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

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Abstract

Charts of 200 children who were diagnosed with autistic spectrum disorder were reviewed. The goal of the review was to reveal patterns in presenting symptoms, underlying processing difficulties, early development, and response to intervention in order to generate hypotheses for future studies. The chart review suggests that a number of children with autistic spectrum diagnoses are, with an appropriate intervention program, capable of empathy, affective reciprocity, creative thinking, and healthy peer relationships; that an intervention approach that focuses on individual differences, developmental level, and affective interaction may be especially promising; and that there are different underlying processing patterns with a difficulty in connecting affect and sequencing capacities as a possible common denominator. It also suggests that there is an early marker, the difficulty in engaging in complex purposeful gestural communication, and that contrary to traditional beliefs, a significant number of children may have relatively better functioning in the first year with a regression in the second and third years. This review also suggests that difficulties with relating and intimacy are often secondary to underlying processing disturbances. Many of the children can become quite loving and caring, thoughtful and creative, suggesting a need to change the criteria for diagnosing these disorders.

Early diagnosis and intervention for children with disorders of communicating and relating has been difficult to achieve. There is often uncertainty about whether a developmental dysfunction is simply a normal variation, a mild self-correcting difficulty, or a severe problem, such as an autistic spectrum disorder. Furthermore, if there is a severe disorder, is treatment likely to be helpful or should parents adapt to chronic limitations?

As to consequence of the uncertainty regarding early signs and intervention efficacy, and in order not to alarm parents, there has understandably been a wait-and –see attitude. There are often pessimistic assumptions, however, which underlie the wait-and see view.

1. There are no reliable early markers for severe disorders of communicating and relating, and, therefore, only time and the full disorder expressing itself will reveal the nature of the communication and relationship disorder.
2. Interventions, while partially helpful for some areas of functioning such as language, are unlikely to significantly alter the course of the disorder. Therefore, there is no reason to expedite the evaluation and intervention program. In contrast, it is more important to allay parents' anxieties and wait and see in the hope that the child does not have the disorder.
3. The primary impairments in severe disorders of relating and communicating are pervasive, involving the very ability to relate to and communicate with others. While intervention will help some children improve more than others, all children with these disorders will continue to have significant impairments in the way they relate to others, think, and communicate. Therefore, parents have to learn to accept their children's limitations.
4. Children with these disorders are more similar than different. It is, therefore, difficult or unnecessary to individualize the program or treatment and educational programs.

To explore these assumptions, we reviewed the charts of 200 children we saw for consultation or treatment over an 8-year period. While there are limitations to a chart review approach, it can identify patterns, generate potentially useful hypotheses, and offer directions for further inquiry. A chart review may be especially helpful when there is in-depth information available on a large number of cases with a very complex, poorly understood disorder undergoing an intensive intervention program and repeated evaluation. A prospective clinical trial, however, is necessary for the definitive study of outcomes.

All the children had severe problems in relating and communicating and were diagnosed, between 22 months and 4 years of age, as having autistic spectrum disorders (i.e., DSM-IV diagnoses of autism or pervasive developmental disorder, not otherwise specified [PDD-NOS]). We found that the majority of these families had asked their primary health care providers about developmental problems three or more months prior to the evaluation and usually it took an additional three or more months for intervention to start. Furthermore, from an analysis of developmental patterns, we found that months before the parents expressed concerns, there were reliable early markers of the communication and relationship dysfunctions in the vast majority of cases. Contrary to textbook descriptions of autistic spectrum disorders, which often describe the majority of children as having an early onset, more than two-thirds of the children showed relatively better development in the first year of life with a clear regression in the second year of life. All 200 cases evidenced auditory processing, motor planning, and sensory modulation dysfunction. There were, however, quite striking differences in the way different children processed information and planned and carried out motor patterns.

After a minimum of 2 years of a comprehensive, relationship/developmentally based intervention program, 58% evidenced very good outcomes. These children became trusting and intimately related to parents, showed joyful and pleasurable affect, and most impressively, had the capacity for learning abstract thinking and interactive, spontaneous communication at a preverbal and verbal level.

These observations suggest new ways of conceptualizing severe disorders of relating and communicating. Autistic spectrum symptoms may not always be as chronic as originally thought. Rather than constituting primary dysfunctions, the symptoms that characterize autistic spectrum disorder may usefully be viewed as a final, common pathway for a variety of underlying central nervous system processing dysfunctions, the most critical of which may be a neurophysiologic dysfunction in the connection between affect (or intent) and the sequencing of motor patterns and verbal symbols.

Background

Severe disorders of relating and communicating appear to be increasing. Estimates have increased from 4/10,000 to 11 to 21/10,000 (Gillberg, 1990; Wing & Gould, 1979). Many practitioners from different parts of the United States informally report seeing more cases of children who fit the criteria for autism and pervasive developmental disorder not otherwise specified, PDD-NOS (DSM-III-R, APA, 1980; DSM-IV, APA, 1994), multisystem developmental disorder, MSDD (DC: 0-3, 1994), and a variety of atypical patterns in communicating and relating.

The criteria for autism described by Kanner (1943) have gradually been broadened in the changing definitions of the *Diagnostic and Statistical Manual of Mental Disorders* published by the American Psychiatric Association. Kanner's original criteria for this disorder involved an infant completely shutting out the external world from the beginning, especially the interpersonal world. The most recent APA descriptions (e.g., DSM-III-R and DSM-IV), however, involve *relative* degrees of dysfunction in reciprocal interaction, relating and symbolic communication, which may emerge at various times in the first 3 years of life.

Research into underlying biological mechanisms for autistic spectrum disorder still appear to lack specificity (Cafiero, 1995; Courchesne et al., 1994; Gillberg, 1990; Rimland, 1964; Schopler & Mesibov, 1987; Courchesne, Yeung-Courchesne, Press, Hesserinck, & Jennigan, 1983). There are a variety of intervention approaches which have promising findings, including behavioral (Lovaas, 1987); pharmacological (Campbell et. al., 1989; Gelle, Ritvo, Freeman, & Yuwiler, 1982; Gillberg, 1989; Handen, 1993; Markowitz, 1990; Panskepp, Lensing, Leboyer, & Bouvard, 1991; Ratay, Sorrer, Mikklesen, & Chmielinski, 1989; Schopler & Mesibov, 1987); educational (Harris, 1975; Koegel, Koegel, & O'Neill, 1989; Olley, Robbins, & Morelli-Robbins, 1993; Stokes & Osnes, 1988); language based (Prizant & Wetherby, 1990); and interpersonal (Carew, 1980; Carr & Darcy, 1990; Feuerstein, Rand, Hoffman, Hoffman, & Miller, 1979; Feuerstein et al., 1981; Harris, Handleman, Kristoff, Bass, & Cordon, 1990; Odom & Strain, 1986. There are also a number of important outcome studies (Bondy & Peterson, 1990; Lovaas, 1987; Miller & Miller, 1992; Rogers, Herbison, Lewis, Pantone, & Reis, 1988; Rogers & Lewis, 1989; Schopler, 1987; Strain and Hoyson, 1988; Strain, Hoyson & Jamison, 1983). The question of intervention efficacy, however, is surrounded by controversy, making it still difficult to draw definitive conclusions (Campbell, Schopler, & Hallin, 1996). In addition, there is a tendency to use specific intervention models, such as certain education al or behavioral

models for large numbers of children rather than piecing together a program based on each child's individual differences and developmental patterns. This leaves unclear how different kinds of children respond to different intervention efforts.

Therefore, there are a number of critical questions about these disorders. What is the range of characteristic symptoms that should be included in the definition? What are the early developmental patterns, as well as underlying biological and psychological mechanisms, of autistic spectrum disorders? What types of interventions are most likely to be helpful for whom? Are these disorders almost always associated with dire prognoses, where the majority of children are expected to have significant emotional, social, and cognitive impairments, and need ongoing care? Alternatively, can any intervention program enable large numbers of children with these disorders to develop healthy emotional relationships, creative, spontaneous patterns of communication and thinking, and a range of developmentally appropriate abilities?

Procedure and Methods

We reviewed the clinical records of 200 children we had evaluated who met the criteria of autism or pervasive developmental disorder not otherwise specified (PDD-NOS) as described in DSM-III-R and DSM-IV, scored in the autistic range on the Childhood Autism Rating Scale (Western Psychology Services, 1988), with scores ranging from 30 to 52, and who participated in evaluations and interventions for two or more years. Upon entry, each child had a comprehensive diagnostic workup and received recommendations for an intervention program based on the child's individual differences and developmental capacities. Periodic reevaluations followed every 2 to 6 months. Each child has been followed for at least 2 years, some up to 8 years, with the last contact considered the outcome. The children ranged in age from 22 months to 4 years with the majority between 2 ½ and 3 ½ years at the initial evaluation.

The clinical work was conducted in a private practice setting with college educated families. About half the population was from out of state and half from the local area.

The charts were reviewed for the following information: presenting symptoms and problems, prior developmental history, the child's maturational and constitutional patterns (individual differences), observations of the infant/child and infant/child-parent interaction patterns (including videotapes of these and, where possible, family videotapes of early developmental patterns), family history, and family functioning. In addition, the Childhood Autism Rating Scale (CARS) (Western Psychology Services, 1988), which rates the severity of autistic symptoms, was implemented for the initial presenting symptoms and developmental patterns and at the last follow-up visit.

Information from follow-up visits included parental reports of changes since the last evaluation, including symptoms or difficulties, adaptive and developmental patterns, observations of parent-child interactions, often with videotapes, and reevaluation reports by occupational therapists, speech pathologists, and educators or special educators. The Functional Emotional Assessment Scale (FEAS) (Greenspan, 1992a; Greenspan % DeGangi, 1997), which indicates the functional developmental levels of emotional, social, cognitive, and language functioning, was used clinically at the initial evaluation and at each follow-up visit. For a sample of children who had done exceedingly well, we administered a Vineland Adaptive Behavior Scale on their most recent follow-up and had videotaped interactions with their parents (which were analyzed using the FEAS). Videos on similar aged children with no diagnosed disorders

and a group of children with continuing autistic patterns were included and raters were blind to the children's status.

The intervention program is based on the floor time model. This is a comprehensive, relationship-based approach tailored to the child's and family's individual differences and the child's developmental level. It includes a home component as well as work with different therapists, such as occupational or physical therapy, speech and language therapy, interactive intensive floor-time work, and early education or special education services (Greenspan, 1992a). The degree to which the family was able to collaborate in and implement all the elements in the program was also rated.

This is a descriptive chart study elucidating patterns from the clinical workups. To remain close to the clinical descriptive data, we summarized patterns and used percentages to describe observed trends. We deliberately avoided statistical analysis, even for some of the data for which drawing statistical conclusions may have been appropriate, to maintain a clinical descriptive focus and respect the limitations of information from medical records. In subsequent analyses, we will use analytic techniques to look, for example, at the degree to which certain antecedent developmental patterns and course of progress may predict certain outcomes. The current study will report on presenting symptoms and problems, early developmental patterns, such as the lack of complex gestures as an early marker, and developmental patterns associated with the intervention program and outcome, including the sequence of improvement and underlying mechanisms associated with autistic spectrum patterns. It will also discuss the limitations in assessment procedures and delays in implementing evaluation and treatment.

Presenting Symptoms and Problems

All the children met the criteria for DSM-IV pervasive developmental disorder, including autism (75%) and PDD-NOS (25%). All had severe impairments in engaging in reciprocal interactions at both the preverbal and verbal levels, in maintaining consistent pleasurable, affective contact (having various degrees of avoidance or self-absorption), and in entering into states of shared attention, where they would focus with a social partner on objects of interest with long interactive sequences, and with evidencing a range of interactive, subtle, nonverbal cues, such as affects and gestures (the back and forth smiles, smirks, head nods and the like).

In addition, all the children evidenced severe difficulties with forming and using symbolic communication. Some of the children had islands of symbolic communication such as using a few words descriptively or functionally, but none could enter into sequences of symbolic give and take at an age appropriate level. The children also all evidenced some degree (from intermittent to most of the time) of self-stimulation and/or perseveration, including rocking, looking at objects through the corner of their eyes, and lining up toys.

There were also differences in presenting symptoms. Some children were completely self-absorbed or avoidant, evidencing only the most fleeting recognition of others or objects and had no islands of symbolic communication. Other children were self-absorbed and avoidant but could intermittently attend and relate, show islands of warm, pleasurable affect, and occasionally employ sequences of reciprocal communication, and islands of symbolic activity (e.g., they used a few words functionally coupled with echolalia). Each child's expected functional capacities were explored to systematically document symptoms (see Table 1). The patterns were as follows:

Affective Engagement

Self Absorption

Five percent of the children were extremely self-absorbed, evidencing almost no affective engagement or pleasure, reciprocal interaction, or symbolic elaboration. Ninety-five percent, in contrast, evidenced some abilities for emotional relating. This is consistent with studies of attachment and emotional expression in this population (Ricks & Wing, 1976; Sigman & Ungerer, 1984), which suggests that children with autistic patterns have attachments and emotional experiences but demonstrate them in their own idiosyncratic manner. Within this group, however, there was a big range in degree of relatedness and the other capacities. The 95% of children with partial abilities for relating divided into the following groups.

TABLE 1
Functional Developmental Levels

Mutual Attention—All Ages	Child's ability to regulate his or her attention and behavior while being interested in the full range of sensations (sounds, sights, smells, movement).
Mutual Engagement—Observable between 3-6 Months	Child's ability to engage in relationships, including the depth and range of pleasure and warmth, as well as related feelings, such as assertiveness, sadness, anger, etc., that can be incorporated into the quality of engagement and stability of engagement (even under stress).
Interactive Intentionality and Reciprocity—Observable between 6-8 months	Two-way, purposeful communication, both initiating and responding. This may be thought of as opening and closing circles of communication, e.g., child looks at or points to a toy, parent follows lead and gives it to him, child closes circle by reaching and smiling. Gestures become more complex as child strings together many circles of communication showing understanding of what to do to get something or somewhere (e.g., gets coat or keys and takes father by the hand to the door, pointing to the car).

Representational/Affective Communication→18 Months	Child's ability to create mental representations (emotional symbols) observed in child's ability to do pretend play or use words, phrases or sentences to convey some emotional intention (e.g., "Want that" "Mad" "Happy" "More").
Representational Elaboration→30 Months	Ability to elaborate in both make-believe and word connections between two or more emotional ideas, e.g., "I'm mad because you took my toy." The ideas need not be related or logically connected but deal with such complex intentions or feelings as closeness, separation, exploration, anger, aggression, self-pride, showing off, etc.
Representational Differentiation→36 Months	Capacity to deal with complex intentions, wishes and feelings in pretend play and symbolic communication (conversations), which involves logic and reality testing, modulating impulses and mood, and learning how to concentrate and plan.

Intermittent Engagement

Thirty-one percent evidenced some infrequent, intermittent capacity for engagement, including, on a need-fulfillment basis, seeking a parent out when hungry and using some very basic social gestures, such as looking at them briefly, or purposeful types of avoidance (deliberately walking away from or turning away from a parent's approach). These children did not evidence either long sequences of reciprocal interaction or meaningful symbolic activity and were often aimless or self-absorbed in self-stimulating or repetitive behaviors.

Intermittent Reciprocity

Forty percent of the population evidenced intermittent capacities for attending, engaging, using simple, reciprocal gestures, such as looking, turning toward or away from a parent, and organizing complex gestures, such as taking a parent by the hand and walking him to the door to go outside or to the refrigerator to find some food. These children also could intermittently evidence some very basic imitative patterns, such as imitating a simple sound or motor gesture (e.g., bang a toy). These children, however, were also self-absorbed or avoidant, depending on the setting and the degree of parental support. Children in this group evidenced complex gestures as much as 30 or 40% of the time or as little as 10% of the time.

Island of Symbolic Activity

Twenty-four percent of the population intermittently evidenced all the capacities just described—engagement, attention, simple and complex reciprocal gestures, and also employed islands of symbolic capacity. Members of this group could, for example, either use complex imitations and simple pretend sequences (such as copying a doll eating and spontaneously putting a finger in the dolly's mouth when the mother would say, "Dolly hungry"). They might use single words, such as *juice* or *out*, to express a need. This group of children, however, frequently also simply repeated words in a nonintentional manner, would enter into self-absorbed and avoidant patterns, and engage in self-stimulatory and perseverative behaviors. In spite of some of their skills, none in this group evidenced age-appropriate reciprocal or symbolic capacities. The degree of perseveration, self-stimulation and echolalia was not generally related to the developmental level of the child (i.e., whether the child had symbolic or reciprocal capacities).

Presenting Patterns: Engagement

No Affective Engagement	5%
Partial Engagement	95%
Of the 95% of children with partial engagement and relatedness: Only intermittent engagement. No reciprocity	31%
Intermittent engaging and reciprocal interaction, but no symbols	40%
Intermittent engaging and reciprocal interaction, also evidenced islands of symbolic capacity	24%

Language Abilities

Receptive language abilities were more or less advanced than expressive, but generally followed a similar pattern. No obvious understanding of even simple verbal communication was evidenced by 55% of the children, 41% had intermittent ability to understand single words and follow simple directions, and 4% could understand two-sequence commands, but somewhat inconsistently and not in all areas. For example, they might understand a command to get a plate and bring it to the table (especially if those words, and the pattern they were part of, were familiar).

Presenting Patterns: Receptive Language

No receptive language understanding	55%
Intermittent with some words and phrases	41%
Two sequence instructions some of the time	4%

Visual-Spatial Abilities

The majority of children were stronger in visual-spatial abilities than auditory processing abilities. A small group of children were precocious in their visual-spatial ability, significantly ahead of age level. They were, for example, able to recognize and discriminate visual patterns or figure out how toys worked. Most of the children have some degree of visual-spatial impairment, although not as great as the auditory processing dysfunction.

Childhood Autism Rating Scale

The childhood Autism Rating Scale (Western Psychology Services, 1988) rates the degree of autistic symptoms on a scale of 15 to 60. A score below 30 is considered nonautistic, while scores of 30 to 60 reflect mild to the most severely autistic. Thirty-six percent of the population scored between 40 and 60. The highest score was 52 (a considerable degree of dysfunction), with 39% scoring between 35 and 40—a moderate degree of dysfunction, and 25% scoring between 30 and 35—a mild degree of autistic dysfunction.

Presenting Patterns: CARS

Rating Scale		Population %
Severe	40-60	36
Moderate	35-40	39
Mild	30-35	25

Individual Differences in Motor Tone and Planning, Sensory Processing, and Sensory Reactivity

The children's presenting developmental patterns were also reviewed with regard to their individual differences in regulatory capacities, which include sensory reactivity, sensory processing, motor planning and muscle tone (Greenspan, 1992a).

Differences in sensitivity to sensation were quite variable, with 39% underreactive to sensation (e.g., were underresponsive to sensations like touch, movement, or sound); 28% self-absorbed (some of the self-absorbed children also had low muscle tone, suggesting that whether an underreactive child seeks out sensations or becomes self-absorbed may, in part, depend on motor patterns); and 11% active and craving, seeking out extra sensation.

Hypersensitivity to sensations such as touch and sound was evidenced by 19%, with 36% showing mixed patterns (where they might be oversensitive to touch and undersensitive to sound or, even within a domain such as sound, be oversensitive to certain frequencies and undersensitive to other frequencies), and 6% not evidencing sensory modality difficulties.

All the children evidenced dysfunctions in auditory processing (receptive language). All the children showed some difficulties with motor planning and sequencing motor acts, such as copying shapes, manipulating an object in a planned sequence rather than repetitively (e.g. taking a car, putting it in a play house, taking it out, and crashing it into another car rather than just rolling a car back and forth or pushing a train on a track).

Severe difficulties in motor planning were evidenced by 48% (i.e., they could not implement a two-step pattern). Some would only do the simplest dropping and dumping objects, while others repeated simple actions over and over again, such as pushing a car back and forth, using a pop-up toy, knocking down blocks. Significant low muscle tone was evidenced by 17%, with difficulties such as learning to crawl, walk, or oral motor activities, stamina and postural control.

Presenting Patterns: Sensory Processing and Motor Planning

Underreactive Self-absorbed 28% Craving sensation 11%	39%
Oversensitive	19%
Mixed (over and under) Reactivity	36%
Auditory Processing Dysfunction	100%
Motor Planning Dysfunction Severe Motor Planning Dysfunction 48% Marked Low Muscle Tone 17%	100%

Early Developmental Patterns

Observation of early developmental patterns suggests that many children evidence a second- or third-year regression. The majority of these children did not have neurophysiologic characteristics consistent with Landau Kleffner syndrome (Mouridsen, 1995). These symptoms were typical for the autistic spectrum disorders. In addition, exploration of the early developmental patterns suggests that the primary impairment appears to involve reciprocal gesturing rather than relating or engaging. The lack of complex gestures may be a useful early marker.

Early Onset vs. Later Regression

In Kanner's (1943) classic description of autism, children were though to have severe difficulties "from the beginning" where they completely shut out the external world.

In order to clarify the characteristic patterns associated with autistic spectrum disorders, we looked at the children's developmental patterns preceding their evaluation. In some instances, we had access to home videotapes (the results of those will be reported in a separate communication) and, in general, they supported the parents' descriptions.

We found a number of patterns, which will be presented in more detail later. Some children indeed from the beginning had significant compromises in their ability to engage and relate. They were hard to engage into a pattern of intimacy and pleasure with back and forth smiles, gesturing, or other affect cueing. Many of these children had low muscle tone and were passive and quite self-absorbed. Some of them, however, were able to gradually become more engaged even though between ages 18 months and 2 ½ years they met the criteria for an autistic spectrum disorder.

Many children in the first year had some partial compromises in their ability to engage, relate, and enter into reciprocal interactions. Then they further lost these abilities in the latter part of the second year or early part of the third year of life.

Other children in the first year of life were viewed by their parents as relatively "typical," not too different from siblings, and were described by parents as having been cuddly and warm, enjoying physical contact, showing pleasure (e.g., smiles and laughter), interacting, and using gestures. Many used some words between 11 and 15 months of age. Then, between approximately 18 and 30 months, they lost these verbal abilities and a great deal of their ability

for engaging and participating in reciprocal interactions. They gradually became more self-absorbed, avoidant, perseverative, and self-stimulatory. Contrary to the description of the type of late onset autistic specific disorder labeled disintegrative disorder (DSM-IV), many of these children, as will be described later, were quite responsive to intervention. In addition, most did not have the EEG abnormalities associated with the Landau Kleffner syndrome (Mouridsen, 1995), another type of late onset disorder with autistic features.

Many of those children who were warm and even "cuddly" in the first year and described by their parents as first evidencing their disorder around age 2, on closer history-taking, however, were found to have compromises in the complex pattern of problem-solving gesturing, characteristic of the beginning to middle of the second year of life. For example, these difficulties involved problems with being able to take mother or father to the refrigerator to get food or to the toy shelf for a favorite toy, or other tasks that involve a complex, multiple-circle, nonverbal communication and problem solving. This pattern, as will be described in subsequent sections, may provide a reliable early marker for these disorders.

In reviewing the charts of the 200 children, 69% of the population evidenced this second- and third-year regression (i.e., late onset of the symptoms of avoidance, self-absorption, perseveration, and self-stimulation somewhere between 18 months and 3 years of age). A gradual onset, beginning in the first year of life, was evidenced by 31%. The pattern of early onset of severe problems of relating in the first year described by Kanner, therefore, occurs with relatively low frequency in this sample. While late onset has been described for a portion of the children by many clinicians, the number of children with relatively late onset may be greater than thought. There appears to be a variety of early developmental patterns associated with later autistic patterns.

Primary Impairment in Engagement or Gestural Communication

We also looked at the children's ability for mastering the functional developmental capacities (Greenspan, 1992a) of shared attention, engagement, simple gestures, complex gestures, use of symbols and nonverbal, symbolic problem solving (see table 1). The impairment in complex problem-solving, gestural interaction was quite specific for autistic spectrum disorders. The ability to engage in and experience warmth and pleasure in relationships was less specific to this disorder.

Many parents reported that their children might not look at them or signal to them either nonverbally or verbally, but would be warm and cuddly and could enjoy comfort. They enjoyed intimacy not only when they were distressed, but at other times as well. After the "regression" in the second or third year of life, many parents described increasing avoidance and self-absorption, but still some remaining intimacy. Only 10 children (5%) of the study sample completely lacked the capacity for some warm or pleasurable engagement. In contrast, all 200 of the children had significant difficulties in generating long chains of reciprocal interchange. This finding is quite different from Kanner's original description of autism, which put the primary impairment in the ability to form a relationship in the first year.

The Lack of Purposeful, Complex Gestures an Earlier Marker

To determine if the lack of complex gesturing could serve as an early marker, we also looked at the degree to which children diagnosed with autistic spectrum disorders evidenced, by age 2, the

presence of complex nonverbal patterns of communication (complex gestures involved long chains of reciprocal interactions used to negotiate a goal such as a toddler taking a caregiver to the door, motioning to go outside). We used age 2, even though this pattern typically emerges between 12 and 16 months of age, so that the delay would be quite significant. One hundred thirty-six children out of 200 (68%) did not evidence this normative, expectable pattern prior to age 2. If we used a 16-month cut off, our clinical impression is that, in all likelihood, many more would not have evidenced complex gestures when expected.

To see if the ability for complex, nonverbal, sequential interaction patterns are characteristic only of autistic spectrum problems or also characteristic of children with language delays and motor problems, we looked at 110 children who did not have autistic features, but who, however, had auditory processing problems, were overreactive to touch or sound, and evidenced motor planning difficulties. These children are often described as having specific language and motor disorders, regulatory disorders, or sensory integration disorders. Their difficulties did not derail their overall development as with autistic disorders. Ninety-six percent of these children were able to enter into complex interactive, gestural communication, and social problem-solving strategies prior to age 2. Only 4% evidenced difficulties in learning complex, purposeful gesturing. The lack of development of this capacity in the second year of life, therefore, may be a useful early marker for children with autistic spectrum or pervasive developmental-type difficulties. This finding is consistent with other studies which have identified a number of the components that go into the ability for complex gestural interaction and problem solving as lacking in children who develop autistic patterns (Attwood, Frith, & Hermelin, 1988; Baron-Cohen, 1994; Baron-Cohen et al., 1996).

Onset of Symptoms: Early Onset vs. Later Regression

Second and Third Year Regression	69%
Gradual Onset in the First Year	31%

Early Developmental Patterns: Ability to Relate

Completely Lacking in Engagement	5%
Completely Lacking Long Chains of Reciprocal Interactions	100%

Lack of Purposeful, Complex Gesturing as an Early Marker

Autistic Spectrum	68% did not evidence complex gestures prior to 2 years of age
Nonautistic Language, Motor, and Sensory Dysfunction	4% did not evidence complex gestures prior to 2 years of age

The ability for complex gestures can be elicited with an easy question which could be routinely used in well-baby care. "How does Johnny or Susie let you know what he or she wants?" If a description of some facet of taking a parent by the hand and walking over or pointing or showing comes up, then the child is capable of complex social, problem-solving gesturing. On the other hand, if it involves just looking in a direction or having tantrums or simply some repetitive actions, like pulling at the parent without showing the parent what he or she wants to do, it does not involve this pattern of complex gesturing.

The characteristic pattern of children who evidence autistic spectrum disorders, then, is of children who do not develop complex chains of problem-solving reciprocal interactions in the

second year even though many can engage with caregivers, use simple gestures, and might have a few words. They often regress in the second or third year with greater self-absorption, avoidance, self-stimulation, and perseveration. Some lose and some retain partial symbolic capacities.

Developmental Progress Associated with Relationship-Based Individual Difference, Interactive Intervention Model

All children received an intervention approach where all contacts (interactions) with the child throughout the day (at all times, using the "floor time" model) included an emphasis on: (1) affects and relationships; (2) the child's developmental level; and (3) individual differences in motor, sensory, affective, cognitive, and language functioning. All children received a comprehensive range of services (e.g., including speech therapy, occupational therapy, general and/or special education, and floor time consultation), and intense floor time interaction sessions at home, ranging from 2 to 5 hours a day (Greenspan, 1992a, 1992b; Greenspan & Wieder, in press). Therapeutic and education services utilized a relationship, individual difference, interactive approach. Also, family patterns, feelings, and coping efforts were addressed continuously (Greenspan, 1992a). The use of the words floor time include the comprehensive model of intervention described above and is identical with developmentally based interactive approaches and relationship, affect-based interventions used at other times.

This approach organizes the intervention around the child's affects and relationships in the context of the child's current developmental level, challenges, and individual differences. For example, with a child who is self-absorbed and not relating to others, the first emphasis would be on pulling the child into a greater degree of pleasure in relating rather than focusing on language or symbolic capacities. For a child who is only able to signal, on a need basis, with repetitive pulling or banging, rather than with a variety of nonverbal signals, the first goal would be to expand these simple gestures into a pattern of more complex reciprocal, affective gestures. For example, to expand a child's perseverative fascination with an object (i.e., tapping it), one might put the object on one's head and challenge the child to take it. With the child who is rubbing a spot on the floor, the clinician or parent might put a hand on the floor covering the spot, inspiring a cat-and-mouse game as the child tries to pick up the hand to get back to his favorite spot. Alternatively, a child who is wandering aimlessly around the room might find his mother or father wandering with him but beating him to his favorite spot. To solve this problem, the child might have to constantly try to hurry up to get there first or to go around his mother or father (generating interaction in place of random or seemingly aimless activity). For the child who is already able to sequence their gestures and is beginning to use words, to facilitate the child's elaboration of imaginative ideas, if the child picks up a doll, one might talk for the doll, pretending to be hungry or needing a kiss. In all these examples, the principle is to create circumstances where the child is "wooed" into a developmental trajectory where he or she can master the expectable stages of emotional growth and the related cognitive and language capacities. In this model, one must pull the child into the developmental sequence at the child's current level of functioning and not skip levels to work on splinter skills.

The child's motor, sensory, cognitive, and language profile is taken into account. The underreactive child, for example, is approached with extra energy and wooing, often with more playful obstructive activity than the child who is oversensitive, where the approach is more soothing, gentle, and gradual. At home, parents are asked to spend 6 to 10 20- to 30-minute

sessions per day working on the child's ability for affective based interactions, using the child's individual differences and developmental level as a starting point. The different therapies also use this individual difference-developmental-level model (i.e. floor time model).

The unique features separating this intervention from other models, such as the behavioral approaches (Lovaas, 1987) or the TEACCH program (Schopler, Mesibov, & Hearsey, 1995), is its focus on relationships and affect, developmental level, individual differences, and comprehensiveness. The theoretical rationale for this intervention (Greenspan, 1992a; Greenspan & Wieder, in press) is that the child's symptoms are often secondary to underlying biologically based processing difficulties including auditory, motor planning, and sensory modulation and processing difficulties. Relationships and affective interactions become derailed secondarily. These secondary disturbances, however, have a large range of possible configurations and are often more rapidly responsive to intervention than the underlying processing dysfunctions. Therefore, the first goal of the intervention is to help the child try to work around the processing difficulties to reestablish affective contact with primary caregivers and begin the process of mastering the presymbolic stages that serve as a basis for language and other higher level symbolic capacities. Specific processing difficulties continue to be treated through speech therapy, occupational therapy, special and early childhood education, and other therapies.

Relationship, affect-based interventions which are based on the child's developmental level and individual differences (in sensory and motor processing) and family patterns should not be confused with play therapy or psychotherapy, which has historically not proven especially helpful for the majority of children with autistic patterns. Traditional psychotherapeutic efforts tend to engage the child in a type of parallel play where he feels the clinician's warmth and support but is not mobilized into types of interaction likely to lead to growth in the critical areas of development (Greenspan, 1992a). The floor time model, in contrast, mobilizes the child's emerging developmental capacities and is based on the thesis that affective interaction can harness cognitive and emotional growth (Feuerstein et al., 1979, 1981; Greenspan 1979, 1981, 1996a; Carew, 1980; Klein, Wieder, & Greenspan, 1987).

Outcome Patterns

The children's patterns and clinical course were based on an experienced clinician's observations and detailed notes organized according to the categories in the Functional Emotional Assessment Scale (Greenspan, 1992a; Greenspan and DeGangi, 1997). To describe outcomes, we divided the children's functioning into three broad groups. A "good to outstanding" outcome group included children who, after two or more years of intervention, evidenced joyful relating, simple preverbal gestures with a variety of affect cues (appropriate, reciprocal smiling, frowns, looks of surprise, annoyance, glee, happiness, and the like). They were able to engage in purposeful, organized, and long, problem-solving, interactive sequences (e.g., 50+ circles of spontaneous verbal communication), and states of shared social attention on various social, cognitive, or motor-based tasks. They had the capacity for creative and imaginative use of symbols (e.g., create and participate in pretend play), and the ability to construct bridges between their symbols (i.e., hold a logical, two-way conversation, separate fantasy from reality, and anticipate consequence). Most importantly, in this group, the children's symbolic activity was related to underlying intent and affect, rather than memorized or rote sequences. These children mastered basic ego functions including reality testing, impulse control, organization of thoughts and

affects, a differentiated sense of self, and an ability to experience a range of affects, thoughts, ideas, and concerns. They no longer evidenced self-absorption, avoidance, self-stimulation, or perseveration. On the CARS autism rating scale, all the children in this group shifted into the nonautistic range.

Some children in the "good to outstanding" group became precocious in their academic abilities, reading, or doing math two or three grade levels above their ages (some perhaps developed their visual-spatial abilities early when auditory processing lagged). Some, even though they had intact basic ego functions, still evidenced auditory or visual-spatial difficulties which were improving. Most of the children in the "good to outstanding" group, even ones with precocious reading or math skills, had some degree of motor planning challenges (e.g., evidenced in fine motor control relating to penmanship or drawing or complex, gross motor challenges).

A second group made significant gains in their ability to relate and communicate with gestures. They became related to their parents, often seeking them out in a joyful, zestful, and pleasurable manner. Parents commented, "I've discovered a little person inside my child." They could enter into long sequences of purposeful reciprocal affective cueing and interactions (e.g., 30 or more circles of communication). They could also enter into states of shared attention with social, cognitive, and motor problem solving. In this group, however, the children were still having significant challenges in developing their symbolic capacities. Some had some partial ability to use symbols in pretend play and language, but significantly below age levels. For example, in this group many children could engage in concrete pretend play sequences, such as driving a car or feeding a doll, and use words for some simple negotiations of their desires ("I want to go outside" or "I want juice"), but were not yet able to construct long, creative, interactive symbolic sequences (i.e., couldn't have a give-and-take conversation or elaborate in a play sequence an experience they had). This group, therefore, had relatively good mastery of early developmental levels and were only beginning their symbolic capacities. This group, like the first group, no longer evidenced self-absorption, avoidance of relating, self-stimulation or perseveration.

A third group continued to have significant difficulties in both the presymbolic and the symbolic realms. They had significant impairments in their ability to attend, enter into simple and complex sequences of gesturing, and, if they were using some concrete symbols in pretend play when props were available or language when they wanted something, it was coupled with a significant degree of self-absorption, avoidance, self-stimulation, and perseveration. In this group, those who had some symbolic capacity (e.g., to sing songs or do puzzles) were unable to imitate and use these abilities in an interactive, communicative manner. Many in this group were making slow progress in their basic ability to relate with warmth to others, but some evidenced vacillation between gaining and losing capacities.

Outcome Findings

The outcomes for the children were addressed in two ways: (1) overall, and (2) relative to the severity which they presented at entry. Each will be described below.

One hundred sixteen of the 200 children (58%) were in the "good to outstanding" outcome group, 50 (25%) were in the "medium" outcome group, and 34 (17%) continued to have significant difficulties. Some of the group with significant continuing difficulties were making

very slow progress while a subgroup of those with significant difficulties, 8 (4%) of the children, were vacillating or losing capacities.

Floor Time Intervention Outcomes

	n = 200 %
Good to Outstanding	58
Medium	25
Ongoing Difficulties	17

Intervention Outcomes: Severity of Presenting Symptoms

To explore the factors other than the intervention program which might have been associated with outcomes, we looked at the distribution of outcomes and initial ratings on the Childhood Autism Rating Scale (CARS). In the good to outstanding group, 20% had 40 or more on the CARS representing a significant degree of autistic difficulty; 43% had 35 to 40 on the CARS scores, indicating a moderate degree of impairment; 37% had 30 to 35, indicating a mild degree of autistic impairment. In contrast, in the group who continued to have significant difficulties, 70% had scores suggesting a significant degree of impairment, 20% had scores in the moderate range and 10% had scores in the mild range. The medium outcome group showed distributions between these two, with 45% having scores of 40 and above (significant impairment), 38% with 35 to 40, in the moderate range, and 17% in the mild range.

The distribution of CARS scores suggests that the children with poor outcomes had a more extreme degree of autistic symptomatology and impairment than the group with the good to outstanding outcomes. The group with the medium outcomes was in between the two on the CARS. It appears that the severity of the presenting symptomatology is a factor in the developmental patterns associated with the intervention. In all the outcome groups, however, there was a distribution on the autism rating scale scores. In the good to outstanding outcome group, there were children with mild, moderate, and severe dysfunctions as well as in the other two groups. The single largest group of presenting patterns is in the CARS 35 to 40 in the moderate range. In addition, children who have presented with all different degrees of severity have made good to outstanding progress, and continued to have severe difficulties. The degree of impairment in itself, therefore, is not an overriding factor, although likely an important one.

Intervention Outcomes: Comparisons of Children with Floor Time, Comprehensive, Developmentally Based, Interactive Approaches, and Traditional Approaches

We had the opportunity to examine the charts of a group of children we saw who had been receiving other interventions and had not yet implemented our recommendations. In order to compare the developmental patterns of children in a comprehensive, developmental, individual-difference, affect-based model of intervention with traditionally approaches, therefore, we studied the charts of these 53 additional children whose parents came seeking additional ideas or second opinions regarding their child's intervention programs or diagnosis. They had been diagnosed with pervasive developmental disorder or autism, and for two or more years they had been receiving speech therapy, occupational therapy, and special education approaches or behavioral therapy. These children presented between ages 4 and 10, the same age range we assessed outcomes in the floor time intervention model. Their parents were also college-

educated and a self-selected group seeking further evaluation and recommendations. Even though these children had similar diagnoses and comparable family characteristics, the patterns we could see in comparison with the intensive floor time intervention group should be viewed as very explorative. The lack of comparative intervention studies for autistic spectrum disorders, however, makes such explorations potentially useful.

Thirty-one of the 53 children (58%) evidenced self-absorption, avoidance, and lack of ability to enter into chains of reciprocal interaction. While this subgroup intermittently evidenced some degree of pleasure in their relationships, they were not able to sustain pleasurable interactions. Some, intermittently, had fragmented use of ideation.

Twenty-one of the 53 children (40%) had some symbolic capacities, but with severe limitations. They generally could not use their islands of symbolic activity in a consistently creative and logical manner. For example, there were some concrete abilities to use for needs, such as getting juice or getting the door open (words like *juice* or *out*, *open, door*). There were also some beginning elements of pretend play, such as feeding the dolly or putting the dolly in the car. However, there was no elaboration on these actions. Occasionally they could respond to multiple choice questions. Often, however, they would be preoccupied with their own play, babble to themselves, or use ideas in a fragmented manner. They continued to be self-absorbed, self-stimulatory, and perseverative. This subgroup, therefore, tended to operate at a concrete, fragmented level of ideation, rather than an elaborative, creative, and logical one and was not yet consistently engaged.

One of the 53 children (2%) evidenced intact ego or personality functions consistent with the description of the good to outstanding floor time intervention group.

On the CARS, 43% of the traditional services group were in the severe range, 15% in the moderate range, 40% were in the mild range, and 2% no longer qualified for the diagnosis of autism.

Floor Time and Traditional Interventions Comparison Groups

	Floor Time %	Traditional Services %
Good to Outstanding	58	2
Medium	24	40
Continuing Significant Difficulties	17	58

Many children, even with years of intervention, are unable to function beyond the level of fragmented, concrete use of ideation and have significant difficulties in presymbolic relating and gestural interactions (e.g., Gillberg & Steffenburg, 1987; Kanner, 1971; Mesibov, Schopler, & Schaffer, 1989; Piven, Harper, Palmer, & Arndt, 1996; Rumsey, Rapoport, & Sceery, 1985; Rutter, Greenfield, & Lockyer, 1967; Szatmari, Barolucci, Bremmer, Bond, & Rich, 1989). The comparison group provides a picture of how some children with autistic spectrum diagnoses progress in typical programs. The comparison group, as indicated earlier, may be a self-selected group of children who were not making significant progress. Our impression, however, is that they were similar to children in many programs. Programs that can do significantly better than the above description of children receiving traditional services should be carefully studied to

learn more about children's potential for growth and what types of interventions may be most helpful.

A number of the comparison children had been in intensive (over 30 hours per week) behaviorally based programs. While some of these children tended to have some use of ideation, and some academic abilities, they generally remained at the level of the fragmented and concrete use of ideation and were self-absorbed when not engaged in structured tasks (Greenspan & Wieder, in press).

In-Depth Study of 20 Children: A Comparison with Children without Developmental Problems

Among the children in the good to outstanding group, we studied 20 of the children who had made the most progress. These children were studied in greater depth to understand the types of changes and potential of some children with autistic spectrum diagnoses in an intensive relationship-based intervention program. The Vineland Adaptive Behavior Scales (Sparrow, Dalla, & Cicchetti, 1984) and the Functional Emotional Assessment Scale (Greenspan, 1992a; Greenspan & DeGangi, 1997) were applied to 20 cases that had made exceptional progress from the good to outstanding outcome group representing children between 5 and 10 years old (5-5 to 10-7). These twenty children were also compared to a group of similar aged children without any history of developmental problems. The intervention subgroup was selected to include a range of ages: five 5-year-olds, six 6-year-olds, four 7-year-olds, three 8-year-olds and two 10-year-old boys. These children had all started intervention between 2 and 4 years of age and had received between 2 and 8 years of intervention and/or follow-up consultation. At the time of outcome, all were attending regular schools, enjoyed relationships with friends, and participated in community activities. Many had been assessed for cognitive abilities using standardized test and were functioning in the superior range.

The Vineland summarizes adaptive behavior in the following three domains: communication (receptive, expressive and written); daily living (personal, domestic, and community); and socialization (interpersonal, play and leisure, and coping). All the children were higher than age level in the communication domain with 60% scoring 1 to 2 years higher than chronological age level. The highest scores were obtained in the socialization domain, with 25% more than one year, 40% more than two years, and 25% more than 3 years ahead of chronological age. The adaptive behavior composite scores which average all the domains reported above were all above age level except for one case, a child who had significant motor difficulties. Again, 60% of the children scored 2 or more years above age, and 30% between 1 and 2 years beyond age level. None of the children presented maladaptive behavior patterns. Even though the Vineland Adaptive Behavior Scales are limited to the practical and functional aspects of daily living, these findings support the good outcomes found clinically.

Further analyses of this data with regard to outcome age, age at onset of treatment, and initial severity (FEAS and CARS) is underway. Meanwhile, several additional observations are noteworthy. Overall, the longer the child was in treatment and the older the child, the higher his scores relative to his age, suggesting that children continued to function progressively better as they grew older. This was especially true for socialization where 90% of the children received scores 2 to 3 years ahead of age level. Furthermore, of the three domains, socialization was higher than communication and daily living 90% of the time. Typically, children with autistic spectrum diagnoses continue to evidence significant social impairments even when there is some

progress in language and cognition. The social skills of the children may reflect the impact of an interactive affect-driven model of intervention where social-emotional goals received emphasis and supported the development of interpersonal, play, and coping skills measured by the Vineland. Also, expressive language abilities were better than receptive abilities in *all* the cases. Daily living was lower than communication 60% of the time, suggesting motor planning difficulties, which would affect daily living. Self-care skills are often more challenging for this population and improved somewhat less relative to the communication and socialization domains.

We also rated the same 20 children on a series of relationship and emotional dimensions using videotaped interactions with caregivers. We compared the intervention group of children with a group of children who had no history of language or emotional challenges and who were functioning both emotionally and intellectually at or above age level. In addition, we compared both the intervention group and the normal comparison group with a group of children who continued to have chronic problems in relating and communicating.

In order to make these comparisons, we used the Functional Emotional Assessment Scale (FEAS) (Greenspan, 1992a; Greenspan and DeGangi, 1997). The FEAS is a clinical rating scale that can be applied to videotaped interactions between infants or children and caregivers. The child is rated on the following dimensions: attention and regulation, engagement, affective reciprocity, complex purposeful interaction chains of behavior, functional, creative and imaginative use of ideas, emotional and thematic range, and logical thinking and problem solving. Raters have been trained to high levels of reliability for each dimension of the scale. The caretaker reliability ranges from .89 to .91 and the child reliability from .90 to .97 (Greenspan & DeGangi, 1997).

There were 20 children in the intervention group, 14 children in the normal comparison group, and 12 in the continuing difficulties group within the same age range. Each child in each of the groups was videotaped interacting with a caregiver for 15 or more minutes. A reliable judge blind to the identity of the children used FEAS to score all the videotapes.

The results were as follows. The floor-time intervention group was indistinguishable from the normal control group. Both groups were significantly different from the group with continuing difficulties. Specifically, in the floor-time intervention group, 13 of the 20 children scored 76, the top of the scale. The seven who did not score 76 were all between 70 and 75 (i.e., 73, 73, 74, 75, 70, 71, 72). The mean for the group was 74.8. In the normal comparison group, 12 of the 14 scored 76 at the top of the scale. The two others were 73 and 65. The mean for the group was 74.9. in contrast, of the 13 children in the group with continuing difficulties, seven scored below 20 and six scored below 40, with a mean of 23.7.

In addition, the judge attempted to use subtle observations of the children's affect, voice quality, pattern of articulation, and motor functioning to make an additional clinical judgment and figure out which group the children came from. The judge classified six of the floor-time intervention group as normal comparison group members, while classifying all the continuing difficulty group correctly.

FEAS Outcomes

	N	*MEAN FEAS* 76 is optimal %	Range
Floor Time Intervention Group	20	74.8	70-76
Normal Comparison Group	14	74.9	65-76
Continuing Significant Difficulties	12	23.7	<20-40

The findings on the FEAS are consistent with the findings on the Vineland ratings. The FEAS clinical ratings are especially important, however, because they reliably rate such subtle features of personality functioning as quality of intimacy, affect expressiveness and reciprocity, creativity and imagination, and abstract, flexible thinking, as well as problem-solving and reality testing. All these high level personality functions are expected to be relatively permanently impaired even in children with pervasive developmental disorders who make considerable progress in their language and cognitive abilities. A subgroup of children who did exceedingly well in the floor-time intervention program were, therefore, able to obtain interpersonal, communicative, coping and logical capacities quite similar to peers.

We chose to compare the children who had done very well as a subsample with a normal comparison group to also see if objective measures would validate the capacities these children appear to have mastered. If the children who had done extremely well were comparable to peers without developmental disorders, it would suggest, at a minimum, that some of the children who had an autistic spectrum diagnosis (suggesting chronic, severe impairment) could grow into patterns of health emotional, social, and adaptive behavior and that the adaptive behavior could be sustained.

Sequence of Improvement

Children who made progress tended to improve in a certain sequence. First to improve was the child's affect and pleasure in relating. Within the first 3 to 4 months we would usually see greater joy and positive affect, along with more consistent relatedness (e.g., seeking out parents and caregivers). Even children who had been extremely avoidant and self-absorbed would, after parents were playfully obstructive for periods of time, begin going over to their parents and signaling them with a look, smile, or pat on the knee. Some parents worried about being too playfully obstructive. "Won't he get mad at me if I get stuck behind the door?" Ironically, most parents were pleasantly surprised when their child after a while would push them to get stuck behind the door so they could play the game again. By creating a problem for their child to solve through playful obstruction, their child could "undo" their parents' action. By providing a destination for their child's actions, their child could learn what to do next. This was very important for children who could not initiate and sequence purposeful behavior and interactions because of motor planning difficulties.

It appeared that the children appeared eager for emotional contact, but that initially they couldn't figure out how to achieve their goal. They seemed grateful when their parents had helped them find ways around their processing difficulties and avoidant tendencies to engage in greater social interaction.

Eighty-three percent of the children, which included children who progressed very slowly, initially showed improvement in the range and depth of their engagement and their

pleasure and affect. Once engaged, the same 83% made their second gains in greater affective reciprocity. They moved from simple to complex emotional and motor gestures.

Long sequences of reciprocal affective interaction, where children would, for example, open and close 20 or 30 circles of communication in a row, led to the third area of gain—the emergence of functional symbolic capacities. Creative and imaginative symbolic elaboration and the functional use of language always followed presymbolic affect cueing and communication. Many children went through a transitional stage where they used words off of video or book scripts and then became more and more creative with their behaviors and gestures. If we overfocused on the words rather than the gestures and affects, we slowed down progress. Interestingly, children who remained rigid and stereotyped in their gestural interactions were often rigid and stereotyped as they learned words; for example, using scripts and ritualized language. Once a child became more flexible and creative in nonverbal gestural interactions (e.g., with a big smile, trick Dad by hiding the cookie in her hand), she would begin to use symbols more spontaneously and creatively.

As children became more symbolic many went through a stage of hyperideation. They could not stop talking, flitting from one idea to another. It was as though they were excited with their newfound gifts. There was a mixture of fragmented and illogical ideas, islands of pretend, some scripting (e.g., repeating of words heard on TV), as well as words to get need met. Over time, however, 58% of the children were able to use their emerging symbolic skills both creatively and logically.

Most of the children could express their own ideas much more quickly than they could comprehend the ideas of others. Even children who initially had some understanding of others' language (for example, of simple commands) were still relatively more challenged by their auditory processing of incoming information than by their ability to express ideas. They knew what they wanted to say but inconsistently understood others. Even children who only very slowly were able to use words to express needs and wishes, and had, therefore, better receptive than expressive language, still evidenced greater challenges in understanding others and explaining their intentions. Even when they could tell you what they wanted (e.g., "go out play" and "give me juice") or do pretend play sequences with the dolls hugging and kissing, they would find it difficult to answer the abstract "what," "where," and "why" questions ("What do you want to do next?" or "Where do you want to go?" or "Why do you want to go outside?").

Eventually, with a great deal of interaction and affect-driven dialogues, the ability to abstract and comprehend the ideas of others emerged. Children did not get to this level unless their parents and the therapists focused on rapid, two-way symbolic communication. For example, it wasn't sufficient to listen to a verbal child and repeat what he said. Caregivers had to challenge their child to process incoming ideas (e.g., using affective tone, visual clues, multiple choices, and statements that inspired complex verbal responses to help children deal with more abstract dialogues). It required long back and forth exchanges rather than short, 30-second conversations (e.g., "Oh, you want to go outside? To do what? To play or kick the ball? Which one would be more fun? etc.). Pretend play where the caregiver became a character who enjoyed verbal interchange was very helpful as well (e.g., "I'm hungry! I need something!").

The 58% of children with good to outstanding outcomes who became creative and logical were able to hold spontaneous, affect driven, two-way, symbolic communication. As a consequence, they were able to learn to differentiate their internal worlds (Greenspan, 1989, 1992a). Logical thinking, impulse control, and an organized sense of self emerged. For many there were two steps in this process. First, they learned to hold short creative dialogues that

lacked a cohesive integrated capacity for thinking or an organized sense of self (e.g., islands of logical dialogue). Over time they learned to integrate and expand. The islands became continents and a cohesive, integrated sense of self and capacity for logic emerged. As a consequence, their academic abilities also improved as they became more flexible, were able to learn how to use functional logical exchanges, two-way thinking, to solve problems, and work together with others. Their peer relationships also improved but it required a great deal of practice—four to five play dates a week and access to very communicative peers in preschool and school programs. With dynamic, interactive academic learning in a warm, secure, organized setting, many of the creative and logical children developed average to superior academic abilities. In overly structure academic settings for most of their day, however, their academic progress was slower and they tended to remain more rigid, concrete, and rote.

For some children, the augmentative use of pictures, signs, and other symbolic equivalents were very helpful. For a small group of children who were unable to make the transition in the symbolic realm, we added more structure behavioral-oriented techniques as part of a broad, comprehensive program to improve capacities, to imitate gestures and then words. When combined with the dynamic, interactive floor time approaches, these behavioral strategies were more effective than when used alone (Greenspan & Wieder, in press).

Of the 17% of children who continued to have presymbolic difficulties (as well as symbolic), some made gradual, very slow progress, and 4% either showed decreasing abilities or vacillations between some improvement of function and loss of function.

Underlying Mechanisms Associated with Autistic Spectrum Patterns

While a variety of mechanisms have been suggested, there is no consensus about underlying psychological and biological patterns associated with autistic spectrum dysfunction. To further understand underlying "processing" difficulties, we looked at the processing challenges of the children who did very well and the children who continued to have significant difficulties.

All the children diagnosed with autistic spectrum problems evidenced auditory processing, motor planning, and sensory modulation difficulties. Many of the children also had visual/spatial processing challenges, but some of the children showed relative strength in this area. These and other underlying psychological and cognitive mechanisms have been postulated to underlie autistic symptoms (Baron-Cohen, 1994; Cook, George, Gurman, & Weigel, 1993; Durand, 1990; Frith, 1993; Guess & Carr, 1991; Koegel, Dyer, & Bell, 1987; Kohen-Raz, Volkmar, & Cohen, 1992; Prizant, 1983; Prizant & Wetherby, 1990; Rutter, 1983).

We explored the differences between the good to outstanding group and the group that continued to have severe difficulties in the areas of muscle tone, motor planning, and reactivity to sensation.

There were more children with low muscle tone and motor planning difficulties in the group with poor outcomes and more severe difficulties. Also this group generally had a greater degree of underreactivity to sensation, including both greater craving and greater self-absorption. They also were less hyperreactive to sensation and generally showed less mixed reactivity to sensation as well.

TABLE 2
Muscle Tone, Motor Planning, and Sensory Reactivity

	Outcome Group Good to Outstanding %	Outcome Group Poor %
Low Muscle Tone	12.5	23.5
Significant Motor Planning Problems	18	78
Underreactive to Sensation	30	48
With patterns of:		
Craving/Stimulus Seeking	7	15
Self-Absorption	23	33
Hyperreactive to Sensation	25	15
Mixed Patterns of Reactivity to Sensation (hyper in some areas like sound and hypo in other areas like pain or touch)	45	37

The outcome group that did very well tended to have more overreactivity and mixed reactivity and less severe motor planning and less low muscle tone. However, as pointed out earlier, there was still significant individual variation. Some children with low tone and severe motor planning problems made outstanding progress and some who were oversensitive, with less severe motor planning problems continued to have great difficulties.

These patterns suggest that there are different degrees and types of processing difficulties contributing to autistic spectrum disorders. The nature of these difficulties may have some role in the presentation and the severity of symptoms as well as in the outcomes. Motor planning and sensory modulation appear especially significant contributions to the disorder in addition to the auditory processing and language problems present in the entire group of children.

Limitations in the Assessment Procedures Used to Diagnose Autistic Spectrum Disorders

In reviewing parents' experiences with evaluation in a variety of different locations in the United States and Canada we observed two significant problems in the service system. Often, the evaluation did not include observation of infants or children and parents interacting. In addition, there were often delays of over 3 months from the onset of symptoms to the evaluation and another 3 months before interventions were initiated.

Since many of the children were seen in other settings for evaluations before coming to see us, we asked how these were done. There was an enormous range in the way evaluations were implemented to diagnose autistic spectrum type disorders. In some settings, for example, children were separated from parents and given a battery of tests. In other settings, parents and children came in together, but the children were only observed with caregivers while the parents were given the clinician a history. The child might then be tested with the parent present or not present. Standardized tests were often scored even though processing difficulties impeded the child's ability to take the test. Often, the child's relationship with the parents and interactions with the parents were only observed incidentally while interviewing the parent or while the parent was letting the child sit on their lap during the testing procedures. Only very rarely were children directly observed interacting with parents for any period of time. Only 2.3% of the

evaluations involved observation of caregiver (parent)/child interaction for 15 minutes or more during a free play session.

Many parents, when asked, were quite concerned that their child's relationship capacity was being diagnosed without being observed. Many lamented that they felt their children related to them more warmly at home or in an informal play situation than in a high stress situation of being tested or while being distracted during an interview in a new setting. Because their ability to interact with their children was not observed, many felt distrustful of the eventual diagnosis. In some of the evaluations, the examiner attempted to spontaneously interact with the child, often around structured developmental tasks and sometimes in play-type activities.

The evaluation settings varied. They included private practice, clinics or centers, and hospitals. They also included different professional disciplines, developmental pediatrics, child psychiatry, clinical and developmental psychology, pediatric neurology, and special education, speech pathology, and physical and occupational therapy. In general, speech pathologists and occupational therapists, as well as early childhood and special educators, tended to base more of their opinions on extended interaction with the child himself. Here too, however, there was a tendency not to observe the parent interacting with the child.

The ability to distinguish pervasive developmental disorder, autistic spectrum disorder, or autism from a circumscribed language or motor disorder will often depend on the clinician's assessment of the degree of warmth, pleasure, and spontaneous affect the child shows in relationship to a trusted caregiver rather than such symptoms as perseveration and self stimulation that are also seen in other conditions. Children with uneven development and sensory modulation difficulties are often easily overloaded or underreactive and self-absorbed and may evidence varying degrees of perseveration and /or self stimulation. We have also found that children's capacities to relate with emotional warmth and range, and the degree of their perseverative and avoidant behavior, often depend on how comfortable and secure they feel and, conversely, their degree of stress. New situations, new people, and demanding tasks are often stressful. Children, therefore, require in-depth observation of interactions with a trusted and known caregiver with whom they can share their best gestural and communication, complex interactive capacities. Without such observation, a proper diagnosis cannot be made and treatment may be compromised because the child's strengths and vulnerabilities are not known. The fact that this was missing from over 97% of the cases presents and important challenge to the field.

Delays in Implementing Evaluation and Treatment

We also looked at how long families waited from the first concern to a formal evaluation. Ninety-six percent of the families waited more than 3 months from the first expressed concern, usually to a family health care provider. In many instances they were told to wait and see—it might simply be delayed language, especially if it's a "boy."

Ninety-seven percent also waited over 3 months for an intervention program to begin. This often involved typical administrative and bureaucratic time for doing additional evaluations and scheduling a program.

In general, therefore, there were unnecessary delays in helping families obtain an evaluation, if indicated, and begin an intervention program.

Service System Limitations %

No observation of caregiver/child interaction	97.7
More than 3 months from onset of symptoms to evaluation	96.0
More than 3 months from evaluation to intervention	97.0

Discussion

There are limitations to a chart review approach for identifying developmental patterns and outcomes in children with severe relationship and communication problems. A chart review can identify patterns, generate testable hypotheses, and offer suggestions for further study. A prospective clinical trial is necessary for the definitive study of outcomes. In addition, as will be discussed later, most intervention studies to date have not been with representative samples of children with autistic spectrum diagnoses. This chart review, as indicated, was also of a selective sample of children with autistic spectrum disorders. Therefore, the reported percentages cannot be applied to other populations. While this study suggests that many children can make enormous progress, and describes developmental patterns and an intervention program that may contribute to a child's progress, additional research will be necessary to further study these observed patterns. It is important to emphasize, however, that this chart review does suggest that some children with autistic spectrum diagnoses can not only make significant progress, but can progress in areas of development such as empathy, creative and spontaneous thinking, intimacy, and emotional reciprocity that are often thought to be out of reach of children with this diagnosis.

It should also be noted that the information in the charts was based on an experienced clinician's notes and observations, rather than the judgments of a group of clinicians who had achieved reliability in performing clinical ratings. Many of the observations in the charts, however, require a low level of inference; for example, the age at which the child developed symptoms. In addition, the reported clinical phenomena involved behaviors such as self-absorption or perseveration which are readily observed. A chart review of a large number of cases can provide important direction for future studies when looking at complex questions in an under-studied problem.

One of the more important implications of looking at developmental patterns and outcome is to more clearly elucidate the developmental patterns of those children who are likely to make different kinds of progress. We observed that the children most capable of learning to relate and interact symbolically in a spontaneous and creative manner tended to have a specific early profile. They had at least some ability for complex gestural interaction with warm and pleasurable affect. They often had some emerging ability for using islands of symbolic functioning (pretend play or functional use of language). As indicated earlier, many of these children were also very perseverative, echolalic, and self-stimulatory. The degree of these typical autistic behaviors was less critical for their later progress than the presence or absence of some gestural and emerging complex imitative and symbolic capacities.

An exception to this pattern, however, were children with low muscle tone and sensory underreactivity who were quite self-absorbed. Some of these children evidenced little gestural or symbolic capacity and yet, once the intervention program started, begin showing rapid gains in these areas. Therefore, it appears that it is important to study both the child's pre-existing developmental pattern and the child's early response to the intervention program.

A number of intensive intervention programs are reported similar patterns of "good" outcomes (Bondy & Peterson, 1990; Lovaas, 1987; Miller & Miller, 1992; Rogers et al., 1988;

Rogers & Lewis, 1989; Strain et al., 1983; Strain & Hoyson, 1988). Lovaas, for example, reported 47% of good outcomes in an intensive behavioral program. Strain and Rogers in quite different programs reported similar trends. While the outcomes from these interventions are quite encouraging, it should be pointed out that none of the intervention studies, including this one, worked with truly representative populations. In this study, the population was limited to parents who were motivated to seek additional help and, as indicated earlier, most of the families were quite well educated. The children did, however, present with a range of autistic spectrum symptomatology. In Lovaas' well-known and well-documented study, his exclusion criteria left him with children who evidenced functional capacities in the 11 to 18 month-old range (many children with autistic spectrum diagnoses present with functional abilities in the 6 to 8 month range). Lovaas' population was also characterized by relatively motivated and organized parents. Even though the intensive interventions that have been associated with very promising outcomes have not been with truly representative samples, the reported findings of enormous progress in children who met the criteria for pervasive developmental disorder (autism) is extremely encouraging. While reported percentages must be interpreted in the context of the population worked with, they nevertheless suggest that a significant number of children can do quite well with very intensive intervention programs.

Also of interest is that in both our program and Lovaas' program, children who did best tended to learn complex imitations rather quickly. Children who quickly learn complex imitation are often strong in motor planning and visual/spatial capacities, capable of making quick progress into symbolic realms.

It is especially important, however, to determine which interventions are likely to be most helpful for which types of children and problems. A model characterizing the underlying difficulties in autistic spectrum dysfunctions may further this determination.

Many investigators believe that IQ (e.g., below 50) and lack of language discriminates the children what are unlikely to respond significantly to intervention from those who are likely to make significant gains (Rutter, 1996). Often, however, before children are helped to engage and interact purposefully (i.e., open and close many problem-solving circles of communication in a row), it is difficult to determine their IQ levels, including their nonverbal IQ. It is also difficult for such children to develop language abilities without first having a strong foundation in preverbal communication. A number of children in our chart review started out either unable to be tested or with exceedingly low IQ scores. These children also had little or no verbal language. We found that the best indicator of their likely response to intervention was a trial of the intervention program rather than only one cross-sectional testing or observation. As indicated earlier, motor planning was probably the most important single factor that influenced the rate of early progress.

As discussed above, a number of intensive intervention programs appear helpful. It is important, however, to determine which interventions are likely to be most helpful for which types of children and problems. A model characterizing the underlying difficulties in autistic spectrum dysfunctions may further this determination.

Model for Underlying Dysfunctions

A number of the observations described earlier suggest a model to understand the underlying dysfunction in children with severe disorders of relating and communicating. The majority of

children showed a pattern of regression, after having had a period of relatively better relating earlier in their lives. In addition, the majority of children did not evidence complex behavioral or gestural patterns prior to age 2. As indicated earlier, in the majority of cases, progress was first indicated by improvements in the children's ability to engage and use affect as part of relationships, and then in their use of affects for reciprocal interactions. Furthermore, progress was greater when emerging language and cognitive abilities were directed by internal affect cues rather than external prompts or scripts—the child saying, "I'm hungry," "I want to eat," or "Leave me alone," as opposed to repeating something from a TV show or reciting scripts from a book that are unrelated to the needs and affects of the moment.

Taken together, these observations suggest that a core underlying difficulty may be an inability to connect affect or intent to the sequencing of behaviors or symbols. The children demonstrate an initial inability to go from simple patterns of engagement and gesturing (which many of the children with autistic spectrum diagnoses appear to have mastered) to complex, interactive, purposeful (i.e., involving intent or affect) chains of nonverbal communication. For example, initially most of the children were able to engage in simple give and take of a block, but were unable to take a parent by the hand, walk him to the refrigerator, and show him what they wanted. Taking a caregiver by the hand to the toy chest or refrigerator appears to involve connect affect or intent to a sequence of complex motor patterns. Later on, the same intent or affect has to be connected to symbols and the sequencing of symbols to give meaning and purpose to symbols. Connecting affect to symbols enables language to become meaningful, organized, and logical.

The affect signaling system (i.e., the intent or desire), in part, tells the motor system what it needs to do. It's hard for a child to get beyond simple motor patterns if the child doesn't have a sense of direction or purpose mediated by affect or intent. If, in the second year of life, the ability to connect affect and intent to complex motor patterns is not forming or is disrupted, the capacity for complex social and motor patterns may be undermined. Simple patterns played out repetitively might well occur in place of the complex goal directed patterns. As we created high states of motivation to help children learn to affectively cue and connect with others, we saw their motor planning improve. Under states of high motivation, a child who was capable of only repetition could embark on a two-step sequence. For example, a child obviously wanted to go out the door and was vacillating between touching it repetitively and aimless spinning around near it. When the caregiver appeared dumb and pointed to the handle of the door motioning to open and close it or pointed to the window as an alternate exit (thereby providing a destination for their intent), the child was able to quickly begin gesturing toward the doorknob, as if to say, "Hey, dummy, open the door." When his affect was intense enough, he would go from a repetitive touching pattern to a more purposeful, two-step-touch and gesture to the doorknob. If the affect got too intense, a tantrum might ensue.

In addition to the problem in connect affect to sequencing, the sequencing ability itself, along with auditory processing and sensory modulating difficulties, was dysfunctional in all the children with autistic spectrum diagnosis. Muscle tone and sequencing was more impaired in the severely affected group with very slow progress than the other groups. They couldn't create a sequence of motor or behavioral patterns and instead repeated patterns. Therefore, it was doubly hard for them to enter into complex social interactions (i.e., they didn't have the behavioral or motor sequencing ability to piece together four- or five-step social gestures—i.e., open and close many circles of communication in a row), and they could not connect intent or direction to their actions to provide purpose or a goal.

The apparent greater difficulty with motor planning in the autistic spectrum disorder and the difficulty this group has in improving in this and other capacities may, in part, be due to the proposed primary difficulty in connecting intent or affect to the capacity for sequencing. It is difficult to engage in or practice a sequence of behavior without intent or affect directing it.

While motor planning, auditory processing, and sensory modulation difficulties are also present in many children with a variety of learning, language, sensory integration, and cognitive disorders, it is being suggested that the inability to connect affect (intent) to sequencing capacities is unique to autistic spectrum disorders and, in part, explains why this disorder is characterized by more pervasive problems and greater treatment challenges.

This proposed mechanism, where affect connects motor to (gestural) sequences, also suggests an explanation for the way autistic patterns emerge during early development. Earlier we described the regressions that occur in many children around 18 to 30 months of age. Ordinarily at this age, the children develop symbolic capacities including complex imitations, pretend play, imagination, and more functional use of language. What would happen, however, if different facets of the central nervous system were developing, but the components of the nervous system that connect affect to complex motor sequencing were not forming? It might be a bit like a machine that's becoming more complex but trying to operate without a guidance system. Without affect or intent, motor capacities and islands of symbols may become idiosyncratic and repetitive, as opposed to sequential, purposeful, and goal-directed (e.g., like an athlete who loses his sense of purpose, but has muscles that keep exercising themselves). Relationships may also become more difficult as one cannot connect behavior or communication with underlying needs, desires, or affects. Ironically, as the nervous system becomes more complex, it is more and more difficult for it to operate without a guidance system that uses affect and desire.

Particular types of self-stimulatory patterns, such as looking out of the corner of one's eyes (i.e., using peripheral vision rather than central vision—"visual stimming") are also revealing. The anatomy of the visual system has images from peripheral visual fields (i.e., the far left or right) represented in one or the other hemisphere. Images directly in front of the eyes are represented in both hemispheres. Therefore, to look out of the periphery, one needs only intact functioning in one or the other hemisphere. In order to coordinate the images that emerge from focusing directly in front of oneself, one needs to have both hemispheres connected. Having both hemispheres connected may also be required to fully integrate affect with sequencing capacities (i.e., sequencing tends to be more of a left-sided function and affect more related to right-sided functions). If the difficulty with connecting affect to motor sequencing is related to limitations or deficits with interhemispheric connects, this same difficulty might also affect he ability to focus on visual images directly in front of the eyes.

During the first year of life, we have seen that many infants who later evidenced autistic patterns, could focus on objects, experience some affection and warmth, and even enter into simple reciprocal interactions. Perhaps they are able to perform these tasks because these basic patterns can be carried out by either side of the brain alone (Benson & Zaidel, 1985; Courchesne et al., 1994; Dawson, Warrenburg, & Fuller, 1982; Greenspan, 1996b; Sperry, 1985; Wetherby, Koegel, & Mendel, 1981). But to engage in complex, goal-directed, reciprocal patterns in the second year, affects or intents need a direct connection to motor and behavioral sequencing and emerging verbal and spatial symbols.

Perhaps deficits in the parts of the central nervous system that permit affect and intent to connect to sequencing capacities explains why, in many children with autistic pattern,

component parts of the nervous system that increase motor, sensory, visual-spatial, and language capacities often keep growing without the synthesizing direction of affects or intent. While children vary in their capacities in each component part (i.e., some children remember in a rote fashion what they hear or see; some are quick to do puzzles, while others clearly have severe limitations in different components), they appear to have a common difficulty connecting intent or affect to these component parts. Many of these children's symptoms, remarkable abilities, and unusual behaviors may, in part, be explained, as these component parts, at various levels of capacity, function without the direction of affects or intent. Interestingly, this model may also explain why some children make rapid progress and even evidence precocious capacities once their affect connects to other capacities. Perhaps their component parts are developing quite well but lack the direction and coordination of affect or intent. Other children may have greater deficits in their component parts. For them, connecting affect to the component parts is only a first step that begins a slower pattern of progress. In all likelihood, the central nervous system pathways that connect affect or intent to sequencing capacities—involving motor behavior, verbal symbols, and visual/spatial capacities—involve many different tracks in different parts of the central nervous system. This would be consistent, in part, with the different areas that have been implicated in autistic patterns (e.g., sequencing and/or planning areas, motor coordination areas, sensory areas).

This suggested mechanism should be contrasted with hypotheses that propose a primary deficit in autism is the child's inability to understand or imagine another person's state of mind (i.e., empathize with the feelings of others) (Frith, 1993; Baron-Cohen, Frith, & Leslie, 1988; Baron-Cohen, Tager-Flusberg, & Cohen, 1993). The lack of ability for empathy may very well be a product of a more primary difficulty in connecting affect to complex behavior and motor patterns and symbols. In our population, the children who made very good progress developed the ability to empathize with and understand the feelings and perspectives of others. They learned to empathize gradually as they become more affectively involved in other people's lives. The children who were unable to become affectively involved with others and develop complex, affectively based communication patters and who instead relied on scripts or prompts, did not develop the ability to appreciate the emotions of others.

These observations suggest direction for further study of the biological mechanisms associated with this syndrome. Can the difficulties with connecting affect to sequencing capacities be accounted for by certain critical, central nervous system pathways? The role of right hemisphere dominance has been suggested. What biological systems and pathways are forming in the second year of life that are concerned with connecting intent or affect to sequencing capacities as well as the modulation of sensory experience?

Implications for Intervention

There may be a group of children who are capable of doing well with a variety of intensive programs, but who may do relatively better with programs that from the outset foster engagement, affective interchanges, and spontaneous ways of relating, as well as creative and abstract thinking. A core difficulty of children with autistic spectrum problems is their inability to make generalizations and construct patterns of abstract thinking. Therefore, it may be critical to involve children in dynamic, emotionally based, problem-solving interactions that are likely to foster abstract thinking and the *very ability to generalize itself*.

Some children who had been in intense behavioral programs, we found, could sometimes master rote academic skills and even do well on IQ tests. However, they lacked the ability for spontaneous, creative affective interchanges with adults or peers and could not generalize or engage in abstract thinking (e.g., they might match words to pictures, categories, or read, but be unable to fully explain in a non-rote manner why they wanted to go outside or debate the merits of staying up or going to sleep). When we began a dynamic, problem-solving approach that challenged the children to be more intentional and to reason and elaborate on thoughts and feelings, these children began acquiring abstract thinking skills.

Ironically, we also found that children who were making very slow progress and having a difficult time learning to imitate and symbolize (the ones who did less well in behavioral programs), were the one who we found often required a combined behavioral and dynamic floor time approach. The behavioral approach would help them to master motor and behavioral sequences (e.g., imitation) and the dynamic approach would help them make these sequences their own (as opposed to under the control of external prompts). For example, after learning to repeat the word *cup*, two dolls might use cups in a tea party and keep asking each other for "one more cup." The irony is that children who needed the behavioral approach were the same types of children who found it difficult to imitate purposeful actions and learn to imitate motor and vocal patterns. The children who tend ot do best in intensive behavioral programs are those who learn to imitate and become verbal quickly. These are the children who may progress most optimally in an affect, relationship-based, individual difference-oriented approach (floor time).

It is also important to emphasize, however, that many of the children with relatively more modest outcomes in this review nonetheless were able to make substantial gains. Some of these children, for example, improved their ability to attend and engage with warmth and pleasure. They, however, had a much longer road to travel. While modest from the point of view of the goal of creative, two-way verbal conversation, their gains were not modest from the point of view of degree of improvement. Only a small group of children showed fluctuations or no progress. Therefore, even children with very severe difficulties benefit from an intensive intervention program. It should also be pointed out that the type of intervention program requires time and effort but need not be enormously costly. Family members, helpers, and students can be important members of the inservice team.

Regardless of the merits of particular intervention philosophies and programs, the results of this chart review suggest that there are a number of underlying patterns associated with autistic spectrum problems. It is, therefore, important to tailor the intervention program to the child's unique profile, rather than have the child adapt to a particular program philosophy.

The patterns of improvement described in this chart review and in other intensive intervention programs are quite different from the traditional descriptions of autistic spectrum disorders. Autism has been viewed as a chronic disorder manifesting symptoms into adulthood (e.g., Gillberg & Steffenburg, 1987; Kanner, 1971; Szatmari et al., 1989). Some studies have suggested that selected areas of autistic behavior (Mesibov et al., 1989; Rumsey et al., 1985; Rutter et al., 1967), such as language and social behavior tend to show more improvement than ritualistic, repetitive behaviors. A recent study (Piven et al., 1996) documents changes from their profiles at age 5 among a group of adolescents and adults. They showed relatively greater improvements in social and language domains than in repetitive-ritualistic behavior. In these studies, however, the vast majority of individuals continued to have significant autistic impairments. Even a small number of individuals who no longer had severe enough symptoms to continue to qualify a diagnosis of autism retained many autistic traits. These studies suggest

that autism is a disorder with chronic features, where limited improvement is possible in certain areas (i.e., communication and social behavior) and less possible in others (i.e., ritualistic-repetitive behavior).

In contrast, the present study of 200 children diagnosed with autistic spectrum disorders suggests that many children are capable of significant overall improvement. In fact, the children in the good to outstanding group ceased evidencing ritualistic behavior and became spontaneous and creative in their communication and relationship patterns. Motor planning, i.e., the ability to sequence behavior, did, however, improve more slowly than language and relationship capacities. It is possible that ritualistic behavior is related to motor planning and sequencing deficits and is intensified when children are under stress because they are unable to use reciprocal affective interactions to regulate and master social relationships as well as physiologic and affective states. The ritualistic behavior itself may be an attempt at regulation.

Diagnostic Categories

The different patterns observed in children with autistic spectrum diagnoses also have implications for the categorization of severe problems in relating and communicating.

There are many conditions which involve motor difficulties, such as hand flapping, as well as self-stimulation and perseverative behavior. These conditions include hypotonia, motor planning dysfunctions (i.e., apraxia), sensory modulation difficulties, including sensory integration problems and various cognitive deficits, and language disturbances. What distinguishes autistic spectrum disturbances from many other conditions is the relationship and affective reciprocity disturbances originally described by Kanner (1943). How is it best to classify children who evidence some degree of relating or intimacy, or who have good potential for warmth and closeness with others, who nonetheless evidence perseverative behavior, social awkwardness, communication disturbances, and social immaturity? Should the category of autistic spectrum disorders with the prognosis of chronic limitation in relating to others continue to expand (under the classification of pervasive developmental disorder) and include children who are capable of relationships, intimacy, and creative thinking?

We have suggested elsewhere that in addition to autistic spectrum disorders proper, there should be another grouping, Multisystem Developmental Disorder (MSDD; DC: 0-3, 1994). The dividing line would be the child's potential for experiencing pleasure and affect in relationships. Autistic disorders would stay close to the original definitions offered by Kanner and elaborated on in the Diagnostic and Statistical Manuals of the American Psychiatric Association. Multisystem developmental disorder would include children with a variety of processing and communication problems who, however, evidence some relationship capacity and the potential for increasing their intimacy and engaging in affective reciprocity and communication. It may be prudent to observe a child's response to an individual comprehensive intervention program over a period of time before considering a diagnosis of autism and determining the most appropriate diagnosis.

If, as is currently the trend, the definition of autism or Pervasive Developmental Disorder is allowed to continue to broaden to include children who are capable of different degrees of warm, joyful relationships, it may lose its original defining characteristics. The value of research and prognostic studies done under the original definition would become dubious. Also, parents are likely to become further confused. The terms PDD or autistic spectrum are associated with chronic limitations in relating to others and suggests a pessimistic prognosis for the vast majority

of children. As this chart review suggests, many children with varying degrees of relationship capacity or potential, who, nonetheless, meet the current DSM-IV criteria for pervasive developmental disorder and autism (i.e., the autistic spectrum) may have a different prognosis from the group Kanner described and DSM-IV further systematizes. Perhaps, therefore, it may prove helpful to use the designation of Multisystem Developmental Disorder for children who have the potential for healthy affective and interactive development. The other alternative is to retain the current concept of an autistic spectrum which includes children with varying degrees of intimacy and dramatically change the definition of autistic spectrum disorder, the criteria used to diagnose it, and the prognostic expectations associated with certain forms of it.

Another problem with the current categorization is its implication that autism is a distinct disorder that is either present or not. Many parents reported that clinicians often told them to wait and see if the child had autism as though initiating interventions early was not important because if the disease process were present expectations for progress would be quite limited.

In children who were not diagnosed in the autistic spectrum with language, motor, and sensory problems, we noted that there were often varying degrees of dysfunction in relating and communicating. In the CARS ratings of children we evaluated, we observed a continuum ranging from no dysfunction to severely autistic. For example, many were almost, but not quite, severe enough to qualify as autistic, while others just qualified for "autism." The improved children also showed varying degrees of health or dysfunction on the CARS. More refined diagnostic criteria or modified categorizations are, therefore, needed. Furthermore, this chart review suggests that any "autistic" symptoms are a reaction to underlying processing deficits that may or may not result in autism and that these reactions can vary in pervasiveness and intensity, and that recovery or the development of relating and communication for many children is better than formerly expected.

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Note: For a more extensive literature review and discussion of the different studies relating to autistic spectrum disorders, see Tsakiris, E., Treatment effectiveness for preschool autism: A look at affective variables. Dissertation in progress.

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