhancement must be rooted in a sound theoretical or philosophical framework. Otherwise, clinical attempts will be haphazard, unsystematic, ineffective, or inefficient, and may be frustrating and confusing for all persons involved. The discussion begins with an overview of how theories have shaped understandings of social-communicative problems in autism and how these theories have influenced communication assessment and intervention practices. Following this discussion, approaches to communication assessment and enhancement based on current literature on normal social-communicative development are considered.

TYPES OF THEORIES

For the purposes of this discussion, the term "theory" refers to "a belief, policy, or procedure proposed or followed as the basis of action" (*Webster's Dictionary*, 1981, p. 1200). Theories may be formal, such as Skinner's (1957) account of verbal behavior, or informal, such as an educator's or clinician's beliefs about how children learn language, based upon previous experience rather than reference to available literature. In reality, all educators and clinicians bring some theory or underlying philosophy to bear on their work with autistic persons, whether it is based on years of hypothesis testing or grounded in a specific research and theoretical literature.

In general, types of theories affecting communication assessment and enhancement fall into three categories:

1. Theories about the development of communication and language and applicability of these theories to autistic persons.
2. Theories about the role of the learner and the environment in communication development.
3. Theories about the nature of autism and the effect of the concomitant impairment(s) on communicative growth.

Theories about the Nature of Language and Communication Development

The development of language and communication involves a complex interplay of emerging abilities in social, affective, cognitive, and linguistic domains (Bates, 1979). The burgeoning literature in social, communicative, and cognitive development provides a theoretical foundation both for understanding communication problems and for implementing effective and developmentally appropriate interventions. Sameroff (1987) has stated that "unless one understands how development proceeds, there is little basis for attempts to alter it, either through prevention or intervention programs" (p. 274).

Numerous theories have been proposed to account for the normal development and use of language and communication in children. The three major theoretical categories are behavioral, cognitive/psycholinguistic, and pragmatic/social-interactive (Duchan, 1984). Behavioral theory is nondevelopmental in nature; that is, it is based on general models of learning, and not on research in child language development. Cognitive/psycholinguistic and pragmatic/social-interactive theories have emerged out of proposed models of development, as well as cross-sectional and longitudinal investigations of language and communication development.

More specifically, a behavioral account of speech and language development was provided by Skinner (1957). Skinner saw environmental variables as playing the major role in development; in his view, children's production and imitation of sounds are gradually shaped into recognizable speech through reinforcement of successive approximations. In this account, the child learning to speak is considered to be a passive participant. Skinner did not make reference to cognitive variables or unobservable processes (e.g., rule induction), because observable behavior was the focus of inquiry.

Cognitive/psycholinguistic theories emerged in the 1960s and 1970s and described children as active participants in the language learning process. These theories attempted to account for how children develop internalized knowledge regarding language structure, and the relationships between language forms and meanings expressed through language (Bloom, 1970; R. Brown, 1973; Chomsky, 1968). Cognitive/psycholinguistic theories have also stressed the relationships between language and communication development and other dimensions of cognitive development, especially those discussed by Piaget (1954). In general, these theories emphasized that speech and language acquisition are not results of direct teaching by caregivers, but result from children "discovering" language by observing and interacting with others. Although social experiences were acknowledged to influence the learning process, the clear focus of these theories was on the acquisition of cognitive (nonsocial) knowledge believed to be related to language.

Finally, pragmatic/social-interactive theories of the 1970s and 1980s have placed great emphasis on the role of social experiences. Social interaction in the first year of life is seen as providing the foundation for later language and communication development. Children are viewed as active participants who learn to affect the behavior and attitudes of others through active signaling, and gradually learn to use more sophisticated and conventional means to communicate through these interactions. The quality and nature of the contexts in which interaction occurs are considered to have a great influence on the successful acquisition of language and communicative behavior. Thus, proponents of pragmatic theory state that development can only be understood by analysis of the interactive context, not simply by focusing solely on the child or caregivers. The reader is referred to Duchan (1984), Muma (1986), and Snyder and Lindstedt (1985) for further discussion of these and related theories.

Because autism is a developmental disorder, information on normal language and communication development offers an organizational framework for the as-

essment and intervention of language and communication. The current developmental literature provides a rich source of information applicable to clinical practice and offers more than merely a guideline for sequencing communication objectives. This section provides an overview of some of the major issues in the pragmatic and cognitive/psycholinguistic developmental language literature that influence clinical practice, with a discussion of how these not only can contribute to our understanding of communication problems in autism, but also can provide a strong conceptual basis for improving the effectiveness and efficiency of intervention with autistic individuals.

A Matter of Timing

Developmental principles may help to explain the wide discrepancies between linguistic and nonlinguistic abilities and between social and nonsocial abilities that are characteristic of persons with autism. The typically scattered profile may be explained by the accelerated and protracted development of skills requisite for normal communication (Cairns, 1986; Wetherby, 1985). The particular combination of skills and experiences available to the autistic person is not seen at any point in normal development and leads to distinct patterns and strategies for communicating because of the interplay among the available components.

The autism literature consistently describes development in autism as "deviant," rather than as merely "delayed"; this implies that autistic children develop abilities in a sequence and manner different from those of normal children. However, it may be the relative timing of emergence of skills that is unique, and not merely the sequence of development. Many of the behaviors displayed by autistic children that have been considered "deviant" or "aberrant" may be better understood and even considered legitimate and functional when the combination of skills available to the child is considered from a developmental perspective. Furthermore, normal developmental progressions within specific domains may still be applicable in planning intervention; however, they must be used flexibly.

Developmental Progressions

Developmental theorists have been describing sequences, phases, stages, or progressions in the development of specific skills within cognitive, social-communicative, and linguistic domains for many years (e.g., Bates, 1976; R. Brown, 1973; Bruner, 1975, 1978; Piaget, 1952, 1954; Sander, 1962). Because of the developmental interaction of these domains, knowledge about developmental progressions is critical to understanding the communicative impairments in autism.

In order to utilize a developmental approach in communication assessment and enhancement, clinicians must be knowledgeable about normal developmental progressions. This information can provide a frame of reference for understanding

developmental discrepancies across social-cognitive abilities and the specific language-related domains of phonology, morphology, syntax, semantics, and pragmatics (Eager-Flusberg, 1981). However, clinicians must be careful not to apply developmental information too rigidly. A distinction must be made between working with a developmental model and teaching according to a developmental checklist. Bruner (1983) noted that a developmental model stipulates that an individual's understanding of information or acquisition of skills will be framed by the level of intellectual operations or cognitive development reached. Too rigid an interpretation of a developmental model has resulted in "readiness models," which indicate that a certain level of cognitive ability or development *must* be reached in order for an individual to learn certain skills or information. Donnellan and Kilman (1986) noted that this misinterpretation has resulted in inappropriate teaching practices with autistic children, in which so-called "readiness skills" may be targeted for extended time periods.

Developmental Underpinnings

A major theme that appears in the developmental literature is the mutual interaction and interdependence of cognition and social knowledge in development (Cicchetti & Pogge-Hesse, 1981; Emde, 1980; Piaget, 1954; Saarni, 1978). This intimate relationship is reflected in the recent development of the field of social cognition, which refers to the way individuals perceive, interact with, and organize knowledge about other people (Sherrod & Lamb, 1981). Communication lies at the interface of cognition and affect, and thus may be considered a window into the child's social cognition (Saarni, 1978).

Evidence is available from a variety of sources that certain social, cognitive, and communicative skills are correlates to the emergence of words (Bates, 1979; Piaget, 1954; Snyder, 1984; Steckol & Leonard, 1981). Specific component skills that have been identified include tool use or means-ends behavior, communicative intent or social causality, imitation, and functional object use. These foundation skills contribute to the child's ability to use words communicatively and to learn conventional meanings of words.

Several studies have examined these foundation skills in autistic children in relation to language acquisition. Developmental level of imitation and symbolic play have been found to be deficient and related to language level (Curcio, 1978; Dawson & Adams, 1984; Hammes & Langdell, 1981; McHale, Simeonsson, Marcus, & Olley, 1980; Shapiro, Huebner, & Campbell, 1974; Sigman & Ungerer, 1984; Wetherby & Prutting, 1984; Wing, Gould, Yeates, & Brierley, 1977). Curcio (1978) found that causality and means-ends behavior were related to communicative abilities of nonverbal autistic subjects. Wetherby and Prutting (1984) found that autistic subjects at prelinguistic and early language levels showed better performance in tool use and combinatorial play and poorer performance in symbolic play than normal subjects matched for language level. They suggested that

their autistic subjects' propensity for the use of communication to regulate others' behavior and deficiency in the use of communication to attract and direct another's attention may be related to the differential timing of acquisition of these cognitive-social skills.

The recent application of developmental theory to the pattern of behaviors seen in the autistic population suggests that the language and communication impairments reflect underlying impairments in social cognition. Based on this premise, intervention should address the underlying problem, and not merely the surface behavior. In other words, clinicians should consider a child's social-cognitive capacity for learning language and focus on strengthening the social-cognitive underpinnings of language that may be lagging behind. To teach speech or language without consideration for the social-communicative bases for using these tools seems counterintuitive and counterproductive. For example, Lovaas's (1977) inability to teach communicative speech to all his subjects and the massive number of teaching trials needed for many subjects may have resulted from the fact that these developmental issues were not considered. The potential for true progress in communicative growth may only be increased if the foundation skills are present.

Individual Variation in Strategy

Psycholinguistic approaches of the 1960s and early 1970s focused on identifying similar language patterns across children. More recently, the child language literature has shifted focus to exploring individual variation in communication development, and, more specifically, variation in language-learning strategies or styles (Nelson, 1981). Several dichotomous strategies of language development and use have been identified, such as "referential-expressive" development (Nelson, 1973), "intonation-word" learning (Dore, 1974), "nominal-pronominal" strategies (Bloom, Hood, & Lightbown, 1974), and "analytic-gestalt" learning (Peters, 1983). Thus, the lesson of the past decade has been that normal children may approach and successfully accomplish the task of learning language in more than one way. Differences in learning strategies have been explained by many factors that contribute to the child's individual makeup, including heredity, cerebral hemispheric organization, cognitive style, and the language-learning environment. Bates (1979) proposed that variations in the relative timing of the emergence of cognitive abilities may lead to differences in language-learning strategies.

Similar principles may be operating in contributing to the language-learning strategies of the autistic child. Prizant (1982, 1983b) proposed that autistic children use a gestalt strategy in early language learning by imitating unanalyzed chunks or multiword units of speech and subsequently breaking down these units into meaningful segments. He suggested that for many verbal autistic children, language acquisition progresses from the predominant use of echolalia with little evidence of comprehension or communicative intent to the use of echolalia for a

variety of communicative functions, later followed by a decrease in echolalia accompanied by an increase in spontaneous utterances. The use of pronoun reversals and stereotypic utterances, as well as the insistence on certain verbal routines, may reflect a gestalt strategy.

Prizant (1983b) proposed that language learning by autistic children may represent an extreme form of the gestalt style that has been identified in normal children (Peters, 1983). It is intriguing to speculate why a large proportion of autistic children utilize a gestalt strategy to learn language. Dawson, Finley, Phillips, and Galpert (1986) hypothesized that early in language development, autistic children "may tend to rely heavily on those cognitive strategies associated with the right hemisphere" (p. 1452). In a similar vein, Wetherby (1984) noted that "some autistic children may be using the gestalt processing abilities of the right hemisphere as a heuristic means to induce the rules of language" (p. 28). Both Dawson *et al.* (1986) and Wetherby (1984) suggested that a shift from right- to left-hemisphere processing of speech and language may occur in development, possibly accounting for the shift from gestalt to analytic style of language acquisition as discussed by Prizant (1983b). However, a gestalt style has also been observed in some children without social impairments (Nelson, 1981). Many relevant questions regarding the mutual influence of social and cognitive impairments in autism have yet to be addressed (Shah & Wing, 1986). It is likely that the observation and identification of language-learning strategies used by autistic children can provide guidelines for intervention approaches. An understanding of these strategies may serve to provide specific direction for enhancing language. This issue is expanded upon in the final section of this chapter.

Relationship between Language Comprehension and Production

The traditional position on the relationship between language comprehension and production in normal children is that comprehension precedes production. However, studies of normal children's comprehension and production of vocabulary (Goldin-Meadow, Seligman, & Gelman, 1976; Huttenlocher, 1974; Snyder, Bates, & Bretherton, 1981) and subject-object constructions (Chapman & Miller, 1975) indicate that comprehension does not always precede or surpass production. The contemporary position is that comprehension and production proceed through similar developmental sequences, but that the developmental discrepancy between them varies across children and at different points in development (Bloom & Lahey, 1978; McLean & Snyder-McLean, 1978; Musselwhite & St. Louis, 1982; Owens, 1984).

Bloom and Lahey (1978) suggested that waiting to teach production of a particular word, concept, or rule until comprehension has developed is not a prudent clinical practice. The few training studies that have been done have found that training comprehension does not transfer to production skills (Guess & Baer, 1973; Miller, Cuvo, & Borakove, 1977), but that training production does transfer

to comprehension (Miller *et al.*, 1977). Furthermore, normal and language-impaired children have been found to produce words that they do not comprehend (see Leonard *et al.*, 1982). Although further research is needed to explore this relationship, it seems warranted to conclude from the evidence to date that language comprehension and production should be targeted concurrently or that language production should be the primary focus of intervention.

In summary, it is our contention that educators and clinicians can be most effective in enhancing language and communicative ability by judiciously applying knowledge of normal communication development, based on the current theoretical and research literature.

Theories about the Role of the Child and the Language-Learning Environment in Communication Development

Current developmental theories emphasize the child's active, constructive role in conceptually structuring, mastering, and making sense of the environment (Piaget, 1954; Sherrod & Lamb, 1981). Sameroff (1987) has discussed models of longitudinal development based on considerations of both the child and environment, and the nature of the role each plays (i.e., active vs. passive). Sameroff indicates that developmental growth is

never a function of the individual taken alone or the experiential context taken alone. Behavioral competencies are a product of the combination of an individual and his or her experiences. To predict outcome, a singular focus on characteristics of the individual . . . will be misleading. What needs to be added is an analysis and assessment of the experiences available . . . (p. 275)

Three of the models discussed by Sameroff that are applicable to an analysis of communication enhancement efforts are "passive person-active environment," "active person-passive environment," and "active person-active environment." In the first model, "passive person-active environment," Sameroff includes "approaches to behavior modification in which the conditioner actively structures the input . . . but where the person is assumed to make no contribution to the outcome independent of experience" (p. 273). The behavioral notions of "reinforcing properties of a stimulus" or a child's behavior "being under stimulus control" exemplify the environmental rather than person focus of this model.

The second model, "active individual-passive environment," is most descriptive of psycholinguistic and cognitivist approaches where the individual is seen as an active hypothesis tester and constructor of experience, with little emphasis on the nature or quality of environmental experiences. According to Sameroff, Chomskian and Piagetian theories fall under this category. Both Chomsky and Piaget have been criticized for overlooking the significant influence of the quality of environmental experience, especially linguistic, social, and communicative experience, in influencing linguistic and cognitive growth.

Finally, the last model—"active person-active environment"—is exemplified by the "transactional model" of Sameroff and Chandler (1975), which stipulates that

developmental outcomes are not a product of the initial characteristics of the child or the context or even their combination. . . . [They] are the result of interplay between child and context over time, in which the state of one impacts on the next state of the other in a continuous dynamic process. (Sameroff, 1987, p. 274)

Many contemporary approaches to communication enhancement fall within this third model, including the transactional model described by McLean and Snyder-McLean (1978), the interactionist approach described by Bloom and Lahey (1978) and Fey (1986), and the functionalist perspective described by Muma (1986).

The distinction between the "active person-active environment" model and the "passive person-active environment" model is paralleled by Bloom and Lahey's (1978) and Fey's (1986) discussion of how clinicians and educators view their role as interventionists. They noted that a "facilitator" of communicative competence acknowledges the active role of the child in learning. In this model, the clinician's or educator's responsibility is to structure opportunities for learning and to react actively and flexibly to the child's actions or communicative attempts. Great emphasis is placed on individual differences in children and their strategies and current means of communication (Duchan, 1983). This information helps to guide efforts in identifying goals and objectives for communication enhancement. In contrast, the "passive person-active environment" model dictates that the "trainer" is responsible for determining what is to be learned, how it is to be learned, and what behaviors or responses are judged to be acceptable or unacceptable. The often-noted goal of training "compliance" is exemplary of this model. In our experience, this latter model often results in lack of initiation, cue dependency, and problems in generalization.

Recognizing these problems, behavioral interventionists (Halle, 1984; Hart, 1985; Peck, 1985) have begun to apply an "active person-active environment" model to communication enhancement, acknowledging the significance of a child's motivation and strategies in learning, as well as the dangers of approaches that rely too much on external control and do not consider individual differences in children.

Theories about the Nature of Autism

Theories about the nature of the autistic syndrome may have a significant impact on strategies to enhance communication ability. Various theories have been formulated from two different approaches to the study of autism: first, attempts to identify the primary and/or most significant deficits that are presumed to impair communication development; and second, efforts to describe how persons with autism learn, which address profiles of learning strengths and weaknesses.

The first approach identifies primary deficits or pathology that may account for a wide range of symptomatology. Specific examples are as diverse as theories of stimulus overselectivity (Koegel, Egel, & Dunlap, 1980), social avoidance (Tinbergen & Tinbergen, 1983), problems in sensory integration (Ayres, 1979), or an inability to maintain stable states of arousal to sensory stimuli (Delacato, 1974). Practitioners of this type of approach suggest that remediation of primary deficits should have a positive impact on communication, because communication deficits are believed to be secondary to these problems.

The second type of approach places greater emphasis on profiles of ability and disability in determining communication problems and developing approaches to enhance communication ability. It has been documented repeatedly that persons with autism demonstrate relative abilities in rote memory (including memory for and adherence to activity routines), visual-spatial and configurational judgment, and, in some cases, specific musical skills (Hennelin & O'Connor, 1970; Prior, 1979; Prizant, 1983b; Rimland, 1978). Relative disabilities are in communication development, social skills, symbolization, and the ability to express emotions in a conventional manner and understand the emotions and intentions of others (Fein, Pennington, Markowitz, Braverman, & Waterhouse, 1986; Hobson, Chapter 2, this volume; Mundy & Sigman, Chapter 1, this volume; Ricks & Wing, 1975). In general, strengths lie in knowledge about the inanimate (nonsocial) world (i.e., objects, spatial orientation, sequences of events), and weaknesses lie in knowledge of people, interpersonal interaction, and social conventions. It also has been suggested that for persons with autism, the processing of nontransient information, such as that presented through the visual modality (e.g., visual display), is easier than processing of transient, "rapidly fading" information, such as the auditory signals comprising speech (Prizant & Schuler, 1987b).

A reconciliation of the differing approaches (i.e., primary-deficit debates and theories of abilities and disabilities) is now emerging in the literature. Current conceptualizations of the autistic syndrome emphasize the centrality of impairments in social and communicative behaviors (Cohen, Paul, & Volkmar, 1986; Dawson & Galpert, 1986; Denckla, 1986; Fein *et al.*, 1986), based on developmental information. There is now general agreement that the language impairments specific to autism are not primary, but are secondary to impairments within cognitive and social domains (Fein *et al.*, 1986; Rutter, 1983). Most current definitions of the syndrome emphasize impairments in social communication, not just in speech or language (American Psychiatric Association, 1987; Denckla, 1986; Rutter, 1978). The study of social-cognitive, linguistic, and communication impairments has demonstrated that what differentiates the autistic child from the specific language-impaired child and from the nonautistic mentally retarded child is the specific developmental pattern of abilities and disabilities across communicative, social-cognitive, and non-social-cognitive domains.

These recent changes in theory indicate that efforts to understand and enhance communication in autism *must* be guided by addressing the learning strengths of autistic persons. Furthermore, specific symptomatology, especially so-called

"deviant" behavior and patterns of language use, should be understood in reference to the learning style discussed above, rather than simply dismissed as inappropriate and bizarre (Prizant, 1983b). Efforts to enhance communication must take into account how persons with autism learn to communicate. Because such learning may not reflect normal patterns and profiles of communication and social development (Prizant, 1983b; Wetherby, 1986), goals and procedures may have to accommodate such differences.

IMPLICATIONS FOR COMMUNICATION ASSESSMENT AND ENHANCEMENT

It is beyond the scope and purpose of this chapter to present a comprehensive discussion on communication assessment and enhancement (see Fay & Schuler, 1980; Prizant & Schuler, 1987a, 1987b; Prizant & Wetherby, 1985; Rutter, 1985; Schuler & Prizant, 1987). However, we continue to traverse the bridge between theory and practice by reconsidering how current information about normal social-communicative development, about the transactional process affecting communicative growth, and about the nature of autism is beginning to affect both communication assessment and enhancement efforts.

Applying Normal Developmental Information

Over the past decade, theory and research on normal social-communicative development have provided the foundation for assessment and communication enhancement for language-impaired children (Bloom & Lahey, 1978; McLean & Snyder-McLean, 1978; Schiefelbusch & Bricker, 1981). Only recently has this literature begun to have an effect on programs for persons with autism and other severe handicaps. For many years, approaches based upon Skinner's (1957) account of verbal behavior dominated the literature on language training for persons with autism and severe handicaps (Bryen & Joyce, 1985), as exemplified by Lovaas's (1977, 1981) programs. Many authors following behavioral theory either did not consider the emerging literature on language and communication development, due to their belief that such development could be explained by basic tenets of traditional learning theory, or dismissed developmental theories because of the belief that they could not be applied to populations that were not developing normally. Although significant differences remain between so-called behavioral and developmental approaches to enhancing communication, a constructive dialogue has begun that has resulted in a theoretical sharing and cross-fertilization of these models. For further discussion, the reader is referred to Carr (1985), Fey (1986), Koegel and Johnson (Chapter 13, this volume), Lord (1985b), Duchan (1984), and Donnellan and Kilman (1986). As we see it, the most significant contributions of this recent developmental literature to communication assessment and enhancement are based on the following principles.

Preverbal Communication as a Precursor to Verbal Communication

Communication development involves continuity from preverbal communication through linguistic communication, and the development of preverbal communication is a necessary precursor to the development of the intentional use of language to communicate (Bates, 1976; Harding, 1984; Harding & Golinkoff, 1979). This basic tenet holds for children with autism as well as for other children with or without disabilities (Prizant & Wetherby, 1985). Thus, for assessment purposes, it is incumbent upon clinicians to develop a communicative profile for an individual, based on the specific communicative intents expressed and the means used to express specific intents, whether verbal, vocal, gestural, or combinations thereof (Prizant & Schuler, 1987b; Prizant & Wetherby, 1985; Wetherby & Prizant, in press). An individual's strategies and abilities in communication, and the ways in which they vary across situational contexts, need to be delineated. Thus, the focus is on current competence and ability, rather than simply on listing absent behaviors that need to be developed and/or prioritizing so-called "deficits" for eradication (Prizant, 1983b).

Within a developmental approach, communicative growth may be conceptualized as bidimensional (McLean, Snyder-McLean, Jacobs, & Rowland, 1981; Prizant & Wetherby, 1985). The vertical dimension involves movement from less sophisticated and less conventional means of communication to more sophisticated, conventional, and explicit means, based loosely on patterns of normal development. For example, vertical growth may involve movement from the use of idiosyncratic or unconventional communicative means (e.g., idiosyncratic gestures, physical manipulation) to more sophisticated and conventional means (e.g., conventional gestures, use of a communication board) to express the same intents. Movement from prelinguistic to emerging language stages and beyond also reflects vertical growth.

The notion of developmental continuity from preverbal to verbal levels, one aspect of vertical development, has led to an understanding that communicative intent should be a primary focus of communication enhancement efforts, and that nonspeech communication is a legitimate goal for many persons. The recent use of augmentative communication systems with autistic persons (see Kicirian, 1983, and Schuler, 1985, for reviews) is predicated largely on the understanding that for many nonverbal or minimally verbal individuals, an immediate goal may not be speech but any socially acceptable means of expressing intent, which may provide the necessary scaffolding for later language development. With a careful description of current levels of intentional communication, enhancement efforts may then focus on movement to more sophisticated means of expressing intent. For example, a child who consistently uses physical manipulation to request objects or actions may be taught to use gestures, simple signs, or pictures to accomplish the same goals.

Horizontal growth, which involves expansion of expressive repertoire at spe-

cific levels of development, is also an integral part of the development of communicative competence. However, it is not enough to address only the forms used to express specific meanings. Other language- and communication-related abilities must be taken into account. Expansion may be targeted for areas as diverse as a child's use of different gestural complexes (Bates, 1979), pictures on a communication board, spoken vocabulary, a variety of semantic relations expressed in two- to three-word utterances, or range of functions or intents expressed (e.g., requests, protests, comments).

Communicative Competence as the Outcome of Synergistic Development

The development of communicative competence is the outcome of synergistic development in social, cognitive, communicative, and linguistic domains. Traditionally, behavioral approaches to language training were concerned primarily with teaching speech or other surface forms, with little consideration given to conceptual underpinnings and social use of communicative acts (Bryen & Joyce, 1985; Carr, 1985). With a narrow, nondevelopmental focus on form, and an apparent unawareness of the applicability of emerging literature on normal language acquisition, advocates of these approaches did not consider social and cognitive foundations for language acquisition and use. Bryen and Joyce (1985) reviewed 43 language intervention studies with autistic and severely handicapped individuals from the 1970s and found that only 16.2% considered social factors; consideration of specific cognitive factors ranged from 0% (means-ends skills) to a high of 11.6% (symbolic functioning). Similarly, they found that clinicians who began to use nonspeech communication systems with nonverbal individuals rarely considered social and cognitive factors. Assessments were relegated to collecting baseline data on the presence or absence of various aspects of linguistic form (e.g., repertoire of speech sounds, expressive and receptive vocabulary, presence or absence of specific grammatical forms, etc.). Without a framework for understanding the complexities and interdependencies in development, efforts to teach language targeted isolated behaviors for intervention, with the underlying assumption being that training sound production (through imitation) would result in "words," and "sentences" would result from training children to combine "words." Although Skinner's (1957) theory of the development of verbal behavior no longer is considered a credible explanation of language development, researchers and clinicians have clung to this model in their efforts to train speech (Lovaas, 1977, 1981).

Recent approaches to assessment and intervention are now concerned with examining a child's communicative profile in reference to specific emerging social and cognitive capacities found to be related to communicative development. In fact, this literature has provided greater insight into the very nature of autism by identifying profiles of discrepancies among emerging abilities in communicative,

social-cognitive, cognitive, and social-affective domains (Cohen *et al.*, 1986; Fein *et al.*, 1986; Wetherby & Prutting, 1984).

In reference to communication enhancement, a child's developmental profile (i.e., social, cognitive, and communicative) provides important information for clinical decision making. For example, decisions regarding the introduction of nonspeech communication systems are derived from a child's developmental profile, based on measures of expressive and receptive language, vocal and gestural imitation, communicative intent, and social and nonsocial means-ends behavior. However, the inflexible use of decision-making rules should be avoided (Schuler, 1985). Furthermore, because the most severe impairments in autism involve social-cognitive and social-affective realms of development (Denckla, 1986; Fein *et al.*, 1986), communication enhancement efforts need to be framed by social and affective contexts appropriate to a child's developmental level (Dawson & Galpert, 1986). Dawson and Adams (1984) found that they were able to increase social responsiveness, quality of play, and gaze behavior in autistic children who were "low imitators" by imitating their behavior rather than presenting developmentally discrepant models for imitation. The significance of these findings is that the early development of imitation may provide young children with a strategy for further social and communicative growth, and that such development can be stimulated in intensive "naturalistic" play interactions. Because imitation provides a context for learning about and sharing social, cognitive, and affective experiences (Dawson & Galpert, 1986; Prizant, 1986; Uzgiris, 1981), progress in this area could enhance development in many domains.

For older and/or higher-functioning individuals, it is important to target linguistic forms (e.g., spoken, signed written words and phrases) that not only will have an impact on everyday independent functioning, but also are within the developmental range of linguistic and conceptual capacities of an individual. Many persons with autism are quite adept at memorizing and rotely reproducing linguistic forms (either written, signed, or spoken); however, this strategy may not result in the development of an internalized rule-governed system. Unfortunately, these "splinter skills" may not be realized as functional in an individual's life unless equal emphasis is placed on the meanings or conceptual underpinnings of such forms, and how they may be used in interacting with others (Prizant & Schuler, 1987b). This information can only be obtained by considering the relative profile of abilities and disabilities in cognitive, social, and linguistic domains.

Developmental theory also provides specific guidelines for selecting a sequence of language and communicative forms appropriate to an individual's linguistic and cognitive capacities. Behavioral language treatment programs often violate normal developmental progressions. For example, Lovaas (1977) suggested teaching yes-no to encode affirmation-denial (e.g., "Is this an X?") without considering teaching yes-no to encode acceptance-rejection (e.g., "Do you want X?")—a progression that contradicts normal developmental patterns (Bloom, 1970). Similar problems have been noted in the training of pronouns (Fay, 1979). Nor-

mal patterns of linguistic and communication development typically reflect a gradual increase in linguistic and cognitive complexity (R. Brown, 1973). This would suggest that developmentally earlier forms and meanings should be targeted first to provide a foundation for later development.

Recently, Carr (1985) and Donnellan and Kilman (1986) have claimed that the best communication-enhancing practices at present wed teaching technology ("how to teach") contributed primarily by behavioral theory with content ("what to teach") contributed by developmental approaches. These authors add that so-called functional approaches (L. Brown *et al.*, 1979) to communication enhancement, which emphasizes the relevance of communicative acts to a child's life, have emerged largely from the behavioral literature, although developmentalists have also addressed this issue in detail (Holland, 1975).

The Importance of a Systemic Approach

In a developmental model, attempts are made to understand how a child's behavior "fits into" developing social, cognitive, and communicative competencies. The approach is systemic, rather than one of isolated components. In a developmental approach, all behavior is viewed in reference to a child's growing capacity across developmental domains. One contribution in this area is the application of the developmental concept of communicative intent to understanding both conventional and unconventional communicative behaviors in autism (Prizant & Wetherby, 1985, 1987). Recent analyses of communicative intent and function (Prizant & Duchan, 1981; Prizant & Rydell, 1984; Wetherby & Prutting, 1984) have not only identified communicative intent underlying behaviors previously considered to be socially unacceptable and aberrant, but have also pointed out the need to understand such behavior in reference to developing social, cognitive, and communicative capacities. Thus, assessment is concerned with the varied means a child may use to communicate intent, whether verbal or preverbal, conventional or unconventional. In fact, Wetherby (1986) and Wetherby and Prutting (1984) have noted that the developmental sophistication of certain communicative means may be different for different intents (e.g., words for requests, and self-injurious behavior for protest or rejection).

Within this framework, communication enhancement efforts are concerned primarily with helping a child to acquire conventional means to express intents, with continuing movement toward the use of more sophisticated forms. This issue is relevant for those communicating at prelinguistic levels as well as at emerging language levels. Possibly due to the pervasive impairments in social cognition, and more specifically in imitation and joint referencing (Mundy & Sigman, Chapter 1, this volume), the communication attempts of individuals with autism are often idiosyncratic and not easily readable. In a developmental approach the two general tasks are, first, to understand an individual's relative levels of functioning in communicative and social-cognitive domains; and, second, to help the individual

acquire more conventional means to communicate, emphasizing the conceptual and social-cognitive "meanings" encoded by the communicative acts.

Applying Pragmatic/Social-Interactive Theory

Pragmatic theory (Bates, 1976), or social-interactive theory (Duchan, 1984), "asks how people negotiate interactions with one another" (Duchan, 1984, p. 66). As discussed earlier, recent developmental literature in communication has used pragmatic constructs in attempting to describe the processes and sequences in children's acquisition of social-communicative competence. Behaviorally oriented researchers have also applied pragmatic constructs to communication of autistic children, although these approaches have been largely nondevelopmental (Carr, 1985).

The essence of pragmatic theory is that the unit of analysis is the interaction between two or more people. This research and theoretical literature, which has emerged over the past decade, has addressed three major areas relative to children's emerging communicative competence: communicative intent and function; discourse and conversational behavior; and language adjustments and social-linguistic sensitivity. These areas are now discussed in reference to assessment and communication enhancement for persons with autism.

Within pragmatic theory, the recent emphasis on communicative intention and function highlights the fact that children learn to communicate to get things done (Halliday, 1975). In communication assessment, the challenge for the educator or clinician is to give a clear description of a child's ability to influence others, regardless of the means used. Functional analyses of behavioral approaches (Carr & Durand, 1985; Donnellan, Mirenda, Mesaros, & Fassbender, 1984; Skinner, 1957) have focused on the effects of behavioral acts and not on the child's intentions. A truly pragmatic approach takes into account both a child's intentions and the functions served by behavioral acts (Duchan, 1987; Prizant & Wetherby, 1985; Wetherby & Prizant, *in press*). Documentation of a child's current ability to express a range of intentions provides a foundation for enhancing communication.

Communicative intent can only be inferred by observing behavior across situational contexts. Pragmatic theory has emphasized the need for clinicians and educators to respond to inferred intent, thus providing natural reinforcement. That is, what should be reinforcing to a child's communicative efforts is the child's realizing the impact of his or her efforts. Thus, current approaches encourage clinicians and educators to impute intent to the behavior of children who are at early stages of communicative intentionality, or whose communicative attempts are less conventional and therefore less readable (Dunst & Lowe, 1986; Schuler & Prizant, 1987). Recent pragmatic literature (Harding, 1984) suggests that young children learn how to communicate intentionally by observing others reacting to their behavior as if it was intentionally communicative.

Pragmatic theory also acknowledges the active role of the child in hypothesis testing about communicative interactions and what makes interactions work (Duchan, 1984). Thus, if responses to a child's communicative efforts are clear, consistent, and true to the content and intent expressed, it is more likely that the child will learn about the most effective way he or she is able to express specific intents successfully, or, if necessary, will adjust his or her means to communicate to be more effective.

The developmental literature on discourse and conversation emphasizes that successful communication involves reciprocity and mutual negotiation. Communication assessment and enhancement efforts should, first, determine the extent to which an individual is aware of and can participate in both initiator and respondent roles in communication; and second, determine the most appropriate approaches for helping an individual progress in such knowledge.

Because early taking of turns may provide the foundation for later conversational abilities (Bruner, 1975), current approaches emphasize the active involvement of even very young and lower-functioning individuals at developmentally appropriate levels (Dawson & Galpert, 1986). For older individuals or those with greater communicative competencies, greater emphasis is placed on language use and adherence to conventions of conversation, including strategies to initiate, maintain, and terminate conversations and repair communicative breakdowns (Lapidus, 1985; Prizant & Schuler, 1987a). A major problem resulting from past discrete trial communication training in autism has been the resulting lack of initiation and cue-dependent responding of the persons receiving training (Bryen & Joyce, 1985; Carr, 1985; Prizant & Schuler, 1987b).

The more recent focus on encouraging children to initiate more and to take a more active role in communicating should result in the acquisition of greater knowledge of the reciprocal nature of conversation (Dawson & Galpert, 1986; Mirenda & Donnellan, 1986). Mirenda and Donnellan (1986) found that the use of a "facilitative" versus a "directive" style with autistic and mentally retarded adolescents resulted in higher rates of student-initiated interactions, asking of questions, and initiation of conversational topics. The facilitative style was defined by a high level of adult responsiveness to student initiations. Peck (1985) studied eight severely handicapped students with autism and/or mental retardation and found that "substantial increases in the social communicative behavior of children . . . [were] achieved . . . when teacher interaction style [was] modified to afford more opportunities for student initiation and control of social interactions" (p. 191). Peck added that the teachers had no difficulty in shifting to a more "facilitative" style and in arranging social-communicative opportunities after the basic principles were described and modeled for them. Tiegerman and Primavera (1984), Dawson and Adams (1984), and Dawson and Lewy (Chapter 3, this volume) found that facilitative strategies increased the use of communicative eye gaze in autistic subjects. Such studies are beginning to provide empirical support for the applicability of basic developmental principles regarding social interaction and pragmatic theory.

The third major area of pragmatic theory and research is that of language adjustments and social-linguistic sensitivity. This literature has identified two relevant dimensions for communication assessment and enhancement: first, the need for individuals with autism to be able to make judgments about and adapt to the shifting demands of different communicative situations; and, second, the need for persons communicating with autistic persons to adjust their language and style of social interaction to help facilitate successful interactions.

In communication assessment, it is essential to observe an individual across different situations to determine whether and how communicative abilities vary with different counteractants. If significant discrepancies are noted, attempts should be made to determine the sources of communicative breakdowns in reference to both the types of interactions that occur and the features of situations that may preclude successful communicative exchanges. For example, persons with autism tend to do better in structured and predictable interactions than in novel and unfamiliar situations (Clark & Rutter, 1981; Ferrara & Hill, 1980). The use of caregivers and other informants (e.g., teachers, siblings, etc.) as essential partners in this process is of great importance. Recently, instruments have been developed to help gather information regarding communicative abilities across situational and interpersonal contexts (Lapidus, 1985; Theimer, Schuler, & Perillo, 1985).

In communication enhancement, the ability to adjust language use and communicative style is important for participating appropriately in school, home, and community contexts. For individuals communicating through nonspeech means or at earlier prelinguistic levels of communication, a goal of communication enhancement is the acquisition of the ability to "shift codes," whether it involves using more than one nonspeech system (e.g., sign language for school and home, communication board for community) or, for more competent communicators, learning rules of politeness and "conversational scripts" for specific types of interactions (e.g., talking on the telephone, addressing unfamiliar people). The more recent emphasis on functional approaches (Donnellan & Kilman, 1986) and facilitative styles has placed greater emphasis on language and communication enhancement in varied and natural contexts, requiring communicative adjustments. Role playing of frequently recurring social-interactive routines has been utilized to help foster this ability (Donnellan & Kilman, 1986; Lapidus, 1985).

The significant language comprehension deficits of autistic persons have been discussed extensively (Lord, 1985a; Ricks & Wing, 1975). For individuals at lower cognitive levels, problems may include an inability to acquire any meaning from speech, whereas problems for individuals functioning at higher cognitive and linguistic levels typically include literal and concrete interpretations of language. Ability to participate in communicative interactions depends upon understanding the social and conceptual meanings of verbal and nonverbal communication. Thus, successful communicative exchanges are more likely when verbal and nonverbal communication is adjusted to an individual's level of comprehension. Assessment of comprehension through formal and informal testing, as well as observation in natural environments, helps to determine approximate developmental levels of

comprehension of both verbal and nonverbal communication. Communication directed toward persons with autism can then be adjusted accordingly. This is especially crucial for echolalic individuals, who may give a spurious picture of linguistic competence (Prizant, 1983a). Specific suggestions for adjusting verbal and nonverbal communication are discussed in detail by Prizant and Schuler (1987a).

Traditional behavioral language treatment programs used with autistic children often target receptive language objectives before expressive language objectives. In addition, comprehension is usually taught in a discrimination paradigm devoid of contextual cues and natural motivations to respond, which is counter to the way in which normal children develop comprehension (see Lord, 1985a). Thus, this approach needs to be reconsidered in light of current developmental theory and research. This is particularly pertinent to autistic children because of motivational and attentional problems faced during discrimination-training procedures. Furthermore, because echolalia is common, many verbal autistic children may be able to repeat and produce utterances for a communicative purpose, although they may not comprehend the individual components. Developmental relationships between comprehension and production indicate alternative approaches. The reader is referred to Lord (1985a) for an in-depth discussion of the application of developmental strategies to assessing and facilitating comprehension to autistic children.

Pragmatic/social-interactive theory has probably had the most significant impact on recent trends in communication enhancement for both nondevelopmentalists (Carr, 1985; Hart, 1985) and developmentalists (Dawson & Galpert, 1986; Lord, 1985a; Prizant & Wetherby, 1985). It also has provided a common working language for neobehaviorists, developmentalists, and functionalists, which should result in the continuing dissolution of theoretical boundaries.

Applying Information about the Nature and Symptomatology of the Autistic Syndrome

The recent recategorization of autism as a lifelong developmental disability has provided the impetus for clinicians and researchers to understand autism from a developmental perspective. As discussed earlier, research exploring normal development in social-cognitive and communicative domains has helped to elucidate the characteristics and patterns of abilities and disabilities in autism. With a greater understanding of the syndrome, clinicians are beginning to apply this information to communication assessment and intervention. The primary impact is occurring in several areas: developing understanding of specific symptomatology associated with autism; developing understanding of speech and language characteristics in autism; acknowledging the need to capitalize on autistic individuals' relative strengths; and, finally, constructing models of development in autism that may be the most appropriate standards of reference for assessing communicative growth.

Developing Understanding of Specific Unconventional Behaviors

The words "bizarre," "deviant," and "aberrant" have come to be all too familiar to persons who work and live with autistic individuals. What these descriptors imply is that the behavior observed is often difficult to understand by reference to behavior of normally developing children and other children with disabilities. The range of specific behaviors may be as diverse as repetitive motility patterns (e.g., rocking, hand flapping), use of socially unacceptable means to communicate intent (e.g., aggression, self-injurious behavior), and characteristics of speech and language (e.g., immediate and delayed echolalia, perseverative speech, and metaphorical language). The recent application of various research methodologies, including behavioral, pragmatic, and psycholinguistic, has provided a greater understanding of seemingly difficult-to-understand behavior (Duchan, 1985). For example, there has been a major shift in how disruptive, aggressive, and self-injurious behavior is now viewed (Carr & Durand, 1985). Early conceptualizations of autism as a behavior disorder or emotional disturbance justified efforts to extinguish many of these behaviors, with few attempts to understand dynamics of the behaviors relative to their functions in different situational contexts.

With more recent conceptualizations of autism, such behavior is viewed as secondary to the more basic social-cognitive and communicative impairments (Cohen *et al.*, 1986). Current theory and research is indicating that many of these behaviors can be better understood if they are viewed as an inevitable outcome of pervasive social-cognitive and communicative impairments (Carr & Durand, 1985; Donnellan *et al.*, 1984; Prizant, 1983b; Schuler & Prizant, 1987; Wetherby & Prutting, 1984). In assessment, clinicians and educators are now attempting to understand situational determinants of behavior across contexts and the functions that such behavior may serve for the individuals involved. In communication enhancement, the emphasis is now on altering or adapting environments to preclude the occurrence of aberrant behavior, or on replacing/modifying such behavior with more socially acceptable means that may serve the same functions. These approaches recognize the legitimacy of the child's behavior relative to learning profiles, with an emphasis on building competence rather than simply decreasing behavior.

Developing Understanding of Speech and Language Characteristics

Specific changes have occurred in the way speech and language characteristics are viewed. For example, the work of Prizant and colleagues (Prizant, 1983b; Prizant & Duchan, 1981; Prizant & Rydell, 1984; Schuler & Prizant, 1985) on immediate and delayed echolalia has identified the need to understand such behavior along the continua of intentionality, conventionality, and communicativeness. Thus, assessments need to determine the range of different functional forms of echolalia and the degree of intentionality underlying these forms. With greater

insight into an individual's pattern of echolalic behavior, appropriate strategies for communication enhancement may be derived (Prizant, 1983a). Similarly, Hurtig, Ensrud, and Tomblin (1982) have identified specific functions of incessant questioning, a frequently noted "problem behavior" of persons with autism. They found that in approximately 50% of their observations of autistic individuals, incessant questioning was used as an effort to establish contact with others rather than to request information. Hurtig *et al.*'s findings are easily understood if one considers the difficulty autistic persons have in learning appropriate social conventions of conversation. For both echolalic forms and incessant questioning, communication enhancement efforts have shifted to acknowledging the functions that those forms may serve and helping the individuals involved to acquire more conventional means of expressing the same intent.

Capitalizing on Relative Strengths

Increasing knowledge of autism has also led to strategies in communication assessment and enhancement that attempt to capitalize on specific abilities. One relative strength in autism, visual-spatial ability, has had a significant impact on communication enhancement. Information may be presented through the visual-spatial modality, using pictures, picture symbols, and/or written words either as primary means of communication or as an augmentation to spoken language. Miranda (1985) provided specific suggestions for constructing pictorial communication systems, based on the premise that many persons with autism are more effective in processing information visually than auditorally. Prizant and Schuler (1987a) have also recommended the use of pictures and written words to help individuals with autism understand abstract temporal concepts, including past and future events. Many educational programs currently use "picture schedules" to help children anticipate events and develop a concept of daily routines. For those individuals who have particular difficulty dealing with unpredictable change, concretizing the abstractions of temporal structure may allow the individuals to have greater control by helping them to anticipate changes in routine, and if possible, to select among alternative activities. Clinical experience suggests that visual-spatial representation of time fosters conceptual understandings of life routines, resulting in increased motivation and capacity to communicate about the "not-here-and-now."

Recently, supported employment programs (e.g., Community Services for Autistic Citizens [CSAC], Rockville, Maryland) have demonstrated the efficacy of focusing in on learning strengths. In the CSAC program, formerly institutionalized persons with autism are placed in a variety of vocational settings involving structured tasks that demand good visual-spatial skills (e.g., sorting library books, collating and binding in printing shops, etc.) (Julrs, 1985). Anecdotal accounts of the use of musical skills to foster motivation and even provide employment (e.g., piano tuning) pervade the literature on autism (Rimland, 1978). Thus, the exploitation of relative abilities is applicable to activities for daily living and to

acquisition of vocational skills, as well as to enhancement of communication. Assessment should identify patterns of relative abilities and disabilities to help in setting goals for communication and independent living.

Constructing Models of Development

Finally, researchers and clinicians are beginning to construct models of development in autism that may be used as standards of reference for communication assessment and enhancement. For example, Wetherby (1986) has described an "ontology of communicative functions" in autism that may be qualitatively different from that of normal children and other language-impaired children. She noted that children with autism first communicate for behavioral regulation, a relatively nonsocial purpose for communicating. Later in development, the general functions of attracting another's attention to self and directing another's attention to an object or event may emerge in respective order. For normal and other language-impaired children, a wide range of communicative functions is typically observed in the early development of intentional communication (Wetherby & Prizant, in press; Wollner, 1983). The specific pattern observed in autism may be understood in reference to the nature of the social-cognitive impairment. That is, more social forms of communication are more difficult to acquire because the end goal is social sharing, whereas less social forms having a goal of behavioral regulation (e.g., requesting, protesting) may be easier to acquire.

Prizant's (1983b) proposed model of language development in autism, based on gestalt styles observed in other children, has specific implications for assessment and communication enhancement. In noting that the great majority of individuals with autism who speak either are echolalic or were echolalic in development (Prizant, 1983a), he suggested that a gestalt style may be the primary strategy by which autistic individuals acquire a linguistic system. As noted earlier, this style of language acquisition involves early memorization and repetition of language "chunks" (immediate and delayed echolalia), with subsequent analysis and segmentation of these unanalyzed forms to help form the foundation of a more creative and rule-governed linguistic system. Based upon this model, Prizant (1983a) and Prizant and Schuler (1987a) have suggested specific guidelines for assessment and communication enhancement that address the proposed developmental sequence of language acquisition. For example, assessment of progress in language development should take into account movement from gestalt forms (i.e., echolalia) to creative, generative language. Language intervention should help individuals "break the linguistic code" through reduction and simplification of gestalt forms, while acknowledging the functions that such forms may serve. Clearly, longitudinal research is needed to validate hypotheses about proposed developmental models in autism and to stimulate new hypotheses about the course of development in various domains and interrelationships among these domains.

CONCLUSIONS AND FUTURE DIRECTIONS

Since 1980, communication assessment and enhancement for persons with autism has been greatly influenced by the application of various theoretical models and research methodologies emerging largely from the developmental literature. This is in distinct contrast to the predominance in the 1970s of theory and procedures emerging from traditional behaviorism. This recent influx of information has provided a greater understanding of the autistic syndrome and, more specifically, of problems in social interaction and communication. However, empirical validation of the current application of this knowledge is needed. As noted earlier, these data are beginning to emerge.

Some of the most challenging applications of theory to practice still remain. For example, recent research has focused on the affective and emotional dimensions of autism (Prizant & Schaechter, 1988) and has demonstrated pervasive impairments in the ability of persons with autism to understand others' emotional states (Hobson, 1986 and Chapter 2, this volume) and the often subtle signals associated with affective communication (Hermelin & O'Connor, 1985). The extent to which new insights and research findings such as these can be applied to education and treatment remains to be seen. What seems to be clear, however, is that autistic persons and their families are the beneficiaries of increased efforts to tie theory to practice.

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